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The Men Who Really Count

MY idea in editing "Wireless Magazine" has always been that the finest of the available writers should give of their best in my pages. One by one I have added to my list of contributors the men who really count in radio journalism—Reyner, James, P. K. Turner, Percy Harris, Dr. Chapman, Relph, Hunter and Ullyett; these constitute an unmatched group of gifted writers on popular radio such as no other monthly periodical can claim and I am now happy in being able to add a name of great repute in the gramophone world.

As I say in the introduction to his first article, "The Needle and the Record," on page 66 of this issue, Mr. Wilson is an expert in every branch of gramo-radio, but he possesses the happy knack of being able to write very simply from the amateur and experimental point of view. He will contribute to my pages frequently, starting with the present issue, nearly always on some phase of sound reproduction, and I believe that readers in general will enjoy his articles and find them remarkably informing. Our very hearty welcome to P. Wilson!

There is much talk of television at the moment, particularly in relation to the development of short-wave transmission, which is expected to provide a new hope for television. H. J. Barton Chapple is actively engaged in research and practical work in the Baird laboratories and writes in this issue with real understanding of the merits of short-wave television.

The Baird interests have just introduced a new type of Televisor, soon to be placed on the market, and in another article in this issue we tell of the results obtained.

Percy Harris contributes a characteristic article explaining the iron-cored low-frequency transformer and also gives us this month a new three-valve A.C. table radiogram for use with an existing loud-speaker. He uses the special coils designed by Paul D. Tyers and employed in the very successful Multi-mag Three, described a couple of months ago. The Harris Radiogram gives plenty of volume, both from foreign stations and from records.

Our short-wave set—the Gold Coaster—has a history. It was designed by our Technical Staff some time ago especially for use in West Africa. Hence its name.

A correspondent living at Accra, Gold Coast Colony, tells us that the set is the best four-valver he has heard out there. He gets Chelmsford and a number of European stations at full loud-speaker strength and, in addition, Chicago, Philadelphia and Schnectady. You will read his letter for yourself on page 53.

In all probability the Gold Coaster is the first short-wave set described in print after having had the great advantage of extensive tests in a tropical climate. To overseas readers who have available an A.C. supply the set can be fully recommended.

One of our sets this month harks back in two respects to the practice of a few years ago. It is the Triple-tune Four, which has been built in response to readers' requests and with the knowledge that there is available on the market a supply of high-quality plug-in coils at low price.

The set has two screen-grid stages with separate tuning condensers, and offers an opportunity for the economical construction of a first-rate receiver.

The autumn radio season will start one month earlier than usual owing to the Radio Manufacturers' Exhibition at Olympia opening on August 19 instead of about the third week in September, as has been usual for many years.

Our September issue, which will be published on the day the exhibition opens, will be specially enlarged and will be in every respect remarkable value for money. Will you make a note that we are at Stand 7 at Olympia, and will be glad to welcome you there?

B. E. J.

FOR THE CONSTRUCTOR

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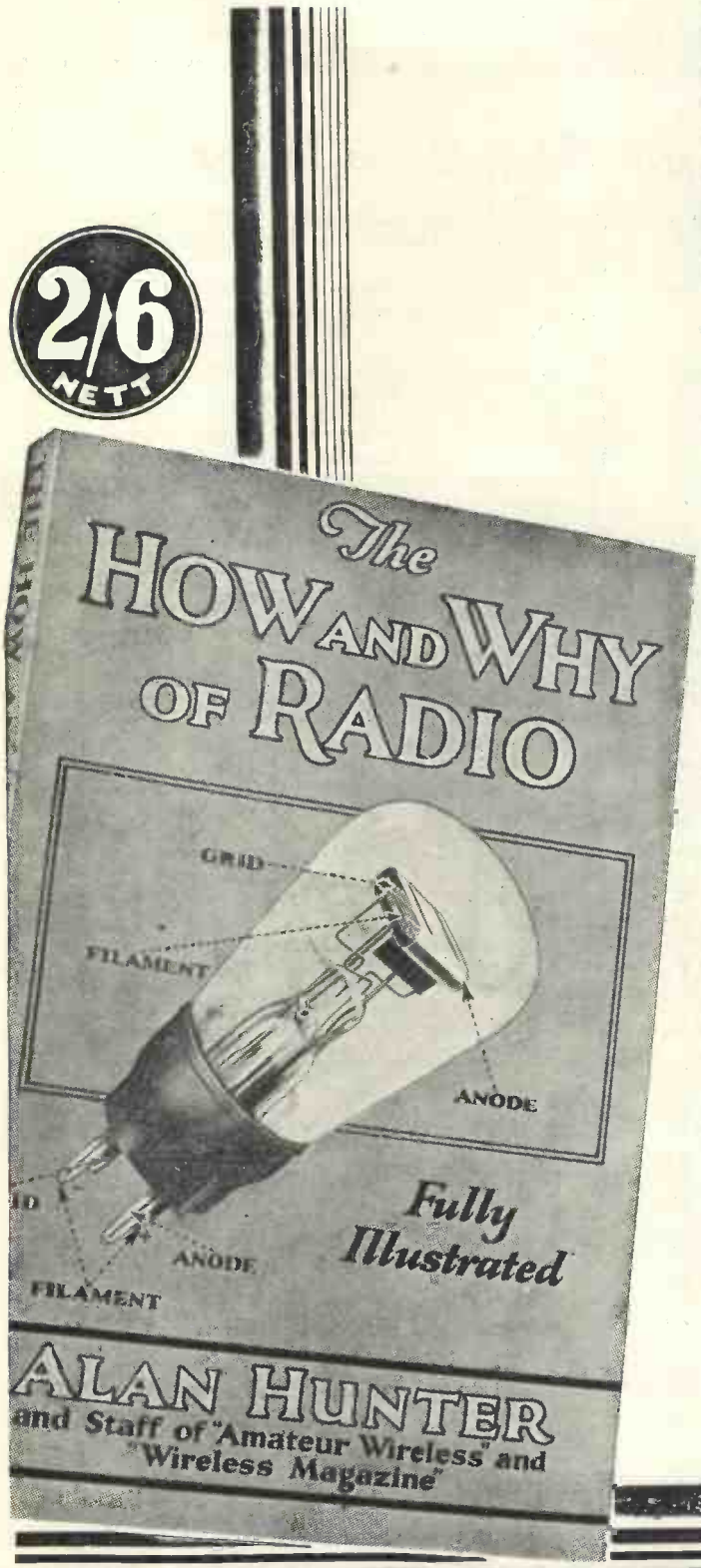

"The How and Why of Radio" by Alan Hunter, has been expressly written for beginners.

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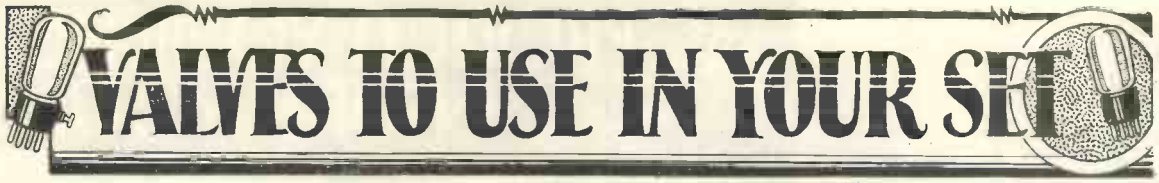
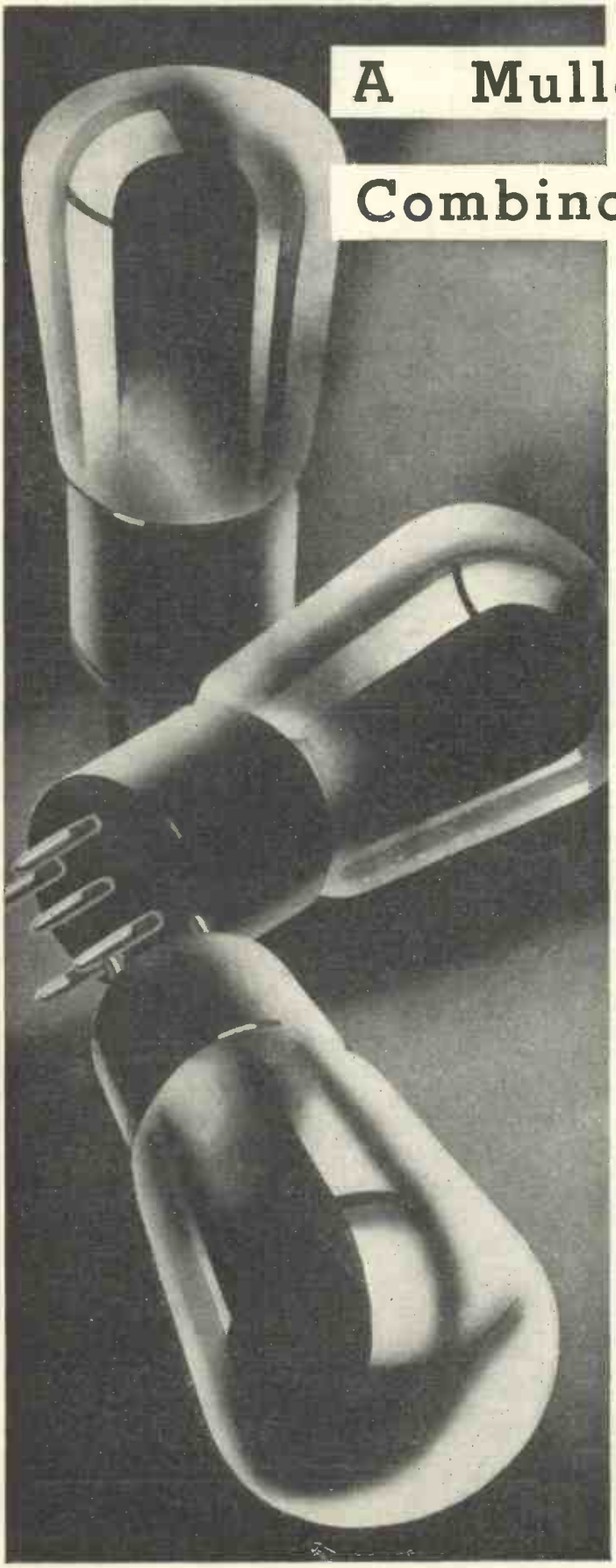


Characteristics of All the Most Important British Types

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	50,000	35	.1	.7	1.1	1.1	1.5
Lissen ..	H2	50,000	45	.1	.9	2.0	1.0	1.5
Cossor ..	210RC	50,000	40	.1	.8	.5	.9	1.5
Osram ..	H210	50,000	35	.1	0.7	1.0	—	—
Six-Sixty	210RC	45,400	50	.1	1.1	1.0	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	1.0	—	1.5
Osram ..	HL210	23,000	20	.1	.87	1.5	—	1.5
Marconi	HL210	23,000	20	.1	.87	1.5	—	1.5
Mullard..	PM1HF	22,500	18	.1	.8	1.0	1.5	3.0
Cossor ..	210HL	22,000	24	.1	1.1	1.75	1.5	3.0
Lissen ..	HL2	22,000	35	.1	1.6	3.0	1.0	1.5
Mazda ..	HL2	21,000	31	.1	1.5	—	—	—
Lissen ..	HL210	20,000	20	.1	1.0	2.2	1.5	4.5
Mullard..	PM1HL	20,000	28	.1	1.4	1.2	1.5	3.0
Mazda ..	HL210	18,500	26	.1	1.4	3.0	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	1.0	1.5	3.0
Cossor ..	210HF	15,800	24	.1	1.5	2.25	1.5	3.0
Cossor ..	210Det	13,000	15	.1	1.15	2.5	1.5	3.0
Six-Sixty	210LF	12,500	10.6	.1	.85	2.5	4.5	7.5
Mullard..	PM1LF	12,000	11	.1	.9	2.6	4.5	7.5
Osram ..	L210	12,000	11	.1	.92	2.0	3.0	6.0
Marconi	L210	12,000	11	.1	.92	2.0	3.0	6.0
Six-Sixty	210D	10,600	17	.1	1.6	2.0	3.0	7.5
Cossor ..	210LF	10,000	14	.1	1.4	3.0	3.0	4.5
Lissen ..	L210	10,000	12	.1	1.2	3.0	3.0	7.5
Lissen ..	L2	10,000	20	.1	2.0	3.0	1.5	3.0
Mullard..	PM2DX	10,000	17	.1	1.7	2.0	3.0	6.0
Mazda ..	L210	10,000	17	.1	1.7	5.0	2.5	4.5
Mazda ..	L2	10,000	19	.1	1.9	3.0	—	3.0
Osram ..	P215	5,000	7	.15	1.4	6.0	7.5	12.0
Six-Sixty	220P	4,800	7.2	.2	1.5	5.0	7.5	12.0
Mullard..	PM2	4,400	7.5	.2	1.7	5.0	7.5	12.0
Lissen ..	P220	4,000	7	.2	1.75	5.0	7.5	15.0
Cossor ..	220P	4,000	9	.2	2.25	6.0	4.5	9.0
Cossor ..	215P	4,000	9	.15	2.25	5.0	4.5	7.5
Cossor ..	220Pa	4,000	16	.2	4.0	5.5	3.0	4.5
Marconi	LP2	3,900	15	.2	3.85	6.0	3.0	4.5
Osram ..	LP2	3,900	15	.2	3.85	6.0	3.0	4.5
Mazda ..	P220	3,700	12.5	.2	3.4	11.0	3.0	6.0
Six-Sixty	220PA	3,700	13	.2	3.5	6.0	3.0	6.0
Mullard..	PM2A	3,600	12.5	.2	3.5	6.5	3.0	6.0
Lissen ..	LP2	3,500	12.0	.2	3.4	8.0	6.0	7.0
Marconi	P240	2,500	4	.4	1.6	12.0	15.0	24.0
Marconi	P2	2,150	7.5	.2	3.5	12.0	6.0	10.5
Osram ..	P2	2,150	7.5	.2	3.5	10.0	7.5	10.5
Six-Sixty	220SP	2,060	7	.2	3.4	13.5	7.5	15.0
Mullard..	PM202	2,000	7	.2	3.5	14.0	7.5	15.0
Mazda ..	P240	1,900	7	.4	3.7	18.0	6.0	13.5
Mullard..	PM252	1,900	7	.4	3.7	14.0	6.0	12.0
Six-Sixty	240SP	1,900	6.6	.4	3.5	14.0	6.0	13.5
Mazda ..	P220A	1,850	6.5	.2	3.5	13.0	9.0	15.0
Lissen ..	P220A	1,700	6	.2	3.5	12.0	9.0	15.0
Lissen ..	PX240	1,500	4.5	.4	3.0	14.0	12.5	22.5
Cossor ..	230XP	1,500	4.5	.3	3.0	15.0	10.5	18.0
Lissen ..	P240A	1,000	5.0	.4	5.0	20.0	15.0	20.0
2-volt Double-grid Valves								
Marconi	DG2	3,750	4.5	.2	1.2	—	—	—
Osram ..	DG2	3,750	4.5	.2	1.2	—	—	—
Cossor ..	210DG	3,400	2.7	.1	.8	—	—	—
Mullard..	PM1DG	—	—	.1	.8	—	—	—
Six-Sixty	210DG	—	—	.1	.8	—	—	—
2-volt Screen-grid Valves								
Lissen ..	SG215	900,000	1,000	.15	1.1	—	—	1.5
Mazda ..	215SG	400,000	450	.15	1.1	—	—	—
Cossor ..	215SG	300,000	330	.15	1.1	1.25	.9	.9
Cossor ..	220SG	200,000	320	.2	1.6	1.5	.9	.9
Osram ..	S22	200,000	350	.2	1.75	3.0	—	—
Marconi	S22	200,000	350	.2	1.75	2.5	.9	1.5
Marconi	S21	200,000	220	.1	1.1	3.0	.9	1.5
Osram ..	S21	200,000	220	.1	1.1	3.0	—	—
Six-Sixty	215SG	190,000	200	.15	1.05	2.0	—	—
Mullard..	PM12	180,000	200	.15	1.1	—	—	—
Mazda ..	S215A	—	800	.15	1.1	—	—	—

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 Variable-mu Screen-grid Valves								
Lissen ..	SG2V	750,000	—	.15	1.6	—	—	—
Cossor ..	220VSG	110,000	—	.2	1.6	—	—	—
2-volt Pentode Valves								
Lissen ..	PT225	71,000	100	.25	1.4	7.0	3.0	6.0
Six-Sixty	230PP	64,000	80	.3	1.25	10.0	6.0	12.0
Marconi	PT240	55,000	90	.4	1.65	9.0	6.0	9.0
Lissen ..	PT240	28,000	64	.4	2.3	12.5	7.5	10.5
Lissen ..	PT220A	22,500	45	.2	2.5	15.0	7.5	9.0
Cossor ..	230PT	—	—	.3	2.0	13.0	15.0	15.0
Cossor ..	230HPT	—	—	.3	1.8	6.5	7.5	7.5
Marconi	PT2	—	—	.2	2.5	5.0	3.0	4.5
Mazda ..	220Pen.	—	—	.2	2.5	—	—	—
Mazda ..	220A Pen.	—	—	—	2.5	—	—	—
Mazda ..	Pen.230	—	—	.3	1.5	—	—	—
Mullard..	PM22	—	—	.3	1.3	12.0	6.0	10.0
Osram ..	PT2	—	—	.2	2.5	5.0	3.0	4.5
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
Six-Sixty	4075RC	58,000	37	.075	.64	.55	1.0	1.5
Mullard..	PM3A	55,000	38	.075	.66	.3	1.5	1.5
Cossor ..	410RC	50,000	40	.1	.8	.6	.5	1.5
Lissen ..	H410	40,000	36	.1	.9	1.6	1.0	1.5
Lissen ..	HLD410	21,000	25	.1	1.2	2.5	1.5	3.0
Marconi	HL410	20,800	25	.1	1.2	1.25	1.5	3.0
Osram ..	HL410	20,800	25	.1	1.2	1.25	1.5	3.0
Cossor ..	410HF	20,000	22	.1	1.1	1.0	1.5	3.0
Mullard..	PM3	13,000	14	.075	1.05	2.0	3.0	6.0
Six-Sixty	4075HF	12,500	13.5	.075	1.1	3.0	3.0	4.5
Cossor ..	410LF	10,000	17	.1	1.7	2.5	1.5	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	3.0	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
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
Cossor ..	410P	4,000	8	.1	2.0	8.0	4.5	9.0
Mullard..	PM4	4,000	8	.1	2.0	7.5	5.0	8.0
Lissen ..	P410	4,000	8	.1	2.0	7.0	6.0	9.0
Marconi	P425	2,300	4.5	.25	1.95	14.0	9.0	16.5
Mullard..	PM254	2,150	6.5	.2	3.0	9.0	9.0	15.0
Six-Sixty	420SP	2,150	6.5	.2	3.0	10.0	8.0	15.0
Marconi	P415	2,080	5.0	.15	2.4	14.0	9.0	16.5
Osram ..	P415	2,080	5	.15	2.4	14.0	9.0	16.5
Cossor ..	425XP	2,000	7	.25	3.5	13.0	6.0	12.0
Mazda ..	P425	1,950	3.5	.25	1.8	26.0	14.0	26.0
Lissen ..	P425	1,500	4.5	.25	3.0	28.0	12.0	20.0
Cossor ..	415XP	1,500	4.5	.15	3.0	15.0	9.0	18.0
Cossor ..	4XP	1,200	4.8	.6	4.0	18.0	12.0	24.0 (at 200 v.)
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								
Lissen ..	SG410	635,000	700	.1	1.1	—	—	—
Mullard..	PM14	230,000	200	.075	.87	—	—	—
Six-Sixty	4075SG	220,000	190	.075	.87	3.0	—	—
Cossor ..	410SG	200,000	200	.1	1.0	—	1.5	1.5
Marconi	S410	200,000	180	.1	.9	3.5	1.5	1.5
Osram ..	S410	200,000	180	.1	.9	3.5	—	—
4-volt Pentode Valves								
Marconi	PT425	50,000	100	.25	2.0	8.0	4.7	7.5
Osram ..	PT425	50,000	100	.25	2.0	8.0	4.0	7.5
Marconi	PT4	50,000	110	1.0	2.2	—	—	—
Osram ..	PT4	50,000	110	1.0	2.2	—	—	—
Lissen ..	PT425	28,000	70	.25	2.5	15.0	6.0	9.0
Six-Sixty	415PP	27,000	60	.15	2.2	15.0	6.0	10.5

(Continued on page 6)



A Mullard All-Mains Combination.

When set designers need valves that are efficient, reliable and up-to-the-minute, they choose Mullard.

The new series of all-mains valves are designed to set a higher and better standard of radio reception. Perfect reliability and outstanding performance is the result of Mullard experience and Mullard workmanship while the new **Rigid Unit Construction** renders them free from microphony.

The valves specified for the Percy Harris Radiogram are:—

2 354V
1 104V

MADE IN ENGLAND

Mullard
THE · MASTER · VALVE

VALVES TO USE IN YOUR SET — Continued from page 4

4-volt Pentode Valves—Continued

Make	Type	Impedance	Amplification Factor	Filament Current	Mutual Conductance	Anode Current at 120 volts	Grid Bias at 100 volts	Grid Bias at 150 volts
Mullard..	PM24A	25,000	50	.275	2.0	15.0	6.0	21.0
Cossor ..	415PT	—	—	.15	2.0	13.0	15.0	15.0
Mazda ..	425Pen.	—	—	.25	2.0	14.0	14.0	—
Mullard..	PM24C	—	—	1.0	3.0	—	—	—
Mullard..	PM24	—	—	.15	1.75	16.0	6.0	12.0
Six-Sixty	SS/Pen.SP	—	—	.275	2.0	—	—	—

6-volt Three-electrode Valves

Mazda ..	H607	90,000	40	.07	.45	1.0	.8	1.5
Mazda ..	H610	66,000	40	.1	.6	1.0	—	—
Marconi	H610	60,000	40	.1	.66	.35	1.5	1.5
Osram ..	H610	60,000	40	.1	.66	.35	1.5	1.5
Six-Sixty	6075RC	58,000	42	.075	.7	.5	1.0	1.5
Cossor ..	610RC	50,000	40	.1	.8	.75	—	1.5
Mullard..	PM5B	49,000	40	.075	.85	.5	1.5	1.5
Lissen ..	H610	40,000	36	.1	.9	1.0	1.0	1.5
Marconi	HL610	30,000	30	.1	1.0	1.0	1.5	1.5
Osram ..	HL610	30,000	30	.1	1.0	1.0	1.5	1.5
Osram ..	LS5B	25,000	20	.8	.8	—	—	—
Lissen ..	HLD610	21,000	25	.1	1.2	2.5	1.5	3.0
Cossor ..	610HF	20,000	20	.1	1.0	1.75	1.5	3.0
Mazda ..	HL610	20,000	22	.1	1.1	1.8	1.5	3.0
Mullard..	PM5D	20,000	26	.075	1.3	1.0	1.5	3.0
Six-Sixty	607HF	15,200	17	.075	1.1	2.0	2.0	4.0
Mullard..	PM5X	14,700	17.5	.075	1.2	1.6	3.0	4.5
Six-Sixty	610D	9,250	18.5	.1	2.0	2.0	3.0	4.0
Mullard..	PM6D	9,000	18	.1	2.0	2.0	3.0	4.5
Lissen ..	L610	8,000	16	.1	2.0	2.0	3.0	4.5
Cossor ..	610LF	7,500	15	.1	2.0	3.4	1.5	4.5
Marconi	L610	7,500	15	.1	2.0	3.0	2.0	4.0
Osram ..	L610	7,500	15	.1	2.0	3.0	1.5	4.5
Osram ..	LS5	6,000	5	.8	.8	—	—	—
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	6.0	6.0	9.0
Osram ..	P610	3,500	8	.1	2.28	6.0	6.0	9.0
Six-Sixty	610P	3,400	7.8	.1	2.3	8.0	6.0	9.0
Lissen ..	P610	3,200	8	.1	2.5	6.0	6.0	9.0
Marconi	LS5A	2,750	2.5	.8	.9	—	—	—
Osram ..	LS5A	2,750	2.5	.8	.9	—	—	—
Cossor ..	625P	2,500	7	.25	2.8	13.0	6.0	12.0 (at200v.)
Lissen ..	P625	2,500	7.5	.25	3.0	8.0	7.5	12.0
Marconi	P625	2,400	6	.25	2.5	11.0	7.0	24.0 (at250v.)
Osram ..	P625	2,400	6	.25	2.5	11.0	7.0	26.0 (at250v.)
Cossor ..	610XP	2,000	5	.1	2.5	15.0	9.0	18.0
Mullard..	PM256	1,850	6	.25	3.25	8.0	9.0	27.0 (at250v.)
Six-Sixty	625SP	1,780	5.8	.25	3.25	8.0	10.0	15.0
Marconi	P625A	1,600	3.7	.25	2.3	20.0	13.5	36.0 (at200v.)
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	20.0	12.0	22.5
Cossor ..	620T	1,400	3.2	2.0	2.3	—	—	—
Mullard..	PM256A	1,400	3.6	.25	2.6	20.0	12.0	33.0 (at200v.)
Marconi	LS6A	1,300	3	2.0	2.3	—	—	—
Mazda ..	P650	1,300	3.5	.5	2.7	30.0	12.0	25.0 (at200v.)
Osram ..	LS6A	1,300	3	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	1.5
Mullard..	PM16	200,000	200	.075	1.0	—	—	—
Osram ..	S610	200,000	210	.1	1.05	4.0	1.5	—
Marconi	S610	200,000	210	.1	1.05	4.0	1.5	—

6-volt Pentode Valves

Marconi	PT625	43,000	80	.25	1.85	10.0	6.0	15.0 (at250v.)
Osram ..	PT625	43,000	80	.25	1.85	10.0	6.0	15.0 (at250v.)
Six-Sixty	SS617PP	28,500	54	.17	1.9	15.0	8.0	14.0
Lissen	PT625	24,000	60	.25	2.5	14.0	7.5	10.0
Cossor ..	615PT	—	—	.15	2.0	17.0	6.9	7.5
Mullard..	PM26	—	—	.17	2.0	15.0	9.0	15.0

A.C. Three-electrode Valves

Mullard..	904V	34,000	75	1.0	2.2	2.0	1.0	1.25
Cossor ..	41MRC	19,500	50	1.0	2.6	2.0	—	1.5
Cossor ..	41MH	18,000	72	1.0	4.0	2.0	—	1.5
Six-Sixty	4DX.AC	17,700	85	1.0	4.8	3.0	1.0	1.5
Cossor ..	41MHF	14,500	41	1.0	2.8	2.5	—	2.0

A.C. Three-electrode Valves—Continued

Make	Type	Impedance	Amplification Factor	Filament Current	Mutual Conductance	Anode Current at 120 volts	Grid Bias at 100 volts	Grid Bias at 150 volts
Six-Sixty	4GP.AC	12,000	36	1.0	3.0	2.0	2.0	3.0
Lissen ..	AC/HL	11,700	35	1.0	3.0	5.0	1.5	3.0
Mazda ..	AC/HL	11,700	35	1.0	3.0	4.5	1.5	3.0
Cossor ..	41MHL	11,500	52	1.0	4.5	4.0	1.2	2.0
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	MHL4	8,000	20	1.0	2.5	5.0	3.0	6.0 (at200v.)
Osram ..	MHL4	8,000	20	1.0	2.5	5.0	3.0	6.0 (at200v.)
Cossor ..	41MLF	7,900	15	1.0	1.9	4.5	4.5	6.0
Six-Sixty	4L.AC	7,500	15	1.0	2.0	6.0	3.0	4.5
Mullard..	164V	4,850	16	1.0	3.3	5.0	4.5	6.5
Mullard..	104V	3,000	12	1.0	4.0	9.0	6.0	7.0
Six-Sixty	SS4PAC	3,000	10	1.0	3.3	10.0	5.9	8.0
Mazda ..	PP3/425	2,900	2.9	1.25	1.0	—	—	100 (at400v.)
Osram ..	ML4	2,860	12	1.0	4.2	12.0	5.0	7.0
Marconi	ML4	2,800	12	1.0	2.5	13.0	4.0	6.0
Mazda ..	AC/P	2,650	10	1.0	3.75	14.0	6.0	12.0
Cossor ..	41MP	2,500	18.7	1.0	7.5	10.0	3.0	6.0
Mullard..	AC064	2,000	6	1.0	3.0	15.0	9.0	14.01
Cossor ..	41MXP	1,500	11.2	1.0	7.5	23.0	6.0	9.0
Mazda ..	PP5/400	1,500	9	2.0	6.0	—	—	32.0 (at400v.)
Mazda ..	AC/P1	1,450	5.4	1.0	3.7	—	—	—
Six-Sixty	HV4/1	1,450	6.3	1.0	3.0	15.0	9.0	14.0
Mullard..	AC044	1,150	4	.7	3.5	17.0	14.0	23.0

A.C. Double-grid Valve

Cossor ..	41MDG	40,000	10	1.0	.25	—	—	—

A.C. Screen-grid Valves

Six-Sixty	4SGAC	1,000,000	1,000	1.0	1.0	1.5	—	—
Mullard..	S4V	909,000	1,000	1.0	1.1	—	—	—
Mazda ..	AC/SG	800,000	1,200	1.0	3.0	5.0	.5	.5
Mazda ..	ACS2	600,000	3,000	1.0	5.0	—	—	—
Cossor ..	MSG/HA	500,000	1,000	1.0	2.0	2.0	1.5	1.5
Marconi	MS4	500,000	550	1.0	1.1	2.2	1.5	1.5
Osram ..	MS4	500,000	550	1.0	1.1	2.2	—	—
Osram ..	VMS4	500,000	550	1.0	—	—	—	—
Six-Sixty	4XSGAC	485,000	1,600	1.0	3.3	—	—	—
Marconi	VMS4	450,000	500	1.0	1.1	—	—	—
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	3.2	1.0	1.0
Osram ..	MS4B	350,000	1,120	1.0	3.2	3.2	1.0	1.0
Lissen ..	AC/SG	340,000	1,100	1.0	3.75	—	—	—
Lissen ..	AC/SGV	300,000	975	1.0	3.25	—	—	—
Six-Sixty	SS4MMAC	300,000	900	—	3.0	—	4.0	—
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	—	1.5
Cossor ..	MSGLA	200,000	750	1.0	2.5	1.5	—	—
Six-Sixty	4YSGAC	—	900	1.0	3.5	—	—	—

A.C. Pentode Valves

Marconi	MPT4	33,000	100	1.0	3.0	—	—	—
Osram ..	MPT4	33,000	100	1.0	3.0	—	—	—
Cossor ..	MS.Pen.A	—	—	1.0	4.0	9.0	2.5	2.5
Cossor ..	MP Pen.	—	—	1.0	4.0	—	—	—
Mazda ..	AC/Pen.	—	—	1.0	2.5	—	—	—
Six-Sixty	SS4PAC	—	—	1.0	3.0	—	—	—
Mullard	Pen4V	—	—	1.0	3.6	—	—	—

D.C. Three-electrode 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	4.5	—	—	—
Osram ..	DL	2,660	12	.25	4.5	10.0	4.0	7.0
Mazda ..	DCP	2,220	10	.5	4.5	—	—	—
Mazda ..	DC2P	2,220	10	.1	4.5	—	—	—

D.C. Screen-grid Valves

Osram ..	DS	500,000	500	.25	1.1	—	—	3.0
Marconi	DS	450,000	500	.25	1.1	—	—	—
Osram ..	DSB	350,000	1,120	.25	3.2	—	—	1.5
Marconi	DSB	350,000	1,120	.25	3.2	—	—	—
Mazda ..	DCSG	—	1,000	.5	2.75	—	—	—

D.C. Pentode Valves

Marconi	DPT	30,000	90	.25	3.0	—	—	—
Osram ..	DPT	30,000	90	.25	3.0	—	—	10.0
Mazda ..	DCPen.	—	—	.5	3.5	—	—	—
Mazda ..	DC2Pen.	—	—	.1	3.5	—	—	—

GUIDE TO THE WORLD'S BROADCASTERS

Specially Compiled for "Wireless Magazine" by JAY COOTE

Metres (*Revised*)
19.56 (W2XAD)
31.48 (W2XAF) **SCHENECTADY** *Kilocycles* *15,330* *9,530*
Power: 20 Kw. (*New York, U.S.A.*)

Distance from London: Approximately 3,050 miles.

Standard Time: Eastern Standard Time (G.M.T. *less* 5 hours).

Announcer: Man.

Opening Call: "*This is station W2XAD* (or *W2XAF*) *Schenectady of the General Electric Company transmitting on a frequency of* 15,330 (*or* 9,530) *kilocycles.*

Interval Signal: Three notes on a xylophone-like instrument.

Standard Transmissions: W2XAD: G.M.T. 20.00-23.00 (daily except Saturdays and Sundays); 18.00-23.00 (Saturdays and Sundays). W2XAF: G.M.T. 22.00-04.00 (daily). Relays WGY, Schenectady (N.Y.), which is linked up with WEAF, New York, of the Red Network (National Broadcasting Company of America).

Closing Words: "*Good-night to you all, Ladies and Gentlemen.*"

19.737 Metres (DJB)
31.381 Metres (DJA) **ZEESEN** *Kilocycles* *15,200* *9,560*
Power: 8 Kw. (*Germany*)

Distance from London: Approximately 588 miles.

Standard Time: Central European (coincides with B.S.T.).

Announcer: Man.

Call: "*Achtung! Achtung! Hier der Deutsche Weltrundfunksender.*" followed by name of studio or city from which relay is effected.

Interval Signal: Metronome (240 beats per minute), or that of studio providing programme.

Standard Transmissions: Relays Berlin and other German studios From G.M.T. 13.00 or earlier to 17.00 broadcasts are carried out through DJB; from 19.00 by DJA on their respective wavelengths. The station closes down with the usual German good-night greetings, followed by the *Deutschlandslied* (German National Anthem): *Deutschland ueber Alles*—to melody of Haydn's hymn, *Austria.*

43.75 Metres **RADIO VITUS (F8LH)** *6,865 Kilocycles*
Power: .2 Kw. (*Paris, France*)

Distance from London: Approximately 214 miles.

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

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

Opening and Interval Signal: Crowing of a cockerel.

Main programmes: G.M.T. 08.30, concert and talks (Sunday); then concerts from 09.00 to 12.00 (Sunday); 19.00, talk, 19.30, concert; dance music (Friday, Saturday); 20.00, gramophone records. The programmes are simultaneously broadcast on 308.5 metres (972 kilocycles).
Closes down with the usual French greetings, followed by the opening signal and, at times, *La Marseillaise.*

65 Metres **KUALA LUMPUR (VS2A)** *4,616 Kilocycles*
Power: .2 Kw. (*Federated Malay States*)

Distance from London: Approximately 5,200 miles.

Standard Time: G.M.T. *plus* 7 hours.

Announcer: Man.

Call: "*This is the Kuala Lumpur* (*F.M.S.*) *Amateur Radio Society calling.*"

Standard Transmissions: G.M.T. 01.15 (Sunday) relay of concert from the Selangor Club; 00.30 (Tuesday), native music; 01.00, European music, market reports, etc.; 01.30-02.30, gramophone records; 00.30-02.30 (Friday), Chinese music and English news bulletin. Closes down with the playing of *God Save the King* (gramophone record), followed by call and conventional greetings.

245.9 Metres **RADIO SCHAERBEEK** *1, 20 Kilocycles*
Power: 1 Kw. (*Brussels, Belgium*)

Distance from London: Approximately 200 miles.

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

Announcer: Man.

Call: "*Allo! Allo! Ici Radio Schaerbeek*" (phon., *Skar-bake*).

Main Programme: B.S.T. 12.00, luncheon hour transmission, news, gramophone records.

Closes down with usual French and Flemish greetings, followed by *La Brabançonne* (Belgian National An .iem).

(*Revised*)
296.1 Metres **HILVERSUM** *1,013 Kilocycles*
Power: 7 Kw. (*Holland*)

Distance from London: Approximately 232 miles.
Standard Time: Amsterdam Winter (or Summer) Time; that is G.M.T. (or B.S.T.) *plus* 20 minutes.
Announcer: Man.
Call: "*Hier Hilversum,*" followed by initials of Society responsible for the broadcasts; e.g., A.V.R.O. (*Algemeene Vereeniging Radio Omroep*), V.A.R.A. (*Vereeniging Arbeiders Radio*), V.P.R.O. (*Vereeniging Protestantische Radio Omroep*). All announcements are made in the Dutch language. No special interval signal.
Daily Programme: B.S.T. 07.40, gramophone records; 07.55, sacred service (Sunday) 09.10, orchestra (Sunday); 09.40, time signal (chimes); 12.10, orchestra; 14.10, concert or play; 16.10, gramophone records; 19.40, time signal and news; main evening entertainment; 20.55, relay of outside broadcast or concert; 22.10, dance music (Sunday); 22.50, gramophone records.

352.1 Metres **GRAZ** *852 Kilocycles*
Power: 7 Kw. (*Austria*)

Distance from London: Approximately 764 miles.

Standard Time: Central European (coincides with B.S.T.).

Opening Signal: Morse V (. . . —).

Interval Signal: Metronome (200 beats per minute); at times, morse letter K (— . —).

Announcer: Man.

Call: (when own transmission) "*Hallo! Hallo! Radio Graz*" (phon., *Grarts*).

Main Programme: Usually relays Vienna broadcasts. Closes down as Vienna station (q.v.).

1,445.8 Metres **EIFFEL TOWER (FLE)** *207.5 Kilocycles*
Power: 13 Kw. (*Paris, France*)

Distance from London: Approximately 214 miles.
Standard Time: Greenwich Mean Time (France adopts B.S.T.).
Announcer: Man.
Opening Signal: Counting of seconds by announcer for a period of one minute.
Call (when own studio transmission): "*Ici le poste National de la Tour Eiffel*" (phon. *Two-er Ay-fell*). When official weather bulletins, etc., are broadcast: "*Ici le Poste Militaire de la Tour Eiffel.*" When relaying *Ecole Supérieure* programme, see PTT Paris.
Unofficial time signals are given by imitation Big Ben chimes, followed by a bugle call.
Main Daily Programme: B.S.T. 07.35, official weather forecast; 08.00, relay of PTT Paris; 11.40, market reports; 13.00, news; weather; 13.25, concert (Sunday); 18.45, children's hour (Sunday); talks; 20.20, official weather report; 20.30, concert or relay of PTT Paris programme.
Closes down with usual French good-night greetings followed by *La Marseillaise* (gramophone record).

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The new LOTUS 10 Gns. BUD

2 valve all electric receiver

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WORLD'S BROADCAST STATIONS

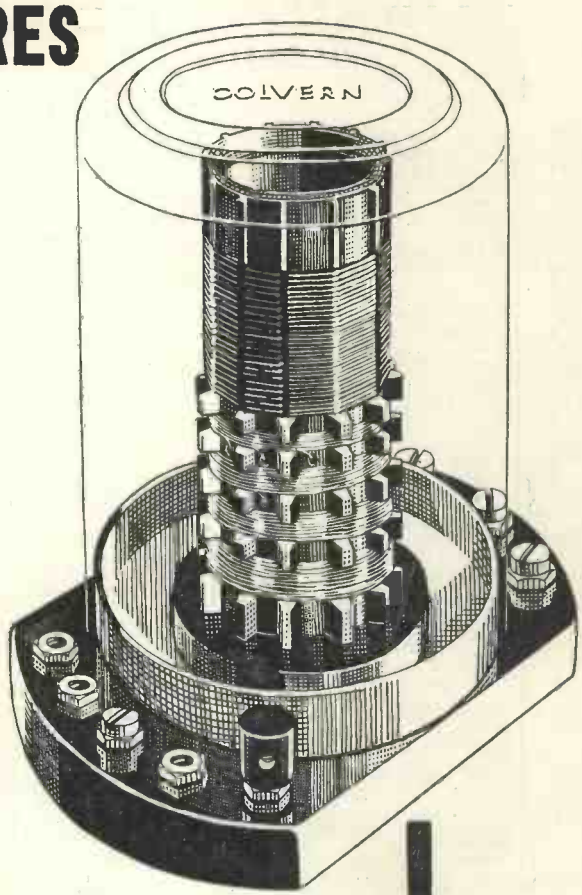
Wave-length	Name of Station	Dial Readings		Country
13.04	Malabar PLZ			Java
14.27	Buenos Aires LSN			Argentine
14.47	Buenos Aires LSY			Argentine
14.60	Malabar PMB			Java
14.83	Nauen DGW			Germany
15	Prangins (Radio Nations)			Switzerland
15.07	Monte Grande LSG			Argentine
15.14	Deal Beach WM1			United States
15.198	Aranjuez EAQ			Spain
15.44	Elisabethville OQH			Belgian Congo
15.5	Kootwijk PCP			Holland
15.5	Sydney VK2ME			Australia
15.51	Deal Beach WNC			United States
15.576	Rio de Janeiro PPU			Brazil
15.625	Ruysselede (Bruges) ORG			Belgium
15.93	Bandoeng PLE			Java
16.10	Rugby GBU			Great Britain
16.19	Coltano IAC			Italy
16.3	Kootwijk PCK			Holland
16.36	Rugby GBS			Great Britain
16.54	Rugby GBW			Great Britain
16.56	Bandoeng PMC			Java
16.66	Rocky Point (N.Y.) WAJ			United States
16.8	Malabar PLF			Java
16.85	Kootwijk PCV			Holland
17.05	Ships			—
18	Prangins (Radio Nations)			Switzerland
18.9	Rocky Point (N.Y.) WIY			United States
18.41	Kootwijk PCL			Holland
18.5	Rugby GBX			Great Britain
19	Barcelona			Spain
	Prangins (Radio Nations)			Switzerland
19.36	Kemikawoa (Tokio) (J1AA)			Japan
19.557	Schenectady W2XAD			United States
19.68	Pontoise FYA			France
19.72	East Pittsburgh W8XK			United States
19.737	Zeesen DJB			Germany
19.94	Rome (Vatican) HVJ			Italy
19.95	Taschkend			U.S.S.R.
20.26	Rocky Point (N.Y.) WQV			United States
20.49	Deal (N.J.) W2XBJ			United States
21.5	Bucharest CV1			Roumania
21.73	Rocky Point (N.Y.) WAJ			United States
21.92	Stuhlweissenburg			Hungary
22.25	Rocky Point (N.Y.) WAJ			United States
23.28	Radio Maroc (Rabat)			Morocco
23.858	Rabat			Morocco
25.14	Pontoise FYA			France
25.4	Rome 2RO			Italy
25.6	Pontoise FYA			France
25.7	Rio de Janeiro PPQ			Brazil
25.24	East Pittsburgh W8XK			United States
25.27	Calcutta VUC			India
25.465	Saigon (Chi-Hoa)			Indo-China
25.53	Chelmsford 5SW			Great Britian
25.6	Valencia			Spain
26.7	S.Y. *Elettra* IBDX			—
27.3	Wellington ZLW			New Zealand
28.2	Bandoeng PLR			Java
28.5	Sydney VK2ME			New South Wales
29.04	Ruysselede			Belgium
29.18	Koenigswusterhausen DIQ			Germany
30	Belgrade			Yugoslavia
30.2	Leopoldville			Belgian Congo
30.4	Madrid EAQ			Spain
30.57	Buenos Aires LQE			Argentine
30.64	Rugby GBW			Great Britain
30.77	Rocky Point WEL			United States
30.94	Buenos Aires LQA			Argentine
31.7	Rio de Janeiro PPU			Brazil
31.25	Lisbon CTIAA (tests)			Portugal
31.28	Philadelphia W3XAU			United States
31.28	Sydney VK2ME			New South Wales
31.28	Melbourne VK3ME			Victoria
31.315	Prangins (Radio Nations)			Switzerland
31.35	Springfield W1XAZ			United States
31.35	Poznan SR1			Poland
31.38	Zeesen DJA			Germany
31.48	Schenectady W2XAF			United States
31.51	Skamlebaek OXY			Denmark
31.55	Melbourne VK3ME			Victoria
31.75	Rocky Point (N.Y.) WEJ			United States
31.86	Bandoeng PLV			Java
32.26	Rabat			Morocco
32.85	Zurich HB9OC			Switzerland
33.61	Elisabethville OQH			Congo
34.4	Aranjuez (Madrid)			Spain
34.66	Drummondville VE9AP			Canada
34.68	Long Island W2XV			United States
35	Prangins (Radio Nations)			Switzerland
35.25	Deal Beach (N.Y.) WOO			United States

Wave-length	Name of Station	Dial Readings		Country
36	Norddeich			Germany
36.92	Bandoeng PLW			Java
37.50	Tokio JKBB			Japan
38.65	Kootwijk PDM			Holland
38.476	Prangins (Radio Nations)			Switzerland
39.74	Calgary (Alb.) CKS			Canada
39.98	Tscheng-Ju XGD			China
40.4	Warsaw SP1AX			Poland
40.54	New York WEM			United States
41	Bangkok HSP2			Siam
41.6	Las Palmas EAR58			Canary Isles
41.7	Singapore VS1AB			Singapore
42.3	Stuttgart D4XAA			Germany
42.8	Rugles F8BP			France
42.9	Lisbon CT1AA			Portugal
43.6	Koethen D4AFF			Germany
43.75	Paris (Vitus) F8LH			France
43.83	Stuhlweissenburg			Hungary
44.5	Rocky Point (N.Y.) WEJ			United States
45	Constantine FM8KR			Tunis
45.38	Moscow			U.S.S.R.
45.5	Bucarest			Roumania
46.69	Boundbrook W3XL			United States
46.72	Minsk RW62			U.S.S.R.
47	Coltano IAC			Italy
48	Casablanca CN8MC			Morocco
48.5	Brussels ON4FB			Belgium
48.86	East Pittsburgh W8XK			United States
49.02	Richmond Hill W2XE			United States
49.05	Saigon F31CD			Indo-China
49.18	Boundbrook W3XAL			United States
49.22	Bowmanville VE9GW			Canada
49.32	Navana			Cuba
49.34	Chicago W9XAA			United States
49.4	Johannesburg ZTJ			South Africa
49.43	Vancouver VE9CS			British Columbia
49.5	Nairobi VQ7LO			Kenya Colony
49.5	Philadelphia W3XAU			United States
49.5	Mason (Ohio) W8XAL			United States
49.59	Halifax VE9HX			Nova Scotia
49.83	Chicago W9XF			United States
49.96	Montreal VE9DR			Canada
49.96	Teguciglapa HRB			Honduras
50	Bucarest			Roumania
	Moscow RV59			U.S.S.R.
50.1	Eindhoven			Holland
50.26	Rome (Vatican) HVJ			Italy
52	Radio Normandie (Fécamp)			France
52.7	Tananarive FIUI			Madagascar
54.4	Moscow RV38			U.S.S.R.
54.52	New York W2XBH			United States
58	Prague Ok1MPT			Czechoslovakia
58.3	Bandoeng PMY			Java
60.26	Rugby GBC G6RX			Great Britain
61	Radio LL (Paris)			France
62.5	Deal Beach WOO			United States
65	Budapest			Hungary
67.65	Doeberitz DFK			Germany
70.2	Khabarovsk RV15			U.S.S.R.
80	Amsterdam PAOARS			Holland
84	Zurich HBOC			Switzerland
88.3	Rugby G6RX			Great Britain
92.31	Doeberitz			Germany
160	Cuxhaven (Elbe-Weser)			Germany
198.5	Riga			Latvia
207.3	Franchimont			Belgium
209	Antwerp			Belgium
210.1	Liége			Belgium
210	Budapest			Hungary
211.3	Newcastle			Great Britain
214.2	Warsaw (No. 2)			Poland
214.3	Aberdeen			Great Britain
215.3	Chatelineau			Belgium
	Brussels (Conférence)			Belgium
217	Königsberg			Germany
218.5	Flensburg			Germany
218	Salzburg			Austria
219.9	Cassel			Germany
219.9	Beziers			France
220	Binche			Belgium
222.1	Fécamp			France
224.4	Cork			Irish Free State
230.3	Radio Wallonia			Belgium
232	Malmö			Sweden
232.2	Kiel			Germany
234.9	Lodz			Poland
235.5	Kristianssand			Norway
236.2	Bordeaux-Sud-Ouest			France
238.9	Nurnberg			Germany
240.5	Stavanger			Norway
241.5	Liége Experimental			Belgium

(Continued on page 12)

AN UP-TO-DATE COIL WITH UP-TO-DATE FEATURES

TYPE TD



TYPE TD, an entirely new Colvern Coil, is designed to give super-selectivity on both long and broadcast wavebands. The coil is completely screened giving a very neat appearance and incorporates tapped aerial coupling and reaction, while the four alternative aerial tappings are arranged as sockets with a wander plug.

The first two tappings give a high degree of selectivity with weak aerial coupling on the medium waveband—suitable for use in a "swamp" area.

Numbers 3 and 4 give aerial couplings similar to those normally employed, but with greatly increased selectivity.

A most important feature of this coil is that there is positively no break through on the long waveband from B.B.C. stations.

Price—Type TD— 8/6 each

Mr. Percy Harris chose Colvern Coils for the "Percy Harris A.C. Radiogram"

COLVERN

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

WORLD'S BROADCAST STATIONS

Cont. from page 10

Wave-length	Name of Station	Dial Readings	Country
241.6	Oporto		Portugal
242	Belfast		Ireland
244.1	Basle		Switzerland
245.9	Radio Schaerbeek		Belgium
	Linz		Austria
246	Berne		Switzerland
247.7	Trieste		Italy
249.6	Prague (No. 2)		Czechoslovakia
249.6	Juan-les-Pins		France
252.7	Barcelona EAJ15		Spain
252.9	Gleiwitz		Germany
255.1	Toulouse PTT		France
257	Hörby		Sweden
259.3	Leipzig		Germany
261.6	London National		Great Britain
263.8	Moravska Ostrava		Czechoslovakia
265.4	Lille		France
267.6	Valencia		Spain
269	Liege (Cointe)		Belgium
269.8	Bremen		Germany
272	Rennes		France
273.6	Turin		Italy
276.5	Heilsberg		Germany
279.3	Bratislava		Czechoslovakia
279.5	Radio Lyons		France
280	Baril		Italy
281.2	Copenhagen		Denmark
282.5	Lisbon CT1AA		Portugal
283	Berlin		Germany
	Magdeburg		Germany
	Stettin		Germany
	Brussels SBR		Belgium
285.2	Innsbruck		Austria
286	Montpelier		France
	Bournemouth		Great Britain
288.5	Scottish National		Great Britain
	Plymouth		Great Britain
	Swansea		Great Britain
291	Viipuri		Finland
293	Kosice		France
293.7	Limoges PTT		Czechoslovakia
296.1	Hilversum		Holland
298.5	Tallinn		Esthonia
301.5	North National		Great Britain
304.9	Bordeaux PTT		France
307	Falun		Sweden
	Zagreb		Yugoslavia
308.6	Radio Vitus		France
309.9	Cardiff		Great Britain
312.2	Genoa		Italy
312.8	Cracow		Poland
315	Marseilles		France
318.8	Naples		Italy
	Sofia		Bulgaria
	Dresden		Germany
321.9	Goteborg		Sweden
325	Breslau		Germany
329.7	Poste Parisien		France
332.2	Milan		Italy
335	Poznan		Poland
337.8	Brussels (No. 2)		Belgium
341.7	Brno		Czechoslovakia
345.2	Strasbourg		France
348.8	Leningrad		U.S.S.R.
348.9	Barcelona EAJ1		Spain
352.1	Graz		Austria
355.9	London Regional		Great Britain
358	Moscow		U.S.S.R.
360.6	Mühlacker		Germany
363.4	Algiers		North Africa
364	Bergen		Norway
367.6	Frederikstaad		Norway
368.1	Helsinki		Finland
	Seville		Spain
	Bolzano		Italy
	Kharkov		U.S.S.R.
369.4	Radio LL, Paris		France
372	Hamburg		Germany
376.4	Scottish Regional		Great Britain
378	Moscow Regional		U.S.S.R.
380.7	Lvov		Poland
384.4	Radio Toulouse		France
385	Stalino		U.S.S.R.
389.6	Frankfurt		Germany

Wave-length	Name of Station	Dial Readings	Country
389.6	Leipsig		Germany
389.6	Archangel		U.S.S.R.
394	Bucharest		Roumania
398.9	Midland Regional		Great Britain
403	Söttens		Switzerland
408	Katowice		Poland
411	Madrid (EAJ5)		Spain
411	Pokrovsk-Volgo		U.S.S.R.
413	Athlone		Irish Free State
416	Radio Maroc		North Africa
419.5	Berlin		Germany
424.3	Moscow (Stalin)		U.S.S.R.
428	Madrid EAJ7		Spain
430	Belgrade		Yugoslavia
435.4	Stockholm		Sweden
441	Rome		Italy
447.1	Paris PTT		France
449.4	Odessa		U.S.S.R.
453.2	Danzig		Danzig
	Klagenfurt		Austria
	Porsgrund		Norway
456.6	San Sebastian		Spain
459	Beromuenster		Switzerland
465.8	Tartu		Estonia
466	Lyons PTT		France
472.4	Langenberg		Germany
473.2	Sebastopol		U.S.S.R.
480	North Regional		Great Britain
488.6	Prague (Leiblitz)		Czechoslovakia
493.4	Trondheim		Norway
500.8	Florence		Italy
502.4	Nini Novgorod		U.S.S.R.
509.0	Brussels No. 1		Belgium
518.1	Vienna		Austria
525	Riga		Latvia
526	Palermo		Italy
532.9	Munich		Germany
541.5	Sundsvall		Sweden
550	Budapest		Hungary
555	Tampere		Finland
559.7	Kaiserslautern		Germany
	Augsberg		Germany
563	Wilno		Poland
566	Hanover		Germany
569.1	Grenoble		France
569.3	Freiburg		Germany
574.7	Ljubljana		Yugoslavia
720	Moscow PTT		U.S.S.R.
760	Geneva		Switzerland
770	Ostersund		Sweden
824.2	Sverdlovsk		U.S.S.R.
849	Rostov (Don)		U.S.S.R.
937.5	Kharkov		U.S.S.R.
1,000	Leningrad		U.S.S.R.
1,032	Kiev		U.S.S.R.
1,071.2	Tiflis		U.S.S.R.
1,071.4	Scheveningen-Haven		Holland
1,083	Oslo		Norway
1,117.4	Moscow (Popoff)		U.S.S.R.
1,153	Kalundborg		Denmark
1,171.5	Tasckent		U.S.S.R.
1,200	Reykjavik		Iceland
1,204.8	Istanbul		Turkey
1,229.5	Boden		Sweden
1,237	Vienna (Testing)		Austria
1,250	Luxemburg		Luxemburg
1,260	Bakou		U.S.S.R.
1,304	Moscow (Trades Union)		U.S.S.R.
1,354.4	Motala		Sweden
1,380	Novosibirsk		U.S.S.R.
1,411.8	Warsaw		Poland
1,445.7	Paris (Eiffel Tower)		France
1,481	Moscow (Komintern)		U.S.S.R.
1,538	Ankara		Turkey
1,554.4	Daventry National		Great Britain
1,600	Irkutsk		U.S.S.R.
1,634.9	Königswusterhausen		Germany
1,725	Radio Paris		France
1,796	Lahti		Finland
1,875	Huizen		Holland
1,935	Kaunas		Lithuania
2,525	Königswusterhausen		Germany
2,900	Königswusterhausen		Germany

Quality is the foremost Consideration . . . !

. . that's why "CLARKE'S ATLAS" P.F.1 Transformer is used and specified for the "Triple-tune Four"

The efficiency of this new "ATLAS" Product the P.F.1. Low Frequency Transformer has soon been appreciated. Specified and used by the designers of the "Triple-tune Four" Receiver described in this issue, the "ATLAS" P.F.1 Low Frequency Transformer creates a new standard of performance and gives an unprecedented level response throughout the audio-frequency range. Unique manufacturing processes give a performance that cannot be bettered by many of the most expensive transformers obtainable. It is finished in a neat olive-green moulded bakelite case with plated terminals which are situated so as to give easy access when making connections.

Ratio 4—1. Primary Inductance 85 H. PRICE **5/6**

"ATLAS" ALL MAINS UNIT

MODEL A.C.188

Winner of the Olympia Ballot, 1930, this Model has proved to be, and is still, the most popular Unit obtainable. It is the ideal Unit for working the "Triple-tune Four" from the mains supply and is suitable for any set up to 5 valves. It provides variable high-tension tappings of 0/100 and 0/120 volts and one fixed of 150 volts, and gives output of 25 m/A at 150 volts. Trickle Charger for 2-, 4-, and 6-volt L.T. Accumulators is incorporated which charges at the rate of .5 amp. Westinghouse Metal Rectifiers. Fully guaranteed for 12 months. Cash Price £6 or Easy Payments of 10s. down and 7 monthly payments of 15s. 6d. each and one of 14s. 6d.

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"TRUE TONE CONTROL"

THIS is the title of a most interesting book which has just come to hand from the Multitone Electric Co., Ltd. This concern is specialising in a new form of tone control, and the Multitone transformer which is used in this simple circuit features in a current WIRELESS MAGAZINE radiogram.

No extensive alteration is needed to a set to fit the Multitone, and the book—which I have been reading with a great deal of interest—shows just how to make the change. It gives circuits and resulting tone-control graphs making the action of the Multitone strikingly obvious.

I advise you not to overlook this new idea. It is not just a "stunt." It really works ! **272**

R.I.'S SHORT-WAVE IDEA

THE R.I. Antinodal short-wave coil is quite new and I was therefore interested to see the folder which gives a layout and circuit for use in connection with this short-wave unit. It is not for me to delve into technicalities and explain the working to you; nor need I do so, for it is all fully explained in the R.I. leaflet.

The layout is of a typical short-wave set employing the R.I. Antinodal coil. A complete short-wave amplifier adaptor is available, employing this coil unit: it tunes from approximately 12 to 80 metres. A valve-holder type plug connects the amplifier adaptor to any standard broadcast set and obviates the need for changing over connections to get short-wave reception.

If you get the Antinodal literature you will find both the coil and the adaptor fully described. **273**

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THE STENODE AND SELECTIVITY

THE Stenode system, as you may remember, was introduced to make possible much greater selectivity than was hitherto possible. I confess I never managed to master the intricate mathematical reasoning involved in the Stenode system's working, but there it is. The Stenode principle has come to stay.

It is now more than just a principle. Sets based on the Stenode idea are now a commercial possibility, and as the Stenode action applies particularly to super-hets, you can be sure when you buy a set with a Stenode circuit that it is not only highly selective, but a good distance-getter as well.

Burne Jones, Ltd., are making up sets on the Stenode principle, and complete sets and radiograms are available. This concern has sent me a most interesting book explaining the whole thing, and I am sure it will appeal to every set user who wants something out of the ordinary. **274**

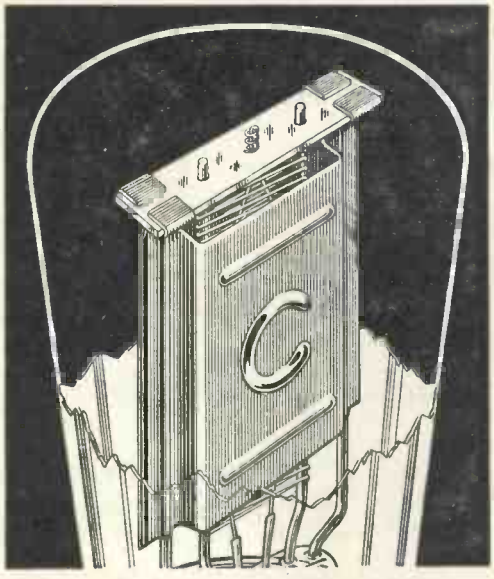
◆ ◆ ◆

A USEFUL POWER PACK

THE Kenwell power pack—a newcomer to me—certainly appears to be a most useful idea. It consists of an energised type moving-coil loud-speaker and a high output mains unit with a trickle charger for the accumulator. All this gear is enclosed in a compact and very attractive walnut cabinet, so that straggling leads are obviated. The high-tension supply gives one fixed tapping of 150 volts, one of 80 volts, and one variable tapping of 0-100 volts.

There are five grid-bias tappings and the trickle charging rate is .25 ampere.

Altogether it strikes me as a very sensible idea and one of particular importance where space must be saved and neatness of the complete set is a consideration. **275**



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1 Cossor 210HL	.. 7s.
1 Cossor 220PA	.. 8s. 9d.

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SHORT-WAVE TELEVISION

Television on a very short wavelength has been achieved in the British Isles by J. L. Baird. In this special article H. J. BARTON CHAPPLE, Wh.Sch., B.Sc., A.C.G.I., explains some of the fundamental problems of television and discusses the advantages of the short-wave system

THE transmission of television signals via the all-pervading ether is a very important problem and it is therefore most opportune to lead up to a full description of the apparatus used for short-wave television by first of all examining the wavelength question in its relation to television.

To " begin at the beginning," let us re-open the question of how wireless waves travel from place to place.

Unless some form of directional aerial is in use the waves propagated from a transmitting aerial are radiated in all directions. In some respects the ideal condition would be for the waves to keep near the earth's surface and follow the curvature, but if this was to happen then the distance over which stations could be received would be limited.

Lost Energy

In passing from the transmitting station to the receiving station the ground ray, as it is called, loses energy, this being absorbed by the earth itself, buildings, hills and various other conductors or partial conductors that happen to be in the path.

This energy loss or attenuation is more marked the shorter the wavelength, assuming a given power for the station, and daily evidence of this is given by the fact that those stations on the long waves—Daventry, Radio Paris, etc.—can be received better during the day than foreign stations on the medium waveband. The ground ray is really the only ray which gets to the distant receiving station during the day.

Now what happens when day gives place to night? We encounter another phenomenon, for the distant station on the medium waveband which could be heard at, say, comfortable volume without any variation of signal strength during the daytime now comes through much louder, but the signal level is not consistent.

We experience " fading " from time to time, so that, although distant reception at night time is attended with much greater success than during the day, this value is countered somewhat by the inconsistency of strength. Although curious, there is a definite reason for this double effect and we must look to the Heaviside layer for an explanation.

The Heaviside layer is really an ionised strata or belt which surrounds the earth some 40 or 50 miles above the surface. We mentioned that the waves from the transmitting station not only pass out as ground or direct rays, but some of the energy passes upwards at all angles.

TELEVISION " GHOST " IMAGES

Fig. 2.—Two illustrations showing how the reflected wave, which reaches the receiver after the ground ray, produces a " ghost " image

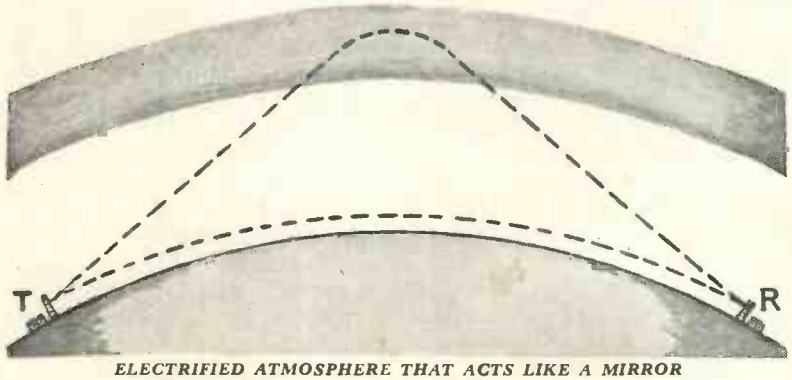
At night time this electrified atmosphere up above acts somewhat in the same manner that a mirror does to light rays; it reflects them back, as has been indicated in diagrammatic form in Fig. 1, where T is the transmitting station and R the receiving aerial.

During the day this ionised layer is diffused by the sun's rays and hence there are, relatively speaking, no reflected rays and consequently no fading effects.

Continuous Variation

Unfortunately, the Heaviside layer is varying all the time both in its distance from the earth and also in its reflective properties, and in consequence at R the reflected rays can be instrumental in bringing about several effects.

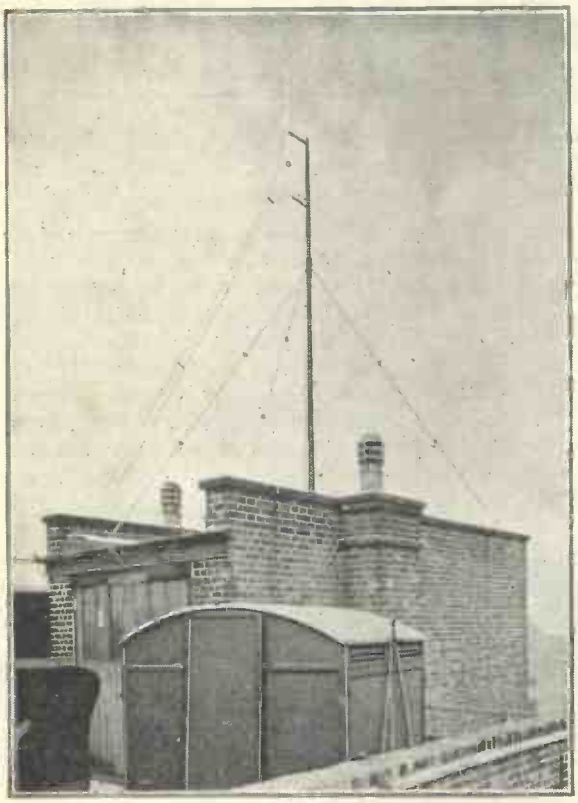
Since the speed of travel of these wireless waves is constant the ground ray will reach R before the reflected rays. This is most unfortunate from the television point of view, for it



ELECTRIFIED ATMOSPHERE THAT ACTS LIKE A MIRROR

Fig. 1.—How wireless waves from the transmitter (T) are reflected back rom the electrified atmosphere to the receiving station (R)

SHORT-WAVE TELEVISION—Continued



SHORT-WAVE AERIAL IN THE CENTRE OF LONDON

The aerial for transmissions of 6.1 metres on the roof of the Baird Company's premises in Long Acre. This aerial is of the "half-wave" type

causes multiple or ghost images somewhat as portrayed in Fig. 2.

With the reflected ray or rays arriving a little *after* the main ray a ghost image (in some cases it is more than one image) is built up above the main image (scanning being assumed in a bottom-to-top direction).

Anyone who has carried out distant reception of television signals on the medium waveband is sure to have noticed these effects and it is interesting to record that Professor Appleton was able to make use of data concerning the exact position of the ghost images to assist him in some of his investigations into the Heaviside-layer problem.

Varying Strength

Added to this, we have the received signal strength varying, since at one time the reflected rays may be adding to the direct ray and at other times opposing it. Readers will therefore appreciate that television transmissions on the medium waveband inherit the same troubles that beset the aural transmissions with the eye frequently registering a greater objection than the ear, which has become more acclimatised to these vagaries owing to greater use.

It must not be inferred from these remarks that distant television reception at night time on the medium wavebands is poor; I am merely giving details of the possibilities that can arise.

On the other hand, there is concrete evidence in letters received by the Baird Company that their television transmissions have been received in every country in Europe.

Another side of the question has to be faced, however, and that is the frequency problem. On the transmitting side a given scene is split up into a number of light strips by means of a tiny moving-light area or spot. These are transmitted consecutively, according to the value of their brightness.

On the receiving side, the reconversion of these variations into corresponding light values takes place; these light values by suitable means being divided and placed in their correct position on the image field.

The transmission must take place so quickly that the inertia of the observing eye is sufficient to be able to connect these minute individual light variations into a complete picture.

Sideband Frequency

The sideband frequency required for this to happen is bound up primarily with the number of strips into which the original scene is dissected and also with the number of times per second this scanning or exploring process takes place.

The greater the number of lines the more will be the intimate detail which can be seen in the final television image and also the greater the number of complete explorations in one second the less likelihood is there for the eye to dwell on the "mechanics" of the process and no "flicker" will be perceptible.

An already overcrowded ether only allows a sideband spread of 9 kilocycles for each transmitting station and it will be appreciated, therefore, that a good deal of television's ultimate value is lost by having to restrict the number of scanning strips to the present standard of thirty, with twelve and a half pictures per second.

Very good results are achieved with this compromise, however, but,

EXPERIMENTAL TELEVISION TRANSMITTER

Portion of the 2TV transmitter used by the Baird Company early in 1929 for television experiments. This gear has now been dismantled. The B.B.C. is to begin a series of evening television transmissions about the time this issue is published

ITS ADVANTAGES AND POSSIBILITIES

whereas in sound transmission the 9-kilocycle limit suffices, it places an unfortunate restriction on television with our present knowledge of the subject.

A way out of the trouble is provided by going down the waveband scale and it must not be overlooked that some of Mr. Baird's very early and important television transmissions were undertaken on a wavelength of 50 metres. This refers particularly to the Transatlantic tests carried out in 1928.

Wavelength of 50 Metres

Using a wavelength of 50 metres, television images were transmitted from Coulsdon, Surrey, to Hartsdale, a suburb of New York. One or two of the illustrations are interesting in this respect.

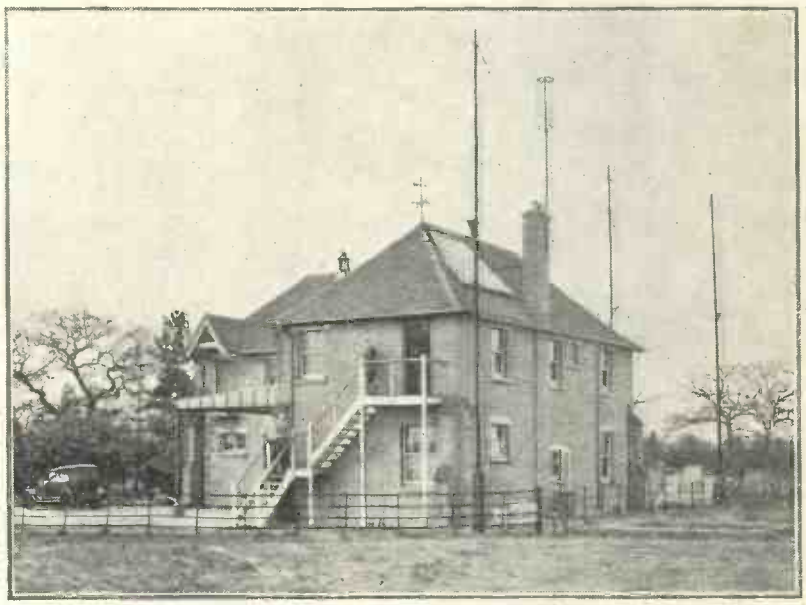
In one of them is seen the heavily insulated lead-in from the short-wave aerial. A few days after this transmission a successful experiment was conducted on the same wavelength and recognisable images were received on the liner *Berengaria* in mid-Atlantic ; the scene on board the boat is recorded in an accompanying photograph.

Then came the erection and use of the television transmitter known under the call sign of 2TV, from which many experimental television transmissions were carried out. This was followed by the inauguration of the daily television transmissions from the twin Brookman's Park stations, but the Baird Company continued their own experimental investigations into transmission problems.

A station was erected in north-west London, wavelengths of 50 and 150 metres being allocated for the purpose.

An accompanying illustration shows the site and laboratories at which much interesting work was carried out and valuable data was secured as a result of these experiments. Even with these low wavelengths, however, one encounters the idiosyncrasies brought about by the presence of the Heaviside layer previously referred to.

It is known that, if we reduce the wavelength, the bending of the waves becomes less and, progressing further down the scale from 50 metres, we find that in the region of 10 metres the reflection ceases altogether. That section of the transmitter's wave



SCENE OF TELEVISION EXPERIMENTS

One of the experimental laboratories, situated on the outskirts of London, used for Baird television transmissions on wavelengths of 50 and 150 metres

TELEVISION IN MID-ATLANTIC

The scene on board the "Berengaria" when television was received in mid-Atlantic in 1928 for the first time in the world's history. The wavelength used was 50 metres

which goes into space, therefore, is lost and we are left with the straight rays which emanate from the transmitter at a tangent to the earth's surface.

As long as the curvature of the earth is not appreciable, these ultra short-wave transmissions can be received quite easily, but the successful establishment of communication between transmitter and receiver can be looked upon, broadly, as being limited by the optical path of these waves.

Restricted Range

The range, therefore, is restricted to a radius of approximately 10 to 15 miles, but this, however, forms the basis of an excellent local-area transmitter, and gives an alternative method of broadcasting which does not in any way interfere with the present service transmitted through the medium of the B.B.C.

SHORT-WAVE TELEVISION—Continued

AERIAL USED FOR TRANSATLANTIC TRANSMISSION
The heavily insulated lead-in of the aerial used by J. L. Baird on the occasion of his Transatlantic television transmissions in 1928

These ultra short-wave transmissions have the additional very important advantage that they allow *flickerless television images of much finer detail* to be transmitted and provide a reliable local service absolutely free from the fading and atmospheric disturbances which are associated with the longer waves.

It was for this reason that the Baird Company erected their own ultra short-wave station in order that they may eventually transmit television at any hour of the day.

"Half-wave" Aerial

The transmitting aerial, as will be seen from the accompanying illustrations, is located on the roof of a brick-built hut. The wavelength of the station is 6.1 metres and, since a " half-wave " aerial is utilised, there are two vertical copper rods, split in the centre to accommodate an aerial ammeter, and arranged to be of a total length of 3.05 metres.

The good height of this aerial above the ground—an important feature with ultra short-wave transmissions, as readers will have gathered from the preceding remarks—is clearly portrayed in relation to the roofs of the nearby buildings.

A pair of transmission lines is metallically connected to the copper rods so that in effect it is divided into three sections. The lines then pass through insulators to the valve transmitter itself, being inductively coupled to the main tuning coil.

At the receiving end a wireless set of quite straightforward design, namely a super-regenerative detector valve connected to a resistance-capacity coupled amplifier, is used.

The output from the receiver is passed to a Baird Televisor. A great advance has been made in this new experimental vision apparatus upon which the resultant images are seen. It portrays the image on a small screen instead of in a lens, as in the Televisor sold to the public up till now. Furthermore, the size of the image is many times larger and allows a roomful of people to see the image simultaneously in complete comfort.

During one set of experiments the television signals, in addition to being sent through to Brookman's Park via Savoy Hill, were passed on to an ultra short-wave transmitter and the received images were at once projected on to the small screen of the Televisor.

The accompanying sound was received through the medium of two portable receivers and those watching were able to see, first of all, a dancer portraying her artistic ability as a full-length image. This was then followed by a cartoonist in the semi-extended formation and finally a vocalist singing character songs.

Undoubtedly, this ultra short-wave working opens up a new vista in the television field and it is hoped that development will be quite rapid.

Details of a new Baird Televisor, using the extended-screen principle, will be found on page 30

Notes and Jottings

SPECIAL iron-braided sleeving, which gives magnetic and electrostatic screening in mains receivers, is being made by Ward and Goldstone, Ltd., of Frederick Road, Pendleton, Manchester. This Goltone sleeving is 9d. a yard for single leads and 1s. a yard for twin leads.

◆ ◆ ◆

Spectators at the Carnera-Gains fight at Shepherd's Bush heard every word of the announcements clearly through the medium of a new Ediswan 500-watt amplifier. Fourteen loud-speakers were fed from two ES250/M valves, operating at 2,000 volts 120 milliamperes each.

◆ ◆ ◆

The following letter, received by Graham Farish, Ltd., of Masons Hill, Bromley, Kent, needs no comment :—

" Dear Sir Or MR.

Just a line to you Sir to say that I got the Ohmites Resistances alright I would like you to send me another one at 30.000 Ohmite Resistance I would like you to no that I makes sets up for Others people and I was looking at you Charging me the full price for them I have another Set to make up with the Same number of Resistances as one I have Done Ever other form that I have Send for things I have got them Hole Sale price they is none of your Ohmite Resistances up hear and all that comes and See's My Set will say where Did you get the Ohmites Resistances thats how your name gos forwards they all take me as there Guide for things.

Yours Truly,

————."

◆ ◆ ◆

More than two dozen moving-coil loud-speakers and an amplifier have been installed in Glave's store in New Oxford Street by the Special Products Department of the Gramophone Co., Ltd. Information about children and articles that have been lost and found forms quite a large proportion of the announcements, whilst at intervals shoppers are entertained by light orchestral music.

News of the Short Waves

THE use of the short waves for commercial telephone services between countries and continents of the world is rapidly growing and new stations are coming on the scenes so quickly that at the moment there appear to be more commercial telephone stations operating on the short waves than there are broadcasting stations.

London and Cairo

The latest service to appear is that between London and Cairo. The Cairo transmitter has been coming over at enormous volume lately and, so far, this service does not appear to have made use of speech distorters.

An early morning search recently revealed the Australian telephone service coming over at good strength from Sydney.

◆ ◆ ◆

After hibernating for most of the winter and early spring, W8XK, at Pittsburgh, is now making itself heard over here again. I understand that the transmitter of this station has moved to Saxonburg, where the giant KDKA station is in operation.

◆ ◆ ◆

Have you noticed the very low degree of modulation used by the short-wave station at Rabat, Morocco? At my home this station generally sends in a thumping carrier wave, but speech is weak.

Excellent Tone

Record reproduction is somewhat better, though, and in any case the tone is generally excellent, which brings to mind the fact that we would like to say some polite things about certain stations which work on a different plan—that is, modulation terrific and tone terrible.

However, we will just hope that the stations concerned will soon decide to reform.

◆ ◆ ◆

The "ultra shorts" continue to thrive at a satisfactory pace and interest in matters below 10 metres is increasing considerably. American manufacturers are proceeding to "cash in" on the new field and will now provide you with receivers which tune from 3 to 7 metres—A.C. models being by no means scarce. If you feel you want fresh grounds to conquer just try chasing the hum of a 3-metre A.C. receiver!

I see further trouble ahead. This will come when the time arrives for the public to demand a receiver which will tune in the ultra short as well as the short, medium and long waves. Switching will tend to get complicated when we have to design tuners from 3 to 2,000 metres! Don't think that this will never come, because it most certainly will.

We shall probably have quite a number of ultra short-wave broadcasting stations springing up for local service during the next few years, but the long-wave stations won't all be scrapped at once—indeed, we might even visualise the day when the 200-300 metre band will look positively lonely.

If each European country built a single long-wave transmitter somewhere between 800 and 2,000 metres as well as a number of ultra short-wave stations for local service, each country would have a complete local and international service without a suggestion of jamming.

Ultra short-wave stations will only give satisfactory reception so long as they are in the direct line of vision from the transmitter; this being so, it is usually preferable to build your transmitter as high as possible and what better spot could you find than the Empire State building in New York? Anyway, they've erected an ultra short-wave transmitter on the very top story.

◆ ◆ ◆

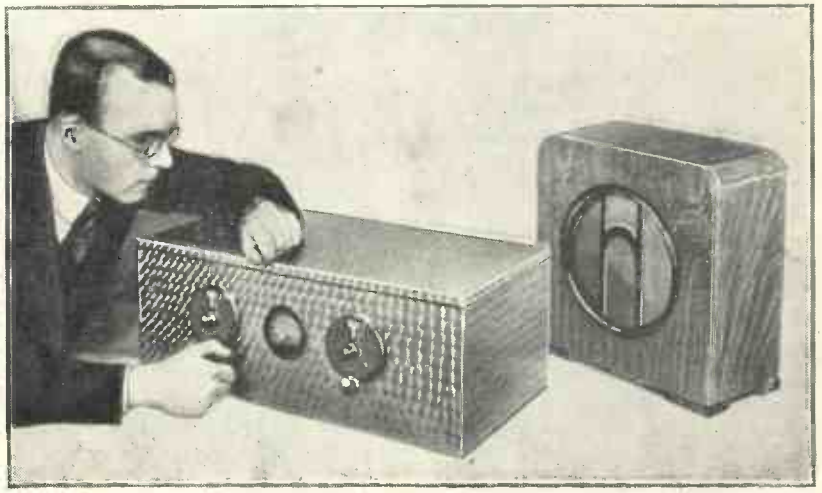
The efficiency of most types of short-wave receivers can be increased if the receiver is built with a liberal amount of metal shielding. If you get rather tired of a wood-and-ebonite foundation for your receivers, you will find the use of metal to provide quite a new joy!

Aluminium Easy to Use

Aluminium is the easiest metal to use. It is easily bent, cut and drilled. The receiver itself can be built on a chassis about 2 in. deep, with a metal case completely enclosing the whole receiver.

There are many advantages in building up a short-wave receiver in this way, although there is certainly more hard work attached to it. Good contacts are assured, and short by-passing earth leads to the chassis are easily made.

If you are one of those people who like to try designing their own short-wavers the best way to go about it is to build the receiver up roughly first on a "breadboard" and then rebuild it on the chassis after you have finished the experimental work. *Mander Barnett.*



A TESTED-IN-THE-TROPICS SHORT-WAVER

Testing a "Wireless Magazine" all-mains short-wave receiver before sending it out to the Gold Coast. The construction of this fine set is fully described in this issue

THE PERCY HARRIS RADIOGRAM

Designed by
PERCY W. HARRIS
M. Inst. Rad. E.

This design is just what hundreds of amateurs want—a compact three-valve radio set built up in the form of a table radio gramophone. The receiver is operated from A.C. mains, even the grid bias being obtained from this source. For the sake of selectivity and good quality band-pass tuning is employed, separate tuning condensers being incorporated. The valve combination consists of a detector and two low-frequency stages, this arrangement giving powerful signals. A valuable feature is the tone control

FOR some time past I have been working on the design of a mains-driven radio gramophone for my own use. Like many experimenters in electrical reproduction, I prefer o alternate between radio and the gramophone, so as to get the best of both, and up to now I have been using a radio set and an entirely separate electrically-driven turntable and amplifier.

Experimental Work

Both have been worked out so as to give me what I want and the performance of both has been such that I desired to combine them in one compact cabinet. This also gave me the opportunity of incorporating in the set a number of ideas which have suggested themselves during my experimental work.

Now that I have completed the instrument I find the results so extraordinarily good that I feel sure the design will prove useful to " Wireless Magazine " readers.

The requirements I set for the instrument were that the tone should be the best possible for both radio and gramophone records; that the efficiency of the radio side should be such as to give a reasonable number of alternative programmes (real programmes, mark you, considered from the *musical* standpoint, not merely the reception of distant stations at poor quality in a mush of static interference and noise); that there should be enough controls to permit of real efficiency and intelligent operation, instead of a low efficiency, " take-it-or-leave-it " style of one-knob control; and, lastly, that the youngest and least experienced members of my family should be able to handle it without trouble or risk.

There was also a further requirement (which may sound strange to some readers, but which I am sure will meet with the approval of many) that the loud-speaker should *not* be built into the cabinet, but should be a separate instrument which could be placed in the most advantageous position in the room for sound distribution.

Incidentally, I have two or three different loud-speakers and I did not wish to " tie up " any of them permanently in this one particular instrument.

Simple Construction

With all these requirements I also desired to combine simplicity of construction so that the design could be reproduced with as few tools as possible and with a minimum of skill by any who so desired.

No attempt has been made to build this radiogram down to an abnormally low cost, sacrificing efficiency and appearance thereby, but at the same time a genuine attempt has been made to keep the cost down to a reasonable figure for such a high-grade instrument.

Now as to the circuit, which may appear slightly complicated at first glance, for it incorporates a number of devices to obtain the utmost stability and high quality.

No High-frequency Stage

It may surprise you to find that there is neither screen-grid valve nor high-frequency stage. It must be remembered that this set has to serve not only as a radio receiver, but also as electrical reproducer for gramophone records. For reasons of simplicity and economy I was anxious not to use more than three valves.

I had the choice, therefore, of one high-frequency, detector and one low-frequency, using the detector as low-frequency stage in the radio gramophone; or a detector with two low-frequency stages, keeping the detector valve for radio detection alone and using the two low-frequency stages either on the radio or the gramophone side as desired.

A gramophone amplifier with two properly designed low-frequency stages can be made to give splendid

results and, at the same time, with band-pass tuning, proper stabilisation, and the use of correct values throughout, remarkable (I might almost be tempted to say marvellous !) radio reception is possible with a detector and two low-frequency stages.

Efficient Coils

Coils can mean a great deal in a radio set both for efficiency and sharpness of tuning. My attention was called some little time ago to the particularly efficient coils designed by Paul B. Tyers for the Multi-mag Three receiver described in the June issue of WIRELESS MAGAZINE. Mr. Tyers's coils were fully described in that issue (page 502).

It will be remembered that there are four different aerial tappings and special pains have been taken in designing the reaction winding so as to get really critical reaction.

On trying one of these coils I was very impressed with it, as it then occurred to me to see what would happen if I took *two* of these coils, using the tightest aerial coupling on the first, and band-pass coupling it to a second coil of the same type, in this case using the grid circuit and reaction winding only, ignoring the aerial winding.

Sharpness of Tuning

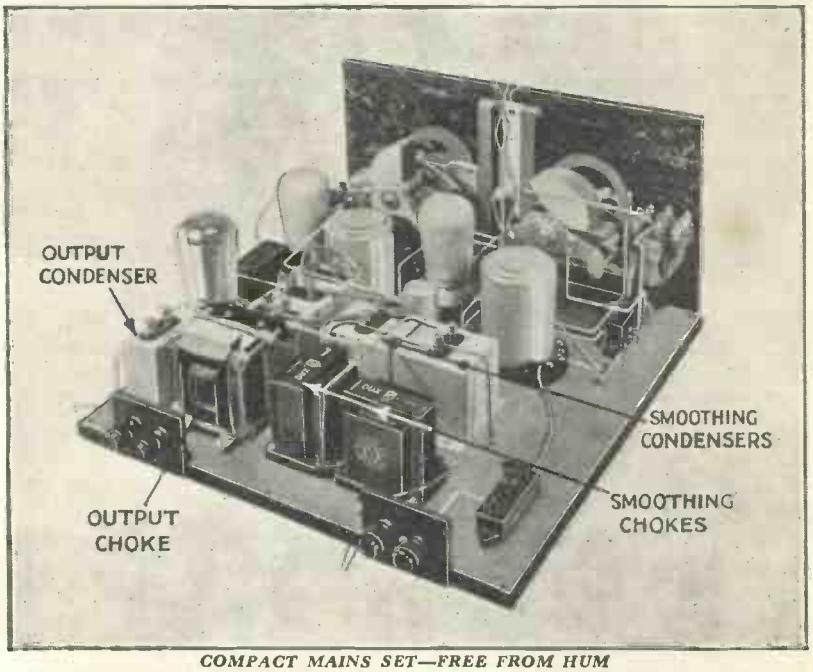
In this way, I thought, I ought to be able to combine the high efficiency of the Tyers coil (when used with the fairly tight aerial coupling) with the remarkable sharpness of tuning due to band-passing and fine reaction.

At first it might appear simple to gang the two condensers tuning these two coils, thereby giving the advantages of single control, but if you have done as much with ganged condensers as I have (I designed the first home-constructor's set, using a ganged condenser, and published it in December, 1924 !) you would know that when two identical coils are tuned with two identical condensers the introduction of reaction into one of the circuits will upset the ganging and, in fact, you cannot use critical reaction in one of a pair of " ganged " coils.

This is not to say, of course, that reaction in such circumstances is not of use, but you must remember that in this case I wanted to make a set with really accurate control and high efficiency. I therefore decided to tune the two coils separately.

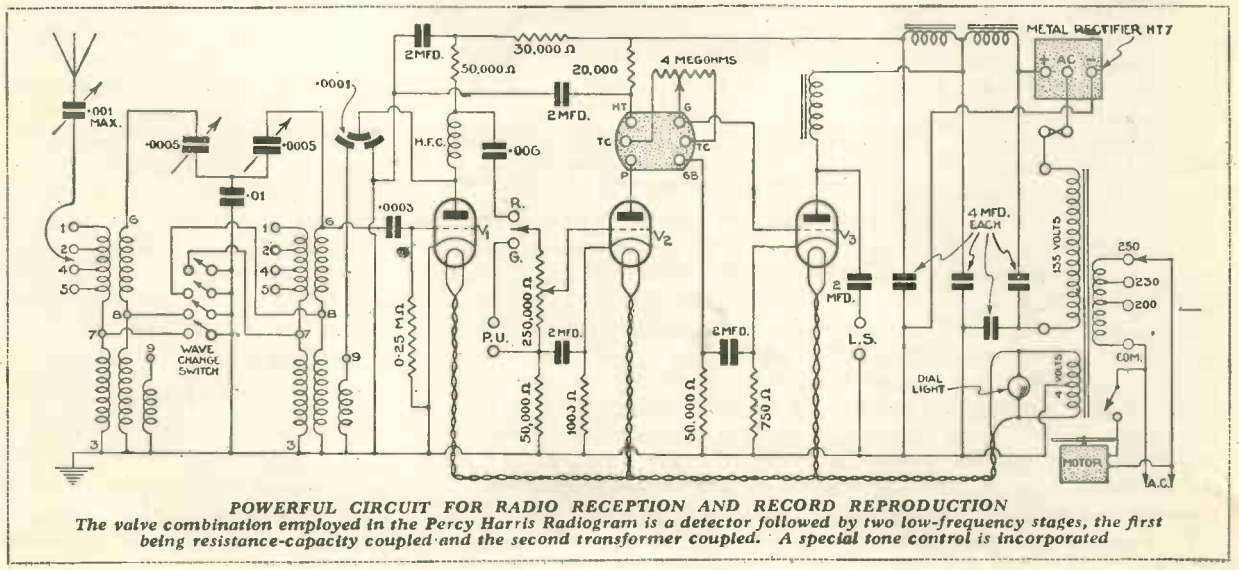
The coils, as you may see from the photographs, are themselves screened, the screen being connected to earth. There is thus no inductive coupling between them and the linking of the two circuits is purely capacitative through the .01-microfarad condenser which joins the common moving plates of the tuning condensers to earth.

With two high-gain stages of low-frequency amplification, layout is important and stability must be carefully sought. By covering the



COMPACT MAINS SET—FREE FROM HUM

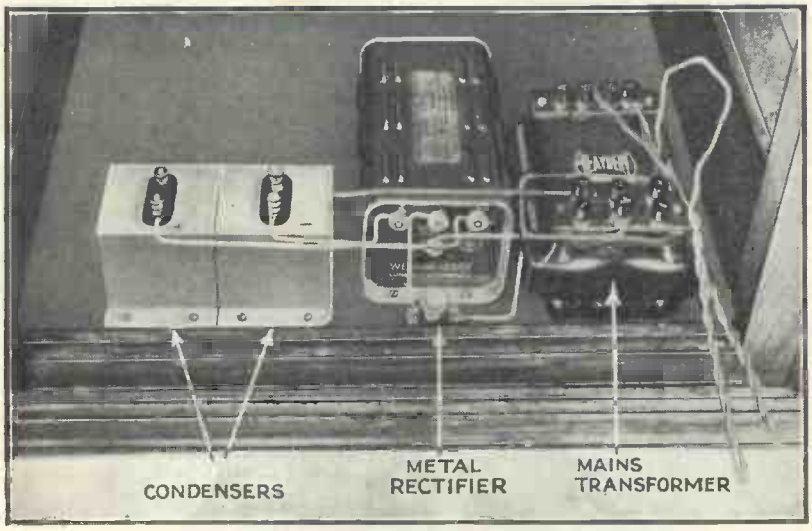
Special precautions have been taken with the smoothing in the Percy Harris Radiogram and the reproduction is quite free from any mains hum



POWERFUL CIRCUIT FOR RADIO RECEPTION AND RECORD REPRODUCTION

The valve combination employed in the Percy Harris Radiogram is a detector followed by two low-frequency stages, the first being resistance-capacity coupled and the second transformer coupled. A special tone control is incorporated

THE PERCY HARRIS RADIOGRAM—Cont.



SEPARATE MAINS PORTION OF THE RECEIVER

The mains portion of the Percy Harris Radiogram is arranged separately at the bottom of the cabinet. The parts can be fixed direct to the base of the cabinet or to a separate removable baseboard

baseboard with a sheet of aluminium foil connected to earth, good stability can be obtained in conjunction with the layout of the parts used—in fact, one can gain most of the advantages of a metal chassis without the difficulty of having to drill it for the securing screws. In the case of this aluminium sheet a bradawl will easily punch any hole you want for a woodscrew to penetrate.

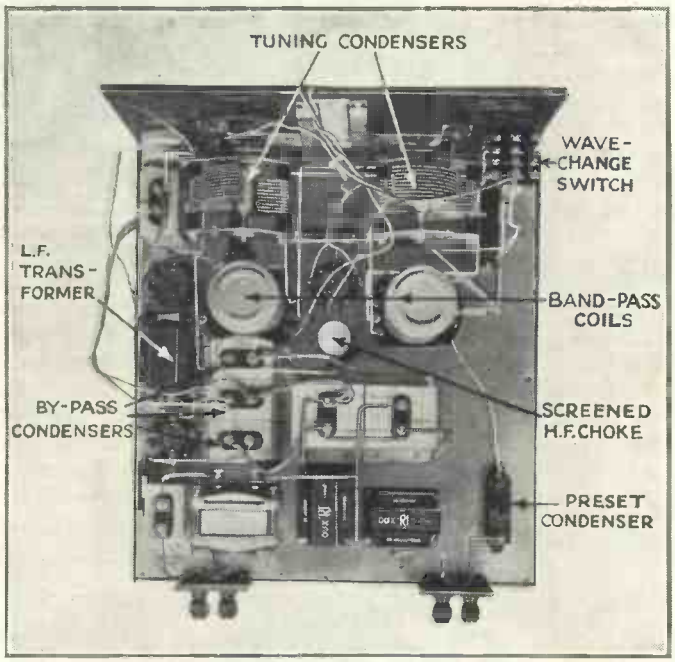
Switching

There being a separate primary and secondary winding for each coil, the wave-change arrangement is slightly more complicated than usual. On the first coil we have to short points 7 and 8 to earth (see circuit diagram) for reception of the medium waves and on the second coil 7 and 8 are similarly shorted.

It might be thought that as we are not using the aerial winding on coil No. 2 there would be no need to short out this winding, but practice will show that this is essential, otherwise there will be absorption on the medium waves by the free long-wave primary of the second coil.

Four points have therefore to be taken to a switch so that all four can be earthed simultaneously for medium-wave reception. In practice, this is not difficult, as will be seen from the illustrations, a suitable switch being readily available.

Mr. Tyers has certainly made a good job of the design of the reaction winding in his coils and I find that a .0001-microfarad differential reaction condenser is fully adequate here. The radio-frequency choke (which, incidentally, is screened) assists reaction and keeps high-frequency currents out of the low-frequency end. We then resistance-capacity couple the detector to the first low-frequency stage by means of the circuit shown.



PHOTOGRAPHIC PLAN VIEW OF THE SET

This special photographic plan view of the Percy Harris Radiogram shows how simple is the assembly. Every part is easily accessible

Volume Control

It will be noticed that a simple radio-gram switch of the two-way type joins the top of the volume-control potentiometer either to the coupling condenser from the detector or to the pick-up, while the slider (connected to the grid of the first low-frequency valve) acts as a volume control for both radio and gramophone and does not in any way affect tuning or quality.

Grid bias for this valve is obtained through the resistor in series with the cathode. As the anode current of the valve has to return to the cathode through this resistance, and as there is a voltage drop through this resistance, the end joined to earth is at negative potential to the cathode, this negative potential providing the grid bias, which is applied through the decoupling resistance joined to the bottom of the volume control.

A 2-microfarad condenser joins the cathode to the bottom of the volume control and forms an easy path for the grid return to cathode.

The coupling of the first low-frequency valve to the output valve is through a new and special kind of transformer, known as the Multitone, which I consider one of the most importance advances yet made in the design of components for home-constructor's use. This transformer has connected across it a special 4-megohm potentiometer in a particular way.

Emphasising Bass or Treble

When the potentiometer slider is turned to one end the transformer performance curve is tilted so as to give a predominance of bass and practically no top while, when

COMPACT TABLE INSTRUMENT

turned to the other end, the slider changes the characteristic of the transformer so as to give a very " peaky " top with very little bass.

At intermediate positions of the slider the curve is intermediate between these two extremes, and, as the variation is continuous, one can adjust this potentiometer to give just the kind of quality one wants.

In this way we can balance the attenuation of high notes brought about by reaction, or compensate for lack of bass or lack of top in particular gramophone records.

Decoupling for Stability

Grid bias is, of course, applied to the last valve through a resistor in the same way as before, and here also we have a decoupling resistance to keep the signals out of the grid-bias resistor. The output of the last valve is choke-condenser coupled to the loud-speaker, both to keep the anode current of the last valve out of the loud-speaker windings and to give more effective decoupling.

It will be noticed that full decoupling is given not only to the detector valve, but also to the first low-frequency valve, through decoupling resistances and 2-microfarad condensers. As the choke output also has an important decoupling effect, the set is remarkably stable.

The power unit is interesting, using, in this case, a Westinghouse metal rectifier with a voltage-doubling circuit which enables a full 200 volts and current up to 30 milliamperes to be obtained out of a comparatively small and inexpensive rectifier.

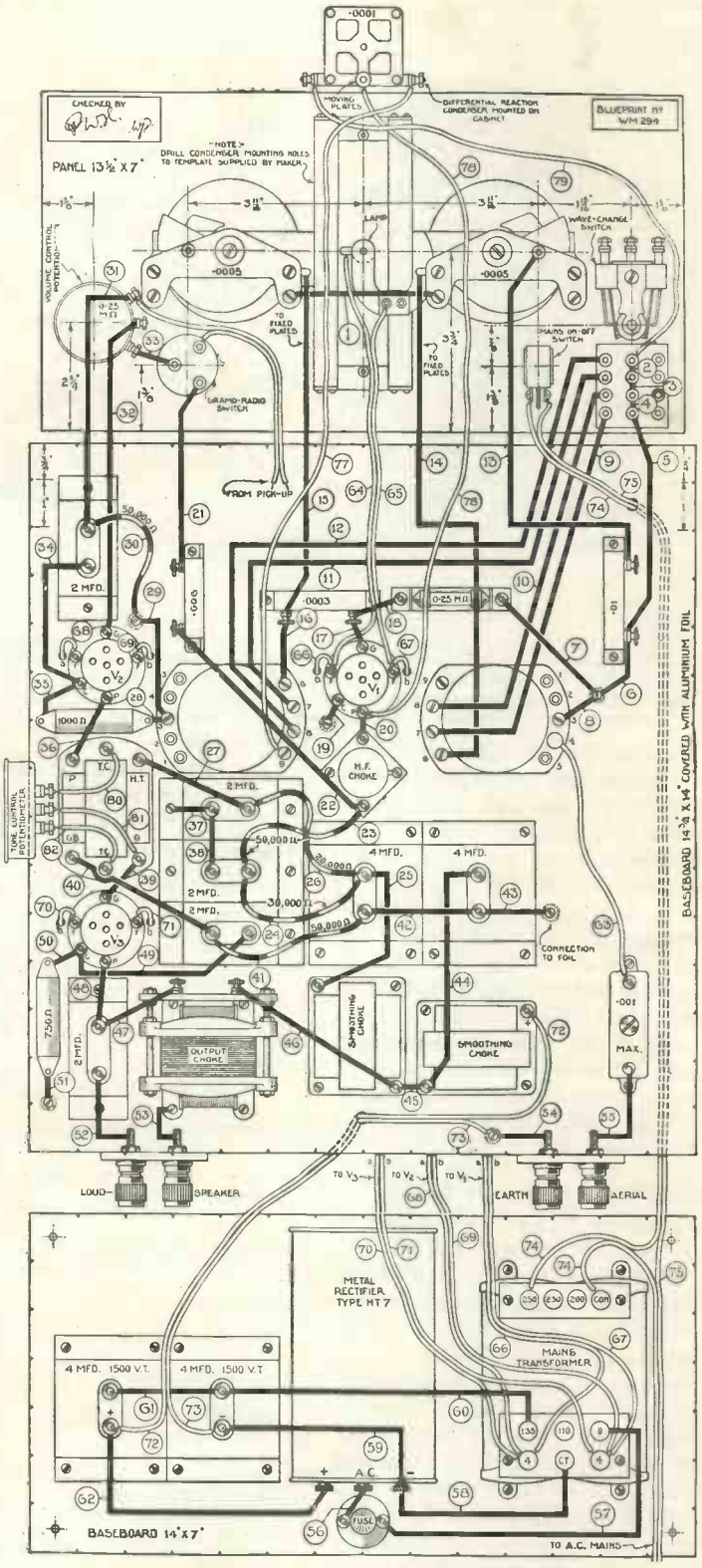
Smoothing has been very carefully worked out so as to reduce hum to the vanishing point, additional care being necessary owing to the use of the two powerful low-frequency stages following the detector.

Incidentally, I may say that in sets using a screen-grid high-frequency stage and detector with only one low-frequency valve, smoothing is comparatively simple, but where two powerful low-frequency stages are used we must take the greatest precautions. For this reason two high-grade chokes are utilised instead of the more common single choke.

Arrangement of Chokes

The bulb fuse shown is for the purpose of protecting the rectifier from overload, and it will also be noticed that the tap, which supplies the output valve only, is taken from the point of junction of the two chokes. Thus the output valve current is smoothed by only one choke (there being no gain after it), whereas the detector and first low-frequency valves get the full smoothing of both chokes, so that the magnification following them does not bring out the hum.

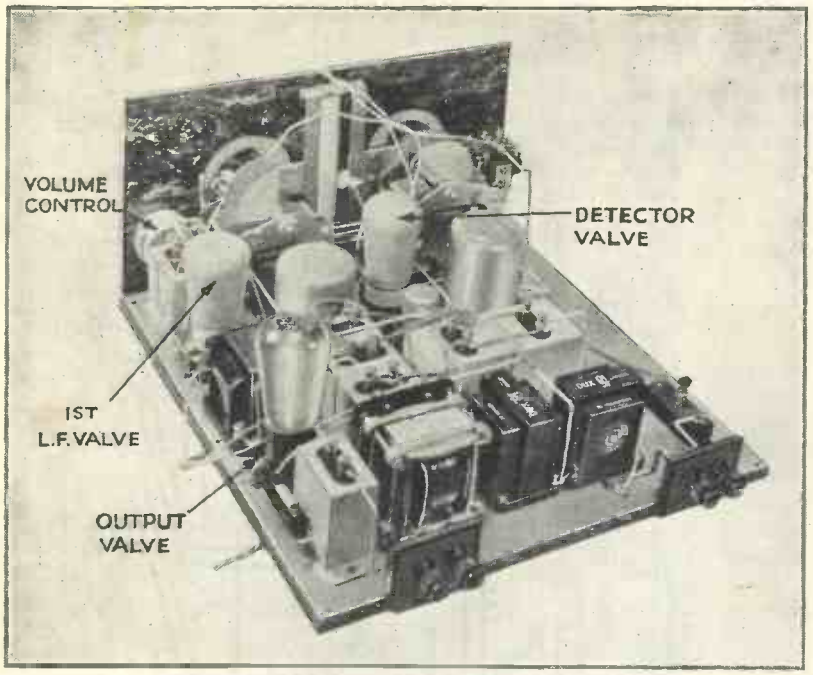
Experienced constructors will know that this is a further decoupling device which makes for stability.



QUARTER-SCALE LAYOUT AND WIRING DIAGRAM

This is a quarter-scale layout and wiring diagram of the Percy Harris Radiogram. If desired 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 August 31. Ask for No. WM294 and address your application to "Wireless Magazine" Blueprint Dept., 58-61 Fetter Lane, London, E.C.4. When wiring up connect the leads in the numerical order indicated.

THE PERCY HARRIS RADIOGRAM—Cont.



COMPLETELY ASSEMBLED AND READY FOR USE

Here is the Percy Harris Radiogram completely assembled and ready for placing in the cabinet. The mains gear is arranged separately in the bottom of the cabinet

Having considered the theoretical circuit diagram, let us see how we apply it in practice. The cabinet chosen is practically square, with the gramophone motor, turntable and pick-up at the top.

A particularly ingenious and interesting tuning arrangement has been chosen for this receiver, in which a vertical scale with two pointers, which can be made to run up and down, indicates the adjustments for the various stations. This vertical scale is illuminated by a lamp run from the 4-volt winding of the power unit.

Automatic Signal Light

When the set is switched off the dial light is also switched off with it, so that we can tell at a glance whether the set has been left on.

Volume control and radio-gramophone switch, being connected together, are placed together on the right-hand side in such a position that the leads going to them are as short as possible. It is important in a set like this to be careful of such leads, for these are connected in the grid circuit of the first low-frequency stage and we do not wish to bring them too near the detector-grid circuit, otherwise there may be undesirable feed-back effects.

As the tone control is connected to the grid circuit of the last valve, this, too, must be kept away from the grid circuit of the previous valve, and therefore it has been placed on the side of the cabinet as close as possible to the grid.

Wave-change and on-and-off switch are placed to the left of the tuning control and also fall in logical positions, while the reaction knob is placed immediately above the illuminated scale so that it can be used conveniently with either hand.

Base of the Cabinet

The base of the cabinet contains the mains transformer, metal rectifier, and the two 4-microfarad condensers which form the voltage-doubling circuit. The unsmoothed current is then taken to the smoothing circuit—two chokes and two 4-microfarad condensers.

The parts are so laid out that constructional work is very easy.

I find in my correspondence that in spite of frequent advice to the contrary some readers make changes

Components Needed for the Percy Harris Radiogram

CHOKE, HIGH-FREQUENCY
1—Wearite screened, type HFP, 3s. 6d. (or Kinva).

CHOKES, LOW-FREQUENCY
1—Tunewell, type 30/50, 15s.
2—R.I. Dux, 17s. 6d. (for smoothing)

COILS
2—Colvern, type TD, 17s.

CONDENSERS, FIXED
1—Lissen .0003-microfarad, 1s. (or T.C.C., Dubilier).
1—Lissen .006-microfarad, 1s. 6d. (or T.C.C., Dubilier).
1—Lissen .01-microfarad, 2s. (or T.C.C., Dubilier).
5—Peak 2-microfarad, 1,500-volt test, 18s. 9d.
4—Peak 4-microfarad, 1,500-volt test, £1 7s.

CONDENSERS, VARIABLE
2—Simplicon .0005-microfarad, type Star UR, 10s.
1—Magnum .0001-microfarad differential reaction, 5s.
1—Formo pre-set .001-microfarad maximum, 1s. 6d.

DIAL, SLOW-MOTION
1—Simplicon full-vision scale, type FVV, 13s. 6d.

EBONITE
1—Becol panel, 13½ in. by 7 in. by $\frac{3}{16}$ in., grained, 6s. 2d.

FUSE
1—Magnum with bulb, 1s. 3d. (or Bulgin, Readi-Rad).

HOLDERS, GRID-LEAK
1—Readi-Rad, 6d.

HOLDERS, VALVE
3—Telsen five-pin, 2s. (or W.B., Lotus).

METAL RECTIFIER
1—Westinghouse, type HT7, 17s. 6d.

PLUGS AND TERMINALS
4—Belling-Lee terminals, marked: Aerial, Earth, L.S. (2), type B, 2s. (or Clix, Eelex).
1—Bulgin mains plug and socket, type F15 4s.

RESISTANCES, FIXED
1—Varley 20,000-ohm spaghetti, 1s. (or Magnum, Bulgin).
1—Varley 30,000-ohm spaghetti, 1s. (or Magnum, Bulgin).
3—Varley 50,000-ohm spaghetti, 4s. 6d. (or Magnum, Bulgin).
1—Varley 750-ohm tag, 1s.
1—Varley 1,000-ohm tag, 1s.
1—Lissen .25-megohm grid leak, 1s.

RESISTANCES, VARIABLE
1—Wearite .25-megohm potentiometer, type Q22, 4s.
1—Multitone 4-megohm potentiometer, 3s. 6d.

SUNDRIES
Glazite insulated wire for connecting.
Length of rubber-covered wire.
Length of twin flex.
1—Pair Bulgin panel brackets, type PB4, 1s. 3d.
1—Sheet of aluminium foil, 14¾ in. by 14 in.
1—Bulgin Duplex needle cup, 2s. 6d.

SWITCHES
1—Bulgin gramo-radio, type S86, 2s.
1—Bulgin toggle on-off, type S80, 1s. 9d.
1—Wearite four-pole change-over with terminals, type 124, 5s.

TRANSFORMER, LOW-FREQUENCY
1—Multitone, 17s. 6d.

TRANSFORMER, MAINS
1—Heayberd, type W25, £1 1s.

ACCESSORIES

CABINET
1—Smith table radiogram (oak), £2 15s.

GRAMOPHONE MOTOR
1—Garrard Junior induction, type 202A, £2 18s. 6d.

PICK-UP
1—British Radiophone, £1 2s. 6d.
1—British Radiophone pick-up rest, 1s. 6d.

VALVES
2—Mullard 354V metallised, £1 7s.
1—Mullard 104V, 15s.

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

SIMPLE AND EFFICIENT MAINS SET

in the layout of a set so as to accommodate it into a particular cabinet or on a special baseboard.

The layout of this set has been very carefully worked out to avoid interaction between parts and there is a definite reason for every position. Do not, therefore, be tempted to remove the tone control from the side of the cabinet and place it by the volume control.

You may find it more easy to handle in this position, but remember it will vitally alter the layout to do so and most probably spoil the working of the whole set.

Components on Cabinet

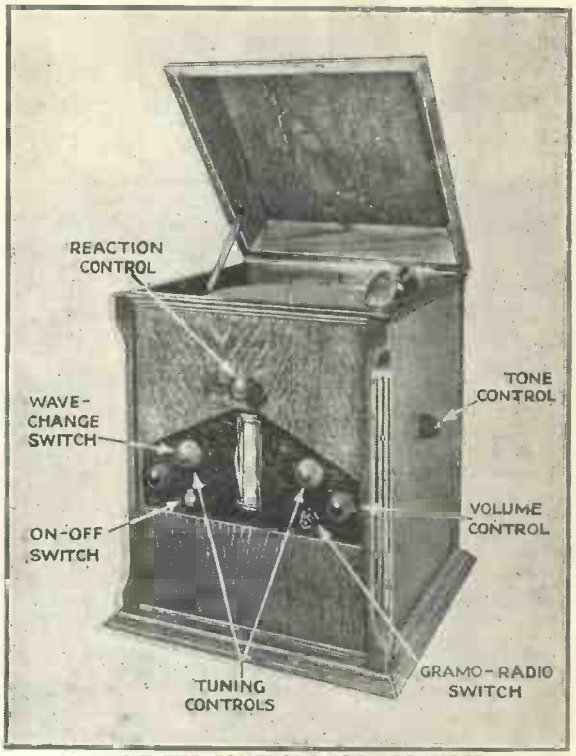
When the set has been built up on the baseboard you will have six flexible leads which have to be connected to components which are fastened to the cabinet itself. These last are the tone-control potentiometer and the reaction condenser, the former being on the side and the latter on the front of the cabinet.

There will also be two flexible leads coming from the pick-up and, of course, you will have your mains leads from the motor.

Two leads from the power unit in the base of the cabinet will have to be taken to the aluminium sheet (which is common negative) and to one terminal of the right-hand choke (looking from the back). The flexible lead which comes into the cabinet from the power or light socket is cut so that one side goes directly to the switch and the other to one of the input terminals of the transformer, the second input terminal going to the remaining flex lead and so out.

The transformer is marked 210, 230 and 250 volts respectively, so that the correct terminal can be used for your particular mains voltage. Instructions for joining up this transformer are given with the component itself and these should be read carefully before using the transformer.

Operation of this set is particularly simple despite there being several controls. Before switching on, set the reaction condenser to zero (turn as far as it will go in an anti-clockwise direction) and turn the wave-change switch to the medium-wave position (in an anti-clockwise direction).



HOW THE CONTROLS ARE ARRANGED

This photograph shows clearly how the controls on the Percy Harris Radiogram are arranged. Note particularly the tone control on the side of the case. The turntable and pick-up can be seen at the top

The gramo-radio switch is put on "Radio" and the volume-control potentiometer is turned as far as it will go in a clockwise direction, or full on. The compression condenser in the aerial circuit should be screwed well down and the flexible lead from this should go into socket No. 1 of the first coil so as to give the maximum aerial coupling.

Now turn the knobs of the two tuning condensers so as to keep the pointers roughly together and you will soon pick up a powerful station; then tune more accurately by turning one or the other knob so as to get best signals. Finally, get the best results of all, if the station is a distant one, by judicious use of the reaction condenser, which will be found to operate very smoothly.

Incidentally, if you do oscillate you'll do little harm, as practically nothing can reach the aerial.

Controlling Tone

The tone-control potentiometer knob should now be turned one way or the other until the tone given by the set is the most satisfactory.

You can then lift the lid of the cabinet, place a record on the gramophone turntable, switch on the motor and turn the knob of the gramo-radio switch to "Gramophone."

You will now immediately get wonderful reproduction—probably the best you have yet heard—with the volume controlled to a nicety on the volume-control knob.

During the currency of this issue of "Wireless Magazine," the original model of the Percy Harris Radiogram will be on show in Selfridge's, Somerset St., London.

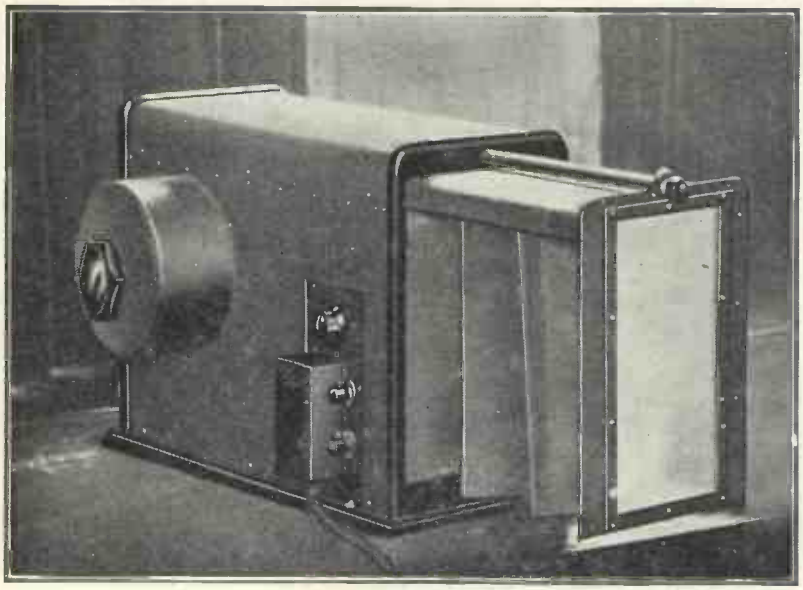
The Wireless Zoo

The Wireless Hog, or Grabber, spends
Most of his time annoying friends;
"My set's gone wrong," he will begin,
"May I share yours? Let me tune-in!"
Though you are wanting Aberdeen,
He grunts: "That's not the one I mean,"
And ere your programme has begun,
Tries foreign stations, one by one.
"Oh, how we wish," his victims sigh,
"We could intern him in his sty!"

LESLIE M. OYLER

A NEW TELEVISOR

By D. SISSON RELPH



THE LATEST FORM OF BRITISH TELEVISION RECEIVER
This is the new Televisor produced by Baird Television, Ltd. The received picture is viewed on the extended screen, the image being black and white

WITH the introduction of a new type of television receiver recently demonstrated to "Wireless Magazine" by Baird Television, Ltd., it seems likely that interest in this subject be re-awakened. At last British television seems as if it will acquire a definite entertainment value.

The chief feature of the new Televisor (which is illustrated by the photographs on this page) is that the picture is viewed on an extended screen; it is no longer necessary to look through a small lens. In this way a room full of people can watch the reception at the same time.

Black-and-White Pictures

The second point of interest is that the reproduced image now has a black-and-white texture, which is very much better than the reddish picture given by previous machines.

As will be clear from the upper of the two photographs on this page, the screen is pulled out like the bellows of a camera. Its size is 4 inches wide by 9 inches high and the received picture occupies the whole of this space.

JOHN L. BAIRD WITH HIS NEW INSTRUMENT
Here you see John L. Baird, the British television inventor, with his latest form of Televisor, which will be put on the market very soon

The definition, when a full face is coming through (at least, on the landline test I saw the other day) is remarkably good and is a distinct advance on anything the first Televisors could produce. There is not the slightest difficulty about recognising the features that are being transmitted.

With a full-length figure the definition is not, of course, so clear, but still there is a definite entertainment value. I saw a cartoonist at work on large-size cartoons, and it was possible to see clearly every line that he drew.

There is still a fair amount of flicker, and the reproduction is nothing like even home-cinema quality, but I feel convinced that a real step forward has been made with the new apparatus.

"Hunting" Reduced

Hunting (that is, the up-and-down motion of the picture), although still present to some extent, has been much reduced. During the demonstration I attended not once did the picture move more than an inch or so either up or down on the screen.

It will be seen that the new machine is very much more compact than was the Televisor originally put on the market by the Baird Company. This is due to the fact that the scanning disc has been done away with, the picture now being built up by means of small mirrors fixed to a revolving drum.

The neon lamp has also been replaced by a special form of Kerr cell, which enables a black-and-white image to be produced.

The Televisor illustrated in these pages is completely mains operated.

The size of the instrument, when closed, is 18 in. long, 8 in. wide, and 13 in. high.

At the time of going to press it is impossible to say when and how the new Televisor will be marketed, the Baird Company not having yet made any final decision on these points. The price, also, has not yet been fixed, but I understand that it is unlikely that the new Televisor will cost more than the original model, which sold at 25 gns.

About the time this issue of "Wireless Magazine" is published the B.B.C. has arranged to start an evening session of television transmissions. These are to be of half-an-hour's duration and will be broadcast four times a week, from 11 p.m. to 11.30 p.m. The stations used will be London National and Midland Regional, both normally having closed down by 11 p.m.

Prof. Appleton's Adventure

AS part of a world-wide year of intensive scientific observation in Polar regions the Radio Research Board has recently sent out an expedition to Tromso, a remote Norwegian town on the Arctic Circle.

Headed by Professor Appleton, who is now internationally famous for his work on the Kennelly-Heaviside layer, and for his discovery of a still higher region of ionised atmosphere called the Appleton layer, this British contingent of radio research workers propose to make a study of atmospheric ionisation in the Polar regions.

Object of Experiments

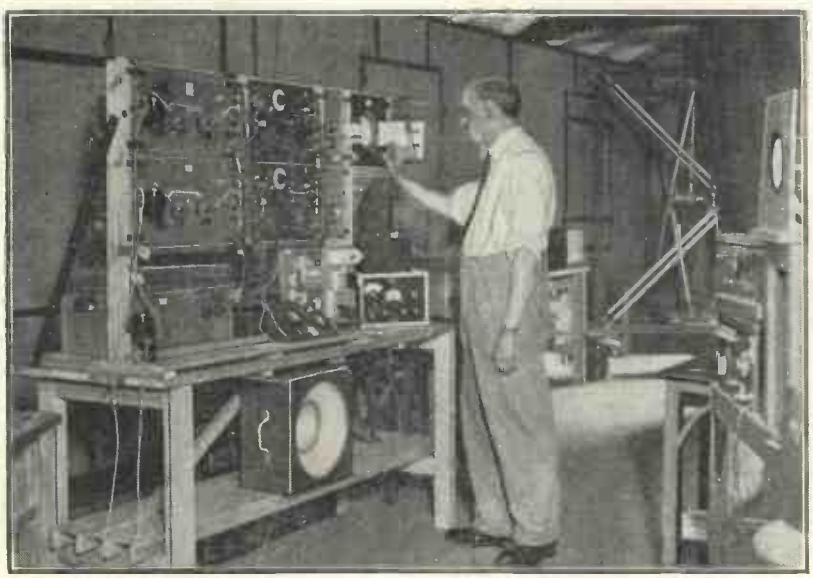
The chief object of the experiments is to measure the intensity of the ionisation—to see how many "thimbles full" of ions there are at different heights in the atmosphere.

Special apparatus has been built for these measurements, consisting of a transmitter to be erected at Simavik, 12 miles from Tromso, and a super-heterodyne type of receiver with a cathode-ray oscillograph.

Automatic photographic mechanism will record the oscillograph pictures produced by the incoming signals, which will comprise not only the direct ray from Simavik to Tromso, but also all the reflected rays from regions above the earth.

These radio echoes of the main signal will be analysed by what has been called a polarimeter, specially developed by the Radio Research Board.

The whole work is expected to enlarge our knowledge of the regions causing reflected rays. Short-wave long-distance communication may benefit considerably when the work, which will take just over a year, is finally completed.



RADIO GEAR FOR THE ARCTIC CIRCLE

This is a "polarimeter," an instrument for studying the nature of the echoes reflected from the ionosphere. The observer is watching the pattern produced by the echoes on the screen of a cathode-ray oscillograph

"Radio Advertising"

To the Editor, "Wireless Magazine."

SIR,—I feel I owe a great debt of gratitude to Mr. Percy Harris for it was one of his sets which introduced me to wireless and gave me some years of great enjoyment until the increased power of stations made something more selective essential.

But I cannot pass without remark his views on radio advertising as expressed in the July number of "Wireless Magazine."

Imitating Possibilities

I have no personal experience of the manner in which this advertising is carried out in America, but I do think that it would be irritating to have each small programme prefaced by a talk on perfumes, face powders, women's clothing, etc.

My views are mainly based upon what I can experience any evening. Let any listener take a programme from Toulouse, Poste Parisien, or Fécamp, and listen to it for a couple of hours and I guarantee he will be cured of any desire to listen to advertisements from the B.B.C.

Even the news items of these stations are interlarded with advertisements, including notices of sales at the various shops.

It seems to me to be absolutely fatuous to complain that the B.B.C. refer to their publications. This is only done after the news and is done with the object of helping listeners to get the maximum from the programme.

Trivial Faults

To object to such references surely only shows how some people long to find fault and the triviality of this fault is so slight that it is good proof that there is not much wrong with the B.B.C.

Folkstone. *E. A. Estcourt.*

[Percy W. Harris replies: "I should like to avail myself of Mr. Estcourt's guarantee, as I have frequently listened to Toulouse, Poste Parisien, and Fécamp! If he will read my article again he will see that I point out how bad radio advertising defeats its own end. I am only in favour of *good* advertising, just as I am in favour of *good* programmes."]

READERS' TESTS of "W.M." SETS

Here we present nine enthusiastic reports from readers 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 reproduced in these pages.

EASYTUNE 60
(May, 1932)

Tenterden (Kent). — Congratulations on the Easytune 60. It is fine. The amazing part is that neither sensitivity nor selectivity is sacrificed in spite of its being the easiest set imaginable to operate.

◆ ◆ ◆

ECONOMY RADIO GRAMOPHONE
(March, 1932)

Weston-super-Mare (Somerset).—You ask for reports of the Economy Four. One word gives it to you. GREAT ! I have in the last fifteen minutes logged thirty-eight stations on the loud-speaker on the medium waves and five on the long. I am working the set without a preset condenser, and there is no sign of our local station (Cardiff, twelve miles away) two degrees either side of the correct reading.

◆ ◆ ◆

NEW ECONOMY THREE
(December, 1931)

Hull (Yorks.).—I built this set for a friend, and on a very bad frame aerial I brought in about forty stations on the medium waveband. Every station was clear and loud. On the long waves : Huizen, Radio Paris, Daventry, Zeesen, Eiffel Tower, two Moscow stations, Motala, Warsaw, Kalundborg, and Leningrad all came in clear and loud.

◆ ◆ ◆

QUADRADYNE
(February, 1932)

Ilford (Essex).—I have pleasure in telling my experience with this set. Built from a standard set of components I did not find the construction unduly difficult. During the last seven years I have built twenty-three " W.M." and " A.W." sets for myself and friends, and I have no hesitation in saying that the Quadradyne is the finest general-purpose set I have put together.

Super-het selectivity is not obtained, neither does one expect it with this type of circuit. Nevertheless, every worth-while foreign station can be received at full loud-speaker strength free of interference. I find that on the long waves selectivity is even better than on the medium waveband, and the gramophone side is excellent. The aerial used is 65 ft. long and, with of plenty high tension, I am getting superlative results.

Madrid (Spain).—I recently built the Quadradyne, and the results are splendid. The selectivity is amazing, and stations more than 600 miles from here are heard like locals. Congratulations for your efficient design. You must know that it is very different to test a set in London where a three-valver would bring in ten or more stations, and here where you need seven tubes to have alternative programmes.

A NEAT LOOKING JOB

Here is a photograph of a St. Alban's reader's version of the 1932 Super 60. He reports excellent results

IDEAL HOME SUPER
(April, 1932)

Littleworth (Staffs.)—Towards the end of April I built the Ideal Home Super for a friend who lives near Brighton (Sussex), who for years has complained of interference from shipping, lack of selectivity, etc. An extract from his letter reads as follows : " What a winner ! Stations galore and practically no interference. At last I can enjoy the beauties of radio."

I have been building sets myself since 1919, when I was in the R.A.F. I was very pleased with the Ideal Home Super myself, although having built a number of " W.M." sets I was not surprised, as it simply lives up to reputation.

◆ ◆ ◆

SUPER SENIOR
(October, 1931)

Old Hill (Staffs.).—I made the Super Senior some two months ago and I am very well satisfied with it. The volume obtained is very surprising. The foreign stations are as loud as the local ones. I can get music at any time with this set.

◆ ◆ ◆

SUPER 60
(March, 1931)

Sleights (Yorks.).—I am writing to tell you how pleased I am with the Super 60, which I have had in use about a year now. The cabinet, set and loud-speaker are all home-made, the latter being a " W.M." linen-diaphragm model. I will not give you a log of the stations received because it is similar to that of many other builders of the Super 60. Again thanking you for the " Perfect Set."

◆ ◆ ◆

1932 SUPER 60
(January, 1932)

Bradfield (Berks.).—Using this set with a 50-ft. aerial, I have logged over eighty stations on the long and medium wavebands and, by using a short-wave adaptor, about forty more on the short waves. The quality of the radio and gramo-radio is quite good.

Complete Short Story

SUPERKINEMA—1941

A forecast of how television and "synthetic" radio music may develop in the future. This story will be read with interest by every owner of a radio set

"THIS looks good," said George suddenly, sitting up abruptly in his chair, and handing me the evening *Clarion*, folded back at a page headed "Electrical Entertainments," his finger on a small paragraph.

I glanced at the date as I took the sheet. It was February 29, 1941. My eye ran down the column to the item he had indicated. Under "Television Programmes" it read:

Special Pick-up To-night

The concluding stages of the Los Angeles-New York transcontinental road race for crude-oil cars will be broadcast and exhibited in England from 8 to 8.30 p.m. to-night over the whole of the World-wide system of television theatres.

"That should be worth seeing," continued George excitedly. "They say that young 'Blitzen' Barracuda, the favourite, has some secret supercharger equipment fitted which gives him about 200 miles an hour on the straight stretches and a very lively possibility of an appalling blow-up any minute. Come on, let's go."

"O.K. with me," I replied, unconsciously using an Americanism I had picked up in the early days of talkies some nine years before, and which persisted in coming out occasionally, despite my long sojourn of seven years in the heart of Africa, thousands of miles away from civilisation, engaged on botanical research.

George opened the door of his very modernistically decorated and furnished service flat, and we took the lift to the basement. Here, in little concrete stalls like old-fashioned horse boxes, were rows of diminutive baby cars, all of uniform size and shape, beautifully low-built and streamlined. Here was something new to me, returned from abroad only in the early hours, and having slept all day.

"These are Metropolis electric runabouts," explained George, "built under monopoly by a big manufacturing company to comply with the stringent regulations for limitations of fume-producing automobiles in metropolitan areas.

"This cable keeps the battery continuously charged," he continued, removing a heavy cable hanging like a halter from the front of the car, "and the cars are always ready for use—absolutely reliable, quiet, clean and comfortable. They're becoming immensely popular for running about town and you'll see hundreds on the road to-night."

He opened the door of the little low-built dull-metal coupé, and, after settling ourselves comfortably in its snug interior, we slid smoothly and noiselessly up the concrete run-way on to the main road.

We drove rapidly down to town, the road appearing very peculiar at first sight by reason of the surface lighting, which came from the edges of the curbs, made apparently of some transparent material with the lights fitted under the curbstones. These road-level lights were supplemented at frequent intervals by the conventional centre pillars surmounted by artistic and efficient globes of futuristic design.

Presently a huge block of buildings, ablaze with neon lighting along every cornice, and flood-lighted to the top of its huge central tower, appeared in view.

George pushed the mono-control steering wheel of the little runabout away from him slightly, and the car slowed up.

"This is a 'double-W' theatre," he announced, "or, to give it its correct designation, the West Central Regional Theatre of the World-wide Television Theatre Corporation, and its American auditorium will be giving the programme we want. We turn in here."

The car slid down the concrete ramp into the basement car park with its row of little stalls, into one of which George steered the car. An attendant handed him a peculiarly shaped metal tally and connected the charging cable to the front of the car.

Around us other parties were arriving and hurrying along a carpeted aisle to the foyer at the far end. We followed the crowd and George paused in the foyer. A solitary attendant was courteously answering inquiries and directing patrons, occasionally glancing at illuminated indicators on which were flashed little coloured lights as the auditorium seats filled up.

I was struck by the almost complete absence of the garish posters and highly coloured advertisements which I had always associated with

SUPERKINEMA: 1941—Continued

cinemas ten or twelve years back.

"The whole business is now run on more dignified lines," George explained, "and the general standard of cinema patrons has gone up considerably during the past few years, particularly in the television theatres, where topical interest and propaganda presentations are so prevalent."

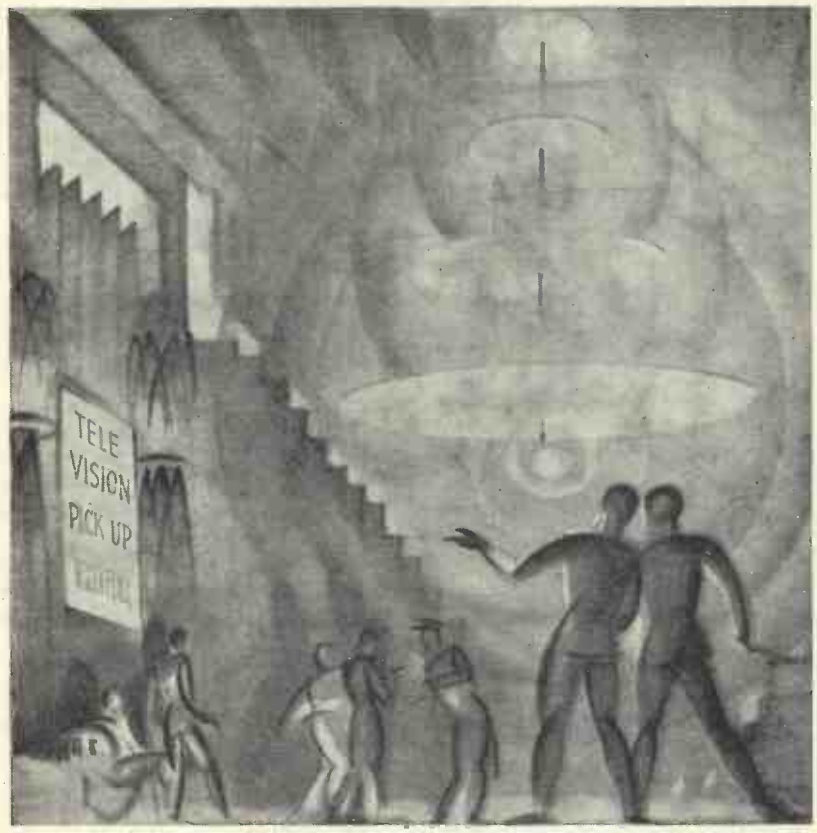
The only display advertisements of programmes consisted of a beautifully designed panel let into the wall on which appeared the headings "Television Pick-up," "Television Film Transmission," and "Stage Show," with details of the respective items.

"The television pick-up," George explained, "is the reception of events actually happening, such as the race we are here to see to-night. It resembles the old-style news reels, except that the events are actually happening at the time of presentation.

"The television film programme is the same as the talkies you remember in the old days, except that instead of every theatre running its own films at its own time, the whole chain of theatres belonging to one company, as for instance the 200 theatres of this World-wide circuit, all have their films televised to them over landlines from the Central Theatre in the Electrical Entertainments Building at Regent Street.

"There are no projectors or films here—no operators—no risk of fire—no deviation from programme time—just a television projector which receives its programme from the Central Theatre, which runs absolutely synchronously with every other theatre on the World-wide chain in this country."

"This new system must have created some unemployment, I imagine."



"The whole business is now run on more dignified lines," George explained, "and the general standard of cinema patrons has gone up considerably during the last few years, particularly in the television theatres, where topical interest and propaganda presentations are so prevalent."

"Yes," admitted George, "just as talkies upset the theatre orchestras, so the television equipment put the operators out of work, but since the big industrial and electrical boom in 1936 they have been easily absorbed into other newer scientific industries."

In the meantime my eyes had been roving round the foyer. I had noticed several turnstiles, above each of which was an illuminated sign (among others I read "Home," "American," and "European") and the complete absence of any pay boxes or cashiers.

"This is a flat-rate theatre," George remarked, thus answering my unspoken question, "two shillings to anywhere in the house," and we proceeded to the turnstile under the "American" sign.

He pressed two florins into the slot at the side of the machine, the turnstile clicked quietly, and we passed through and along a short corridor, up a few stairs, and through the double swing doors into the auditorium.

Inside the auditorium I felt on more familiar ground. There was still the same darkness, the heavily carpeted aisles, and the smart trim-figured attendant to show us to our seats, which were, if anything, a shade more luxurious and comfortable than the best of those I had lounged in back in 1932.

Affixed to the back of the seat in front, within handy reach, was the familiar ash-tray, and also a small automatic machine for cigarettes and matches. There was also a neat little indirectly-illuminated glass panel on which glowed the details of the programme.

We had timed our arrival opportunely. As we took our seats the curtains closed on what was apparently the finale of the stage show, and the orchestra, which I judged to be at least forty-five or fifty strong, disappeared into the orchestra pit on their slowly sinking dais. I glanced at the big clock over the proscenium arch. Five minutes to eight.

I was just about to ask George whether organs were still in vogue when the majestic opening notes of Wagner's *Tannhäuser* Overture made the auditorium tremble, and a spot-light stabbed the darkness and flamed on a young man at a console rising slowly from below stage level.

The music was magnificent, and in tonal quality it seemed at times to sound like nothing I had ever heard before. There was peculiar string tone almost human in its expression—a majestic bass with amazing timbre and volume, sounding like an enormously amplified 'cello in quality—a piping treble of flute-like brilliancy which was of

TELEVISION OF THE FUTURE

such beauty that even my practical and comparatively non-musical senses were affected.

What, I wondered, was this amazing instrument, this wonderful successor to the erstwhile king of instruments, the organ?

While the music swelled and throbbed a most amazingly blended flare of colour was thrown on the magnificent stage curtains, which changed in colour and pattern through an endless variety of shades of colour following the moods of the music, as a veritable symphony in coloured light was flooded on to them.

As the console sank slowly into the floor, the smiling young performer bowing to the tumultuous applause, I turned to my illuminated programme for enlightenment. The item read: "7.55 p.m. to 8.0 p.m. Excerpts from *Tannhäuser* Overture (Wagner), played by Leon Cunningham on the Majestic Multi-audion."

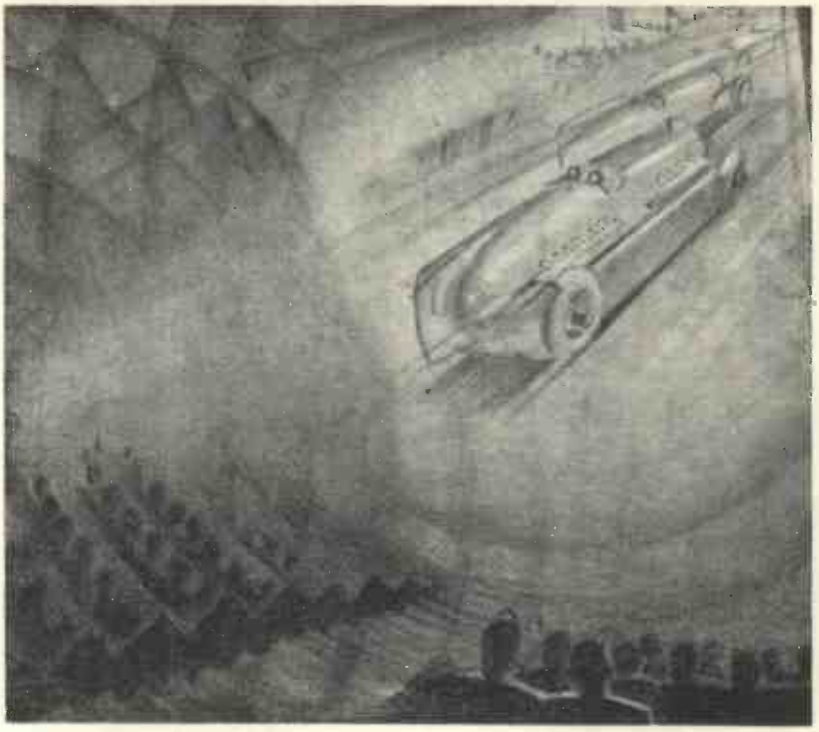
I asked George for details of the amazing instrument.

"Oh," he laughed, "it's just another development we have to thank the electrical experts for. It uses oscillating radio valves to create audio-frequency currents having unusual harmonic formation—or, in plain English, it is just an enormously complicated version of the old wireless set which used to play tunes by whistling and howling as you turned the dials and knobs, only the scientific and electrical people have improved the idea so much that it is possible not only to duplicate the organ and full orchestra, but also to introduce new tones in music which could not be obtained with any wind, string, or percussion instrument.

"It's—hullo, here we are," he broke off excitedly, "the race is on," and, as he spoke, from behind the curtains burst a roar of noise in which I distinguished the babel of thousands of people and the occasional shriek and whine of accelerating cars.

"It's the television pick-up," shouted George in my ear, "straight from America." And with the words the heavy curtains swept open and the screen disclosed to us a scene such as I had often watched at Brooklands motor-race meetings many years before.

Thousands of people—cars parked in serried ranks—the noise of the crowds—the blare of loud-speakers—and, above all, the occasional shriek of a supercharged car as it swept into view and passed the grandstands in a swirl of dust and with a deafening roar.



"It's the television pick-up," shouted George in my ear, "straight from America." And with the words the heavy curtains swept open and the screen disclosed to us a scene such as I had often watched at Brooklands motor-race meetings many years before

"Don't forget this is going on *now*," yelled George in my ear. "This didn't happen yesterday or last week. It's happening this very moment."

For half an hour we watched, from every conceivable vantage point, the most thrilling road race I have ever seen. Hairbreadth escapes—an occasional accident—one horrible scene I cannot describe—everything could be seen and heard better than if actually present, because of the many view-points presented.

The picture was wonderfully clear and detailed, the sound amazingly lifelike.

Here were we, seated comfortably at night in a theatre auditorium in London, looking in on a thrilling event happening in the blazing sun of the early afternoon thousands of miles away! The crowning achievement of electrical communication!

The thirty minutes passed all too quickly, and as the curtains closed and the excited voice of the American commentator and the noise of the crowds faded out I sat back with a sigh of regret at this all-too-short introduction to the newest form of entertainment, and with the firm conviction that the television theatre had claimed yet another rabid supporter.

The programme that followed this "high spot" of the evening was excellent fare of a very similar type to the talking picture I had previously been acquainted with. The picture was perfectly projected, being almost stereoscopic in quality, and the sound was perfectly modulated and absolutely natural.

This was probably due to the comparatively small size of the auditorium, which I should imagine held about 1,500 patrons only. I queried George on this point, as we left after the show.

"Yes," he said, "the building of the big 5,000- and 6,000-seat houses slowed down about 1935, and the tendency nowadays is to reduce the size, partly because the complete television theatre must have at least six separate and specialised auditoriums to keep in touch with all world events, and partly because the small auditorium is more suitable for natural presentation of the talking picture."

(*Continued at foot of next page*)

Stories of the Operas

DER FREISCHUTZ

(The Freeshooter)
By Weber.

CHARACTERS

PRINCE OTTOKAR.....Baritone
CUNO, *Head Ranger*.....Bass
MAX, *a forester*.....Tenor
KASPAR, *a forester*.....Tenor
KILIAN, *a peasant*.....Tenor
A HERMIT.....Bass
ZAMIEL, *a huntsman*.....Speaking Part
AGATHE, *Cuno's daughter*.....Soprano
ANNENCHEN (Annette), *her cousin*
Soprano

Time: Mid-eighteenth century. *Place:* Bohemia.

ACT I

A scene at the target range. Max, the forester, has been defeated at a prize shooting by Kilian, a mere peasant. Naturally, Max should have won; he has always been accustomed to firearms. Kilian is rather unsporting; he rubs in his victory. He and the villagers join in the Mocking Chorus.

Cuno, a crack shot, is troubled over Max and his failure, not only now, but for some time past, especially as to-morrow there is to be a shoot before Prince Ottokar. Max is in love with Cuno's daughter, Agathe.

Max seems to have lost his cunning. When the others have gone, Kaspar approaches him, hands him his gun and points to an eagle in the sky. Max shoots. It is a fine shot; Kaspar tells him the bullet is free, in other words, charmed. If Max will meet Kaspar in the Wolf's Glen at midnight, they will mould bullets with which he can win Agathe on the morrow. Max consents.

ACT II

Agathe's room in the Head Ranger's house. Agathe has gloomy forebodings. Even Annette cannot cheer her. Max enters, but says he cannot stay as he has shot a deer in Wolf's Glen and must go after it.

The scene changes to the Glen, the haunt of Zamiel, the wild huntsman, supposed to be Satan. Kaspar has sold himself to Zamiel and now proposes to turn Max over to him in order to gain a short respite on earth. Max and Kaspar make seven magic bullets, six of which go true to the mark, the seventh where it is willed to go.

ACT III

The final scene is the forester's house again. Agathe still unhappy. She is dressed for the test shooting, which, if Max is only successful, will make her his bride. The test takes place. Max has only the seventh bullet, having expended the other six on the hunt to show off his skill to the Prince. Kaspar climbs a tree and watches. The Prince points to a flying dove.

Agathe enters with the hermit and calls to Max not to shoot; she represents the dove. But he has shot the bullet; Agathe falls in a swoon. Kaspar falls from the tree fatally wounded, the victim of the seventh bullet. Max confesses everything and is forgiven.

Whitaker-Wilson.

An Electric Clock in Your Set

EVER since electric clocks were produced on the mass-production scale keen experimenters have been interested in the possibility of building radio sets incorporating such a timepiece. If the user of the set has synchronised A.C. mains of 50 cycles frequency there is nothing to prevent this being done.

WORKS FROM THE MAINS

The Ferranti clock drum for incorporating in a mains radio receiver; it always gives the right time

The chief difficulty up till now has been to obtain a suitable movement without a case. Now Ferranti's have produced such a clock; it is illustrated here.

There are already indications that a number of set manufacturers will incorporate such electric clocks in their receivers for the next season and many home constructors will undoubtedly want to follow suit.

The Ferranti clock drum costs £1 10s., and is suitable for mounting on panels between $\frac{3}{16}$-in. and $\frac{3}{8}$-in. thick.

Those who are not familiar with the working principle of synchronised electric clocks are referred to the article by J. H. Reyner, B.Sc., A.M.I.E.E., that appeared on page 283 of the April issue of *Wireless Magazine*.

In view of the fact that many people are still unfamiliar with this new type of clock it should perhaps be emphasised that they can only be used on A.C. supplies of the *synchronised* variety.

Before buying an electric clock, therefore, it will be just as well to find out from the local power-supply company whether or not your supply is synchronised.

FOR PANEL MOUNTING

This clock drum is arranged for mounting on the front panel of a radio receiver

Electric clocks will operate from an unsynchronised A.C. supply, but they will not then keep the correct time automatically and will have to be put right from time to time like an ordinary timepiece.

Electric clocks will not work from D.C. supplies at all—still another reason for moving out of a D.C. district if you are unfortunate enough to be living in one!

SUPERKINEMA: 1941—

Continued from preceding page

The lift took us down to the basement car park and George pressed the little metal tally he had retained into the slot in the socket of the charging cable of the car, thus releasing it from its connection and checking the car out.

Ten minutes later we were at George's little apartment. After a quick whisky and soda I took my leave, George escorting me as far as the front door. It was a glorious moonlight night, and in the distance I could see the huge bulk of the television theatre towering into the sky.

"I think I'll walk home," I said. "I want to try to visualise the sort of entertainment we'll be paying for another ten years hence."

"You'll have a hard job to improve on what we have seen to-night," George laughed. "Good night."

RADIO in REVIEW

Working "Over the Bend" :: Artificial Fading :: The Neutron :: More Crystal Sets

By MORTON BARR

THE troubles that arise from working a valve beyond the straight-line part of its characteristic curve are too well known to need repetition. Obviously the first duty of a valve, when used as an amplifier, is to keep the output strictly proportional to the input, and it can only do this so long as it is kept "on the straight."

For instance, the type of interference known as cross-modulation is due to the fact that the straight-line characteristic of the ordinary screen-grid amplifier is comparatively short.

"Over the Bend"

A strong signal is sufficient to carry it "over the bend," so that if another carrier happens to be present in the input at the same time, the two signals are modulated or welded together so firmly that no amount of subsequent tuning can separate them.

The variable-mu valve is designed to minimise this trouble, because there is no sharp bend in its characteristic curve.

A similar effect sometimes occurs in the detector valve, though with a different result. Suppose two transmissions of different strengths but of nearly the same frequency, are being received, say Mühlacker and the London Regional. In a set of average selectivity, Mühlacker can usually be relegated to the distant background, and will remain there so long as the London station is operating.

Increased Strength

But as soon as the latter closes down, the foreign programme immediately increases in strength, although the tuning of the set is left untouched.

What happens is that, at times, the local or stronger carrier wave sweeps the grid voltage on the detector valve so far beyond the bend of the curve (where rectification takes place) that the weaker or distant carrier is unable to swing it back again, and so, for at least a part of the time, the foreign signal is not rectified.

Of course, the frequency at which the grid "swings" occur is such that no apparent discontinuity is noticed in the interfering signal, but since part of its input goes unrectified, this naturally cuts down the signal strength.

When the local station shuts down, the foreigner is no longer artificially "faded out," so to speak, and therefore comes in at higher volume.

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ELECTRONICS

The whole of wireless, and particularly that part of it relating to the thermionic valve, is closely bound up with the study of electrons. Any new development in connection with what has been called "electronics" is, therefore, of rather more than casual interest to radio listeners.

Up to the present we have regarded the electron and the proton as two separate entities, the first being the smallest known unit of negative electricity, whilst the second is its "opposite number" in positive electricity.

The close relation between electricity and matter is shown by the fact that the ordinary material atom is made up of a central portion serving as a focus for several electrons, which continually rotate in definite orbits around it in much the same way as the planets revolve around the sun.

A "close-up" view of this miniature solar system—given a sufficiently powerful microscope—would show the electrons and proton to be widely spaced apart, the electric attraction between the positive and negative charges being counterbalanced by the centrifugal force of rotation, just as the gravitational attraction between the sun and its various satellites is offset by the movement of the latter in their orbits.

Dr. Chadwick, of Cambridge University, has recently discovered that it is possible to fuse a certain number of electrons into close contact with a proton to form a new electrical particle, which has been named a "neutron."

The neutron has no associated field, is relatively massive, and therefore possesses very great penetrative power, particularly as it moves with high velocity.

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WIRELESS IN SCOTLAND

The opening of the new high-power Scottish Regional station will come as a boon to many who live in the remote Highlands and who have so far been practically excluded from the benefits of the broadcast service.

This refers particularly, of course, to those remote districts where it is almost impossible for ordinary folk to use valve reception, partly, perhaps, because of the expense, but more especially because of the difficulties of maintaining and recharging accumulators.

The Falkirk station brings a large area for the first time within reach of crystal reception, and although much of it is thinly populated, those who do live there will appreciate the programmes all the more. In certain localities, for instance, the broadcast "news" bulletins will forestall the newspaper service by the best part of two days. Altogether one may fairly anticipate a fresh boom in crystal sets for Scotland.

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TWO-WAY TELEVISION

A successful demonstration of two-way television has recently been carried out in Paris using apparatus designed by the Baird Company. Both television and speech signals are carried by telephone wires, the subscriber at each end of the line being scanned by infra-red rays, so that he experiences no inconvenience.

Each speaker sees an image of his distant correspondent projected on to a small screen in the telephone cabinet and is able clearly to follow the movement of the lips and changing facial expression. The system is to be exploited in selected areas in France by the Baird-Nathan Company.

The B.B.C. Borrows Two Wavelengths

By ALAN HUNTER

WITH the opening of Scottish Regional at Westerglen, the B.B.C. has once again come up against the shortage of wavelengths. While it has been a simple matter to put Scottish Regional on the wavelength used by Glasgow, namely 376.4 metres, there will be much more difficulty in finding a clear channel for the "fading-in" of the Scottish National programme.

Redundant Stations

As is well known, Scottish Regional has made redundant the stations at Glasgow, Edinburgh, and Dundee, a strong 50-kilowatt signal from Westerglen replacing the relatively minute power previously sent out from these relay points.

Unfortunately, the closing down of the three low-power stations has released only one wavelength—that of Glasgow, for the simple reason that the relays at Edinburgh and Dundee have been on the 288.5-metre wavelength, which is still being used by such stations as Newcastle, Aberdeen, and Bournemouth.

Relay Problems

As this is the only possible wavelength left for Scottish National, something had to be done about the remaining nearby relays, Aberdeen and Newcastle. For, while it is quite possible to work a high-power station at Westerglen on the same wavelength as one or two low-power stations as far away as Bournemouth and Plymouth, there would be far too much "mush" if Newcastle and Aberdeen also shared this wavelength.

It therefore became necessary to search for new wavelengths for the two nearby relays, and thus leave 288.5 metres comparatively clear for the introduction of Scotland's National programme outlet.

The only possible wavelengths available are international common wavelengths and a few of the very poor wavelengths around 200 metres. The B.B.C. has plumped for the exclusiveness of the low wavelengths in preference to the "mushiness" of some of the higher but internationally worked wavelengths.

Strange as it may seem, in these congested days of broadcasting, there are actually two wavelengths doing nothing at the moment, so by international agreement the B.B.C. has borrowed them for use by Newcastle and Aberdeen.

Newcastle will go on to 211.3 metres, and Aberdeen on 214.3 metres. These will be exclusive wavelengths, but owing to the very poor carrying power of wavelengths around 200 metres they will only serve a strictly local audience.

This in itself is not so bad, for listeners in both Newcastle and Aberdeen are on the fringe of the North and Scottish Regionals respectively. It is because they are not actually inside the magic circle of 80 miles radius from the regionals that some sort of extra relay service has been deemed essential for those with small sets. But during most parts of the day and night in Newcastle and Aberdeen the appropriate regional will come in fairly well on quite modest sets.

It is tacitly admitted by the B.B.C. that the borrowing of these very short medium wavelengths may cause a certain amount of tuning difficulty, for it is a fact that many commercial and home-built sets do not, as they stand, tune much below 220 metres, and are therefore unable to bring in the relays on the new wavelengths.

Temporary Transmitters

In order to avoid loss of programmes as much as possible, the B.B.C. proposes to radiate on temporary transmitters tuned to the short wavelengths. These transmitters will, for two or three weeks, be working side by side with the normal Newcastle and Aberdeen stations, so as to enable listeners in the affected areas to make the tuning alterations that may be necessary in order to get down to either 211 or 214 metres. In this connection the B.B.C. has produced pamphlets in which are given some practical hints.

It will take about a week to change over the wavelengths of the stations from their present 288.5 metres to the "borrowed" wavelengths, and during this period the low-power transmitters will carry on the service. Then the higher-powered stations—actually they are 1 kilowatt each—will come into action again.

Less "Mush"

How long the B.B.C. will rejoice in the exclusiveness of its new wavelengths remains to be seen, but it is suggested that less "mush" is likely to be set up in the affected areas when foreign stations take up the wavelengths than when the local high-power station is working on a synchronised wavelength.

When everything has been adjusted, at the transmitting and receiving end, Scottish National will take over its hardly-won wavelength of 288.5 metres. The present indications point to the month of August as being the most probable date of the inception of Scottish National.

We Test Before You Buy

By the "W.M." Set Selection Bureau

Portable Pointers

THIS year there are relatively few portable sets, but those that are available have some very attractive points. Nearly all of the battery-operated portables that have survived run very economically from a standard-capacity battery.

This is because pentodes and power valves with sufficient output to run a sensitive loud-speaker at moderate volume now require only a few milliamperes of anode current.

Don't expect the portable to do what really requires a public-address system—to provide music for dancing on the lawn, or a full-blast programme for a large picnic party. Remember the portable's big limitation is not restricted range, but restricted power output.

One advantage of the portable that is sometimes overlooked is its ability to tune in certain stations normally swamped out by powerful locals. The frame aerial has directional properties, enabling signals coming from one direction to be easily separated from signals coming from any other direction—except the direct opposite direction.

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To Buy or Not to Buy?

That is the question we are being asked at this time of the year, when the season of 1932 is drawing to an end, and the new season of 1933 is looming ahead. Naturally enough, readers in need of new sets are wondering whether to invest now, or whether it would be better to wait until all the new models are announced.

It is a delicate problem. The dealer will naturally tell you to buy now—since his job is obviously to keep up the sales of existing sets as long as he can. Such advice is not disinterested enough to convince our readers, if we may judge by the letters recently received.

Our considered opinion may be of interest to those perplexed by the thought that money and advantages in better reception will be thrown away by buying now. We think that the price question can be ruled out—it is not likely that very substantial reductions will be made.

Prices last year were cut down to such an extent that more than one firm actually produced its models at a loss. There is no reason to believe that the prices of the normal types of sets, such as three- and four-valve consoles and medium-power radio gramophones, will be greatly different from ruling prices.

The other point is whether any radical alteration in technique is likely to be generally adopted in the new season's sets. We think not. The improvements, where made, will most likely be in easier control, greater accessibility for servicing, and possibly in greater freedom from breakdown.

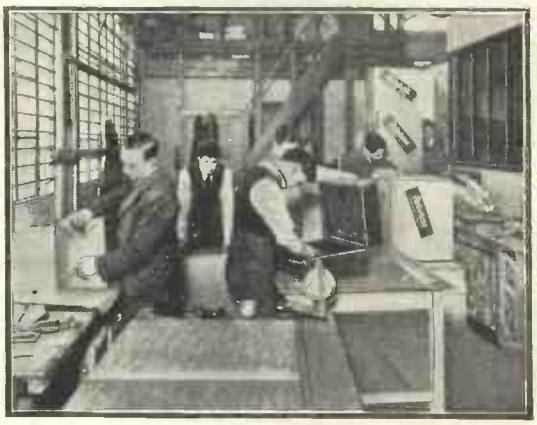
Just as with motor-cars, you find that a set with a season's reputation is often more likely to inspire confidence than a new season's set that has yet to win its spurs.

Every Satisfaction

There are many sets now on the market giving every satisfaction at a reasonable price.

Each year brings less and less radical change in the set designer's technique. The only outstanding advance likely to be seen among the next crop of sets is in the provision of tuning circuits to cover three wave-bands, that is, short, medium and long.

We wish to make it quite clear to prospective buyers of the three sets reported on this month—the McMichael Duplex Four, the Kolster Brandes Electric Kobra, and the Marconiphone Super-tuned Four—that they are new models and will be available during the new season for 1933



READY FOR SUMMER SALES

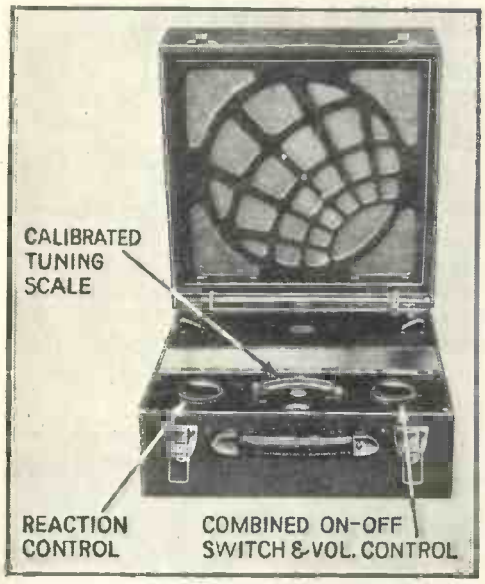
A corner of the dispatch department at the Portadyne works at North Acton, where there are scenes of great activity at this time of the year

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.

McMichael Duplex Four



NEAT APPEARANCE
A front view of the McMichael Duplex Four. The case is finished in leather

NUTSHELL SPECIFICATION

MAKER: L. McMichael, Ltd
PRICE: 17 guineas.
VALVE COMBINATION: Screen grid (Mazda 215SG), detector (Cossor 210HL), low-frequency amplifier (Cossor 210HL), and small power (Marconi LP2).
POWER SUPPLY: Self-contained high-tension battery and non-spillable accumulator.
POWER CONSUMPTION: 9 milli-amperes.
TYPE: Self-contained suitcase portable.
REMARKS: One of the best suitcase portables on the market. Has exceptionally good layout of controls.

ONE of the most satisfactory suitcase portable sets on the market just now is the McMichael. We have arrived at this conclusion after testing a model over a period of two weeks.

Throughout the set there is evidence of careful design, and this is reflected in the ease of operation, the tonal quality, and the high standard of performance in cutting out the powerful locals in favour of the many foreigners within easy range of the set's amplifying properties.

Although it follows convention in the general layout, the McMichael portable is notable for many detailed refinements. The lid of the case contains the loud-speaker and the frame aerials, while the rest of the case is devoted to the four-valve set chassis, a special compartment for the valves, and a third compartment for the batteries.

There are only two batteries, a 2-volt non-spillable cell for the filament supply and a 120-volt battery of the standard-capacity size for the high tension. There is no grid-bias battery, because this is obtained by the bias-resistance method from the high tension.

This practice is commendable in portables, as it reduces battery connection troubles to a minimum, as well as maintaining the right grid bias as the high-tension battery drops in voltage.

The first point that really impressed us was the simplicity of the tuning arrangement. A pointer moves over well-marked scales for medium and long waves. This pointer is worked by the thumb-operated tuning disc, but it is also interconnected with the wave-change switch, so that when the switch is in the long-wave position the pointer moves to the long-wave scale, and the short-wave range is similarly treated.

Tuning is mainly done on the disc, but there is a trimmer close by, to make up any discrepancies in the two-gang tuning circuits.

We were also impressed with the clever engraving of the scales for the two subsidiary controls, reaction on the left and volume on the right. The neat pointer knobs clearly show the function of the controls. Thus the volume control indicates that as volume is decreased so selectivity is increased. Similarly, the reaction scales shows that when reaction is increased so is the volume.

EASY TO MANIPULATE
The tuning scale of this portable is calibrated in wavelengths and every control is clearly marked

Welcome Feature

These little points often confuse the beginner, and that is why we welcome the McMichael engravings.

For the volume control a filament rheostat is used in the screen-grid circuit, instead of the more usual screen-voltage potentiometer. With the valve in the set there is a certain amount of " time-lag " in the action of the volume control due to the slow change in the heating of the screen-grid filament. This is the only technical objection in the whole set.

As for the reaction and tuning, they are quite simple and we were able to get many stations at medium loud-speaker strength. The selectivity is very good, for at six miles from Brookman's Park the two London stations were cut out completely within 20 metres.

Due to the directional aid of the frame aerial, selectivity is above the average in respect of stations coming in from different directions. On the long waves, for example, Zeesen was tuned in absolutely clear of Radio Paris and Daventry, a feat that is impossible with a normal aerial on two tuned circuits.

Quality ? Good, so long as volume is kept to a moderate amount. There is no boom on the bass and speech is clear.

Kolster Brandes Electric Kobra

AS the makers say, the chief object in this set has been to provide a self-contained job at a reasonable price, with sufficient flexibility to meet the somewhat trying selectivity needs of to-day.

It has been recognised when designing this set that some areas need greater selectivity than others. For example, if the set is used in the immediate vicinity of a regional station a much greater degree of selectivity is required than for a set worked, say, fifty miles from a station.

Adjustable Selectivity

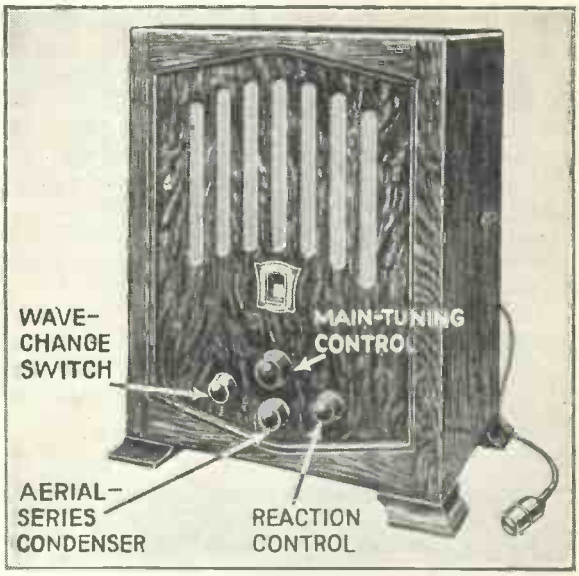
In order not to sacrifice sensitivity in districts that do not require such great selectivity, the makers have provided in the Kobra an inductive coupling circuit, so that any required degree of selectivity can at once be obtained simply by moving a lever on the side of the cabinet to an appropriate position.

Apart from this feature, the Kobra is a straightforward three-valver, with a detector and two low-frequency amplifier circuit, working in conjunction with a moving-coil loud-speaker, which is mains-excited.

The back of the cabinet can be instantly removed for examination of the valves, or for adjustment of the simple mains-voltage panel.

While on the subject of the mains, we note the provision of adequate fuses in the set, and when the back is removed the mains supply is automatically switched off.

There is also a simple plug-and-socket arrangement for using the mains as an aerial, or for the reception of nearby stations.



LAYOUT OF THE CONTROLS

The layout of the tuning controls is clearly shown in the above photograph. The cabinet is made of oak

The great point about the tuning of this set, as already mentioned, is the inductive coupling. But should it be desired to get maximum signal strength, the inductive coupling can be changed over to direct coupling, with, of course, some loss of selectivity.

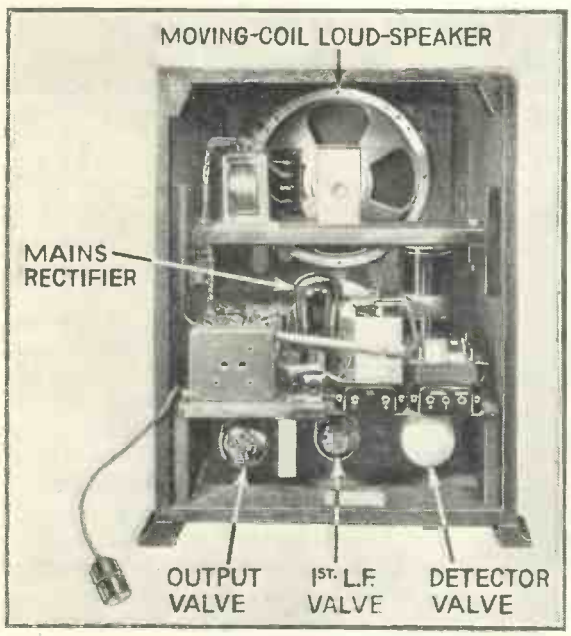
Plugs and sockets are provided at the back, so that either method of aerial coupling can be tried, and separate connections are available for medium and long waves. Thus it is possible to have inductive coupling on the medium waves and direct on the long, or vice versa.

We are impressed with the flexibility of the set's tuning, which is quite easy to understand after following the maker's simple instructions. There is no doubt that for a detector type of set this one is exceptionally good, and once the coupling arrangements have been settled the operation is within the capabilities of anyone.

The main tuning knob below the tuning scale has to be worked in conjunction with the aerial tuning control, which is immediately below. We found it easy to find stations on the main control and to bring them up to full strength by subsequent operation of the subsidiary controls.

The aerial-coupling lever on the side not only varies the selectivity, but also the volume, and cuts down the locals without loss of quality.

In logging stations we noted that with inductive coupling on the medium waves the tuning range goes well down to 200 metres, so this set would be specially useful to Newcastle and Aberdeen listeners.



COMPACT INTERIOR DESIGN

The internal layout of the Electric Kobra has been well designed. An energised moving-coil loud-speaker is fitted

BRIEF SPECIFICATION

MAKER: Kolster Brandes, Ltd.

PRICE: £12 18s. 6d.

VALVE COMBINATION: Detector (Cossor 41MHL), low-frequency amplifier (Mullard 354V), and power output (Mullard 104V), with Philips No. 1821 valve rectifier.

POWER SUPPLY: A.C. mains for all voltages from 100 to 250 volts.

POWER CONSUMPTION: 30 watts.

TYPE: Table console for mains working, with self-contained moving-coil loud-speaker and special inductive coupling circuit for selectivity.

REMARKS: A reasonably priced console, giving pleasing reproduction from a varied selection of stations.

Marconiphone Super-tuned Portable

THIS is one of the best-designed portables we have tested this season. It comes within the upright cabinet category, which means that in the general design there is no attempt to disguise the fact that it is a wireless set; no suitcase container, but a handsome walnut cabinet.

The shape of this cabinet and the provision of a handle makes it easy to carry the set around. On unhinging the back we find very accessible batteries and valves, the set chassis being mounted above the compartment for the batteries.

WELL-SHIELDED PARTS

Coils and condensers are all shielded and metallised valves are used, except for the pentode output. Note the sponge ring round the detector

We noted the ample amount of screening in the set and the use of three metallised valves for the first three stages. There is no chance of instability through interaction.

The detector is provided with an annular ring of rubber sponge to prevent microphonic noises being set up between the sound waves from the loud-speaker and the bulb of the valve.

Snap terminal points are fitted for the external connection of pick-up, loud-speaker, and aerial and earth. But it should be emphasised that this is an entirely self-contained job, with provision for extras as desired.

The loud-speaker in the set is of the balanced-armature type, giving good reproduction from the pentode power valve, to which it is obviously well matched.

The general impression one gains on examining the set is that it is well designed, and tests bear out this impression.

Control is simple, in spite of the fact that there are four knobs to contend with. Tuning is particularly easy, thanks to the plainly engraved tuning escutcheon, which is operated by one of the knobs. There is an additional tuning control, taking the form of a trimmer, but from tests we can say that to log stations is a one-knob business.

Reaction is used as a volume control. As some reaction is needed to give full loud-speaker signals, the use of this control for volume works out quite well. If sufficient reduction in the volume cannot be so obtained, we find that a slight turn of the set as a whole will do the trick, for in this way the frame can be turned away from the station received.

In logging the many stations within range we found the wavelength calibrations a great help. The markings are fairly accurate, in steps of 50 metres on medium and steps of 100 metres on long waves.

We were greatly impressed with the tuning of the set. Both the London stations were eliminated within 10 metres either side of the tuning points. This good selectivity is maintained on the long waves, for by careful adjustment, particularly of the direction of the frame, we were able to get Radio Paris, Zeesen, and Daventry all free from interference.

After dark we heard twenty stations on the medium waves, so there is no need to make use of the external aerial and earth connections.

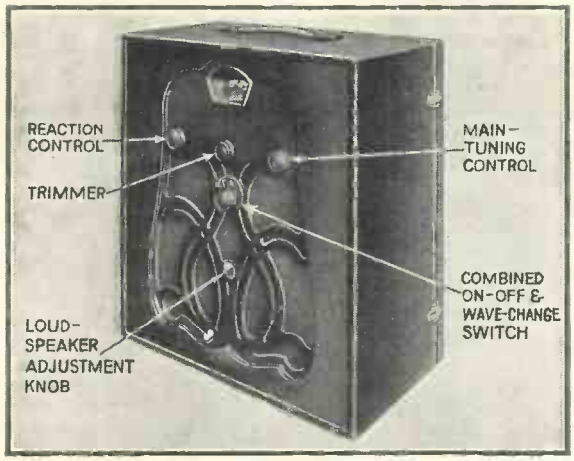
The quality is better than usual for a portable, both speech and music being clear and pleasing. Up to the limit of the pentode there is no sign of distress from the loud-speaker, which is good enough to take advantage of the pick-up connection provided.

Lastly, the total current consumption is quite moderate for the type of circuit and the figure of 10 milliamperes means that the high-tension battery will last two or three months with average use.

Although not of the suit-case type, we should emphasise the fact that this portable is very easy to carry around. It has the advantage of portability with the attraction of looking well in the home.

BRIEF DESCRIPTION

MAKER: The Marconiphone Co., Ltd.
PRICE: 13 guineas.
VALVE COMBINATION: Screen-grid (Marconi S21), detector (Marconi HL2), first low-frequency valve (Marconi HL2), and pentode output valve (Marconi PT2).
POWER SUPPLY: Self-contained batteries, comprising 108-volt high-tension, 2-volt non-spillable accumulator, and 9-volt grid bias.
POWER CONSUMPTION: 10 milli-amperes total anode current on test.
TYPE: Portable of the upright cabinet type.
REMARKS: Well-designed four-valver, giving good output for moderate running costs.



NEAT AND EFFICIENT

The appearance of the Marconiphone set is particularly pleasing. The cabinet is of mahogany finish and a balanced-armature loud-speaker is incorporated

Height Is Not Everything!

In this article GORDON S. MITCHELL, who has contributed a number of interesting articles to the pages of "Wireless Magazine," describes a series of radio tests made in the world's highest building to determine the effect of height on radio reception

RADIO fans all over the world have, no doubt, looked at photographs of the Empire State Building in New York City and have wondered as to what results would be obtained with a radio receiver atop that edifice. Many are the efforts expended to obtain a few extra feet height on aerial masts for broadcast receivers—what results might be expected from an aerial 1,280 ft. high?

Series of Tests

Radio technicians in New York became interested in this question and arrangements were made through the president of the Empire State Corporation for a series of tests to be made atop the tower of the building.

In order fully to appreciate the significance of the tests, an understanding of the physical characteristics of the building is necessary. The Empire State is the tallest building in the world, its tower rising to a height of 1,280 ft. above street level. The building itself covers an entire block on Fifth Avenue, in the heart of the city.

1,000 ft. High

The elevation of the 86th floor is 1,000 ft. From this height a tower rises to an additional height of 280 ft. This tower is, in reality, a huge steel cylinder, pierced by an elevator shaft through which visitors are taken to the 103rd floor. This floor, on the very top of the building, consists of a glass-enclosed gallery completely encircled by an outdoor promenade. (It is to this promenade that gang planks will be lowered if the building is ever used as a dirigible mooring mast).

Mounted on the roof of the tower are wind-pressure instruments which are connected to registering dials in various parts of the building. A registering wind-direction indicator is also mounted on the 15-ft. pole atop the tower.

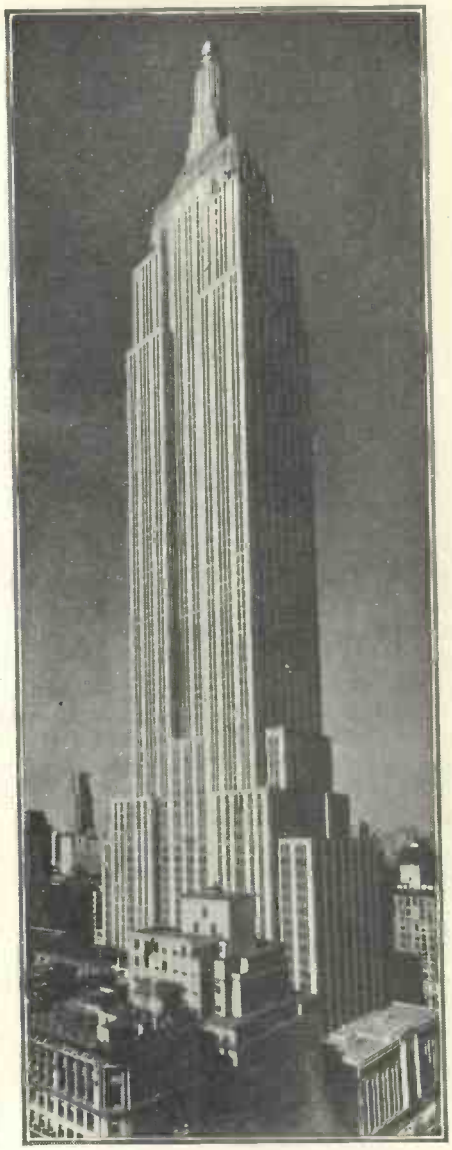
The first consideration in the actual preparation for the radio reception tests was the location of an aerial. Because of the fact that the steel-pipe mast on top of the tower was extremely inaccessible, it was decided to string a wire from the 103rd floor to the building top proper at the 86th floor level.

This provided for an aerial nearly 280 ft. in length, so it was decided to break this span in the centre with an insulator, thus providing two entirely separate aerials, the upper of which might be used for tests at the 103rd floor level and the lower for any tests which were considered necessary at the 86th floor level.

Inasmuch as it was desired to conduct tests on both long and short wavelengths and a duplicate receiver was not desirable, the Scott All-wave Superheterodyne was selected for the experiment. In addition, the receiver had been used in several other transmission tests during the months preceding; consequently its performance was a known factor.

In order to be prepared for whatever conditions might arise during the period of the tests, it was decided to construct a headphone adaptor box, with which it would be possible to cut out the loud-speaker and place headphones in the circuit.

On the afternoon of the tests, a considerable crowd gathered on the 86th floor of the building, drawn by the fact that transatlantic wireless reception was under way. Within a very short time after the tests had begun, the 86th floor was crowded with interested people, whose presence made the actual manipulation of the receiver very difficult. It was at that time that the wisdom of preparing for headphone reception was fully realised.



SCENE OF THE RADIO TESTS

It was on the 86th and 103rd floors of the Empire State Building in New York that the tests described in this interesting article were made. There are observatories open to the public on the 86th and 102nd floors; these accommodate 500 and 100 visitors respectively

Daylight Reception

During the day, a great many broadcast stations in New York City, and within a radius of 250 miles of

HEIGHT IS NOT EVERYTHING!—Cont.

SOME FACTS ABOUT THE WORLD'S HIGHEST BUILDING

There are 102 stories above the street and two stories below. The height of the mooring mast for airships is 1,250 ft. (height of the Eiffel Tower is 984 ft.). The building will house 25,000 tenants and the floating population (visitors) is estimated at 40,000 daily. Express lifts rise at the rate of 1,200 ft. a minute and reach the eightieth floor in less than one minute!

the city, were tuned in. There was no noticeable improvement in reception on account of the very great height, although there was a considerable decrease in "man-made" static which is prevalent about the city (on account of the great number of electric motors and other electrical devices which cause disturbances of the ether).

Complete Isolation

The complete isolation of the location from surrounding buildings was no doubt responsible for this.

During the evening hours, broadcast reception was considerably improved, stations as far away as 1,000 miles being logged without difficulty.

These results were somewhat surprising, as well as disappointing, for it had been anticipated that the great height would result in greatly increased range of pick up. (These results were compared with results obtained with the same receiver during tests conducted previously on or near the ground.)

However, quality was such that several of the executives of the building operating company expressed the intention of installing receivers in the tower to pick up programmes for distribution to points throughout the building.

Reception of European transmitters was also disappointing, there being no improvement in volume level over reception from locations within 50 or 100 ft. of the ground. For a given volume-control setting a slightly lower extraneous noise level was noted, which increased the understandibility of the signals somewhat. There was no increase in signal strength.

After several days of tests from this 86th floor station, the receiver was taken to the 103rd floor and set up. Tests were conducted from this height for a period of two weeks, both day and night. Still there was no increase in signal strength, although a slightly improved extraneous noise level was noted.

All of the regularly received European short-wave stations were tuned-in, but with no better reception than is usually obtained from stations all over the city and near the ground. The best foreign reception was obtained from the short-wave station in Rome, Italy. Chelmsford, in England, however, was a close second.

Interesting Occurrence

An interesting occurrence was noted on one of the test afternoons. The short-wave station at Rome was tuned in, and a considerably lower volume level was noted than had been the case on previous days. This would have been attributed to atmospheric conditions had it not been for the fact that the extraneous noise had dropped off by about the same ratio.

The receiver was checked, and no trouble was found there. It was soon discovered that the aerial, where it entered the room, passed through a steel door frame, where it had become short-circuited. It was earthed at a point approximately 9 ft. from the receiver.

One-turn Loop

The steel of the building and a waterpipe were connected together and used as an earth for the receiver, so in effect the earth and aerial leads constituted a one-turn earthed loop aerial, of 9 ft. diameter. This loop was entirely enclosed within the steel shell of the tower, but nevertheless signals were being received.

When the aerial lead was insulated at the point where it entered the doorway, signal strength again went to its previous day's level. This may be considered an excellent

LOOKING OUT OVER NEW YORK

Some idea of the tremendous height of the Empire State Building can be obtained from this panoramic view from the roof. The foundations were started in March, 1930, and the building was formally opened in May last year

TESTS ON WORLD'S HIGHEST BUILDING

commentary upon the sensitivity of the receiver used in the tests.

One of the greatest sources of trouble during the tests was the interference contributed by two television transmitting stations located not far from the Empire State Building. One of these stations was not more than 2,000 ft. in a straight line from the receiving station (test reception).

Use of a Wavetrap

This station was not only heard over a wide band near its own broadcast frequency, but at innumerable points throughout the entire broadcast spectrum. In order to make certain that this was not due to some inherent defect in the receiver itself, a wavetrap was connected to the receiver, and tuned to the fundamental of the television transmitter.

The harmonic signals still continued to come in, proving that the phenomena was due in no wise to receiver characteristics. (Fundamental wavelength signals were entirely eliminated in the wavetrap.)

Another television transmitter some blocks up Fifth Avenue caused similar trouble, although in no sense as pronounced.

Some experiments conducted were intended to investigate the effect of steel building "shadows" upon broadcast reception; these showed that there was no appreciable effect on this score. When the tests were originally begun, the aerial was placed on the west side of the tower. When signal strength was determined as being poor, it was thought that perhaps the steel tower might be shielding the waves as they came from European stations, consequently the aerial was removed and placed on the east side of the building.

Direct Waves

This would, theoretically, expose the aerial to the direct waves from the east and, had there been any "shadow effect," should have resulted in a material improvement in European reception and a consequent decrease in reception from the western part of the United States.

There was no noticeable difference in reception after the aerial had been moved, which led to the conclusion that there was no shadow cast by the steel tower of the building which would affect radio waves.

THE WIRELESS SHOW

One summer night the Wireless Parts,
All well-versed in varied arts,
Broadcast and Televised a show :—
"The Merry Minstrels' Radio."
The Amplifier sang a song,
Which, all agreed, was much too long;
Then the Electron Sisters danced
The "Anode Bend," their grace enhanced
By Neon Lamps all in a row
Which shed a very pleasant Glow.
The Circuit said he would recite
"The Charge," but, seized with bad stage-fright,
He stammered; his Capacity
To say his lines grew less, and he
Did naught, alas! but Oscillate.
His confidence had been too great:
Though Positive that he'd succeed
His skill was Negative indeed.
The Currents Orchestra next gave
"The Ampere's Life upon the Wave,"
With the Conductor beating time
Their rendering was quite sublime.
Then the Loud-speaker roared with might
"That ends our Programme for to-night!"

LESLIE M. OYLER.

The experiment led definitely to the conclusion that the relatively high capacity between the aerial and the tower was responsible for the poor reception — in other words, it might be stated that the effective height of the aerial was not its height above the ground, but its height (or distance) from the steel tower of the building.

This average distance (from aerial to tower) was approximately 15 ft., which under this premise would result in equal results to an aerial strung between two poles and 15 ft. above the ground.

This conclusion, however, did not fully explain the low signal strength, for the same receiver, when used in Connecticut (several hundred miles from New York City), during the summer months, brought in all European stations with sufficient volume that the signals could be heard 200 ft. from the receiver.

Reception of Chelmsford

This was an everyday occurrence, and was often possible for long periods during the middle of the day. Reception at this place (Connecticut) was particularly satisfactory from Chelmsford G5SW, and from the English telephony station which transmits the programmes re-broadcast throughout the United States from the Columbia network stations.

These tests indicate that reception is not improved by great height, at least in so far as steel buildings are concerned.

Wireless Magazine, August, 1932

P. K. TURNER, M.I.E.E., Discusses

The Designer and His Work

LEARNING ABOUT RADIO FROM AN EXPERT

Many of the big companies organise instructional classes for their dealers. Here is a class in progress at the Marconi works at Dagenham. There are two courses, one lasting a week and another of three weeks' duration

THE other day I fell into conversation with a stranger—for the purpose of this article I will call him Smith—and after a little talk I found he was a wireless enthusiast and a reader of WIRELESS MAGAZINE. As we went on, he lamented the fact that there was hardly ever a published set that was just *exactly* what he wanted. And, moreover, when he tried to combine several sets to get just what he wanted from each, the result often wouldn't work at all!

Naturally I said: "Well, of course, anyone like yourself, who has very clear ideas of what he wants, ought to design his own sets for himself."

Lack of Information

Yes, that was just what he wanted to do, but no one had published a book on how to do it, or offered classes on the subject. If he could hear of any way of learning the job, he would like a shot.

So then I tried to find out what he expected to have to learn, and how long it would take; and I found, as I half expected, that he hoped to be able in a month or two to fill a notebook with "circuits" "secrets of design," and so on; after which he would be able to make any set he wanted.

So I told him my name then, and gave him some idea of how one *does* set about to design a receiver, and what sort of knowledge is really necessary; and he was so surprised that I decided then and there to write out some of what I had told him, so that other readers could decide whether they would like to learn to design their own sets.

First of all, what is "design" as applied to the broadcast receiver? I believe that most amateurs, like Smith, think it is a question of inventing new circuits—he was obsessed with "circuits." It was a long while before I could convince him that circuits, as such, don't cut much ice. There are usually several that will do what one wants.

When I start on the design of a set, I don't first decide on the circuit and then try and find out what the set will do. I think first of the performance that is required—performance in the wide sense, including cost, ease of handling, etc.—and the selection of the circuit is practically automatic as I go through it bit by bit, working out how to get the required performance.

It is true that many sets are not built in this way; too often they are not *designed* at all as I understand it. Their builders cannot say how many milliwatts of power they expect, what is their probable amplification or frequency response, or what distortion will probably occur. It is surprisingly easy nowadays to decide on a circuit, buy components, and build a set which works quite well—in a way. That is to say, it makes a loud noise and gets quite a lot of stations.

But has it got the best possible performance for the money and trouble spent on it, and the power it uses? Too often, no; and just because it is not really designed at all.

The second very important point I made clear to Smith was also a surprise to him: that nine-tenths of the work of designing a set is simple plain *arithmetic*. True, to be a first-class radio engineer means a lot more than this; one must have a pretty fair knowledge of some branches of higher mathematics, an engineering and scientific training, and a lot of experience.

Lots of Arithmetic

But as far as concerns the design of a straightforward broadcast receiver that one intends to build for one's self, one needs little of this; but there is lots and lots of arithmetic. It hadn't occurred to him that getting the best value out of the components in a set means working out by arithmetic—or sometimes by simple algebra—the exact value that every component must have.

In a well-designed set, the designer must be able to give a definite reply in every case when he is asked: "Why is that condenser 1 microfarad and this one 4 microfarads?" "What is the purpose of this

resistor, and why is it 10,000 ohms?" and so on.

It was here that Smith showed good mettle. Before now, would-be students of radio design have sheered off altogether when they learned this fundamental fact: that the design of a good receiver is not as a rule a matter of brilliant invention or inspiration, but of simple, straightforward, and sometimes very boring, calculation. But he stood the shock; and then he began to ask about "formulae." Where could he find a collection of formulae with which to do the calculations?

One's Own Formulae

Well, I could have given him one. But, as I told him, it wouldn't have been of much use. For most work of this kind everyone must work out his own formulae, to suit his own mind and method of thought; with the exception of just three or four fundamental ones that have been published again and again. Every wireless receiver consists of just two things: electric circuits and valves.

If you know Ohm's law for A.C. you can deal with the circuits, and if you have valve curves and data you can deal with the valves; and that's that. There is one other set of data that is more difficult to deal with, but which must be known before one can design; it is: What does the user want? This is sometimes quite difficult to find out, but one must somehow.

Lastly, there are a few things in which experience is important. These are the "secrets" of design that Smith had in his mind, though in actual fact very few of them are secrets at all. Such things as the *probable* frequency range of a given type of loud-speaker; how many volts London Regional will probably put into an average aerial 100 miles off; when decoupling is likely to be necessary, and so forth.

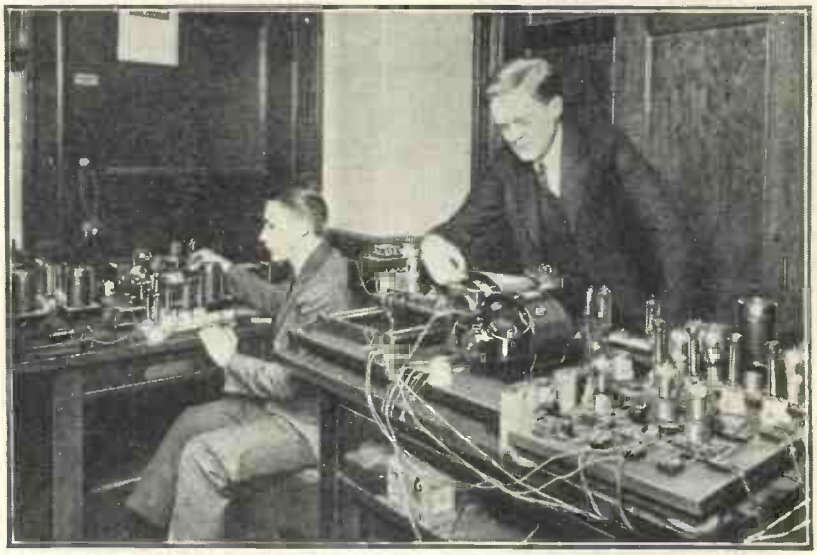
Some of these can be worked out, but experience saves the trouble; in some cases there are too many unknown factors to allow of calculation, and experience (one's own and the published results of others) is the only guide.

How, then, does one design a set? One begins with the "data": the "things given." First of all, is the set mains or battery driven? If battery, how much high tension can the user afford? If mains, are they D.C. or A.C., and so on. One can't even begin to think about the design till this is settled.

Power Output

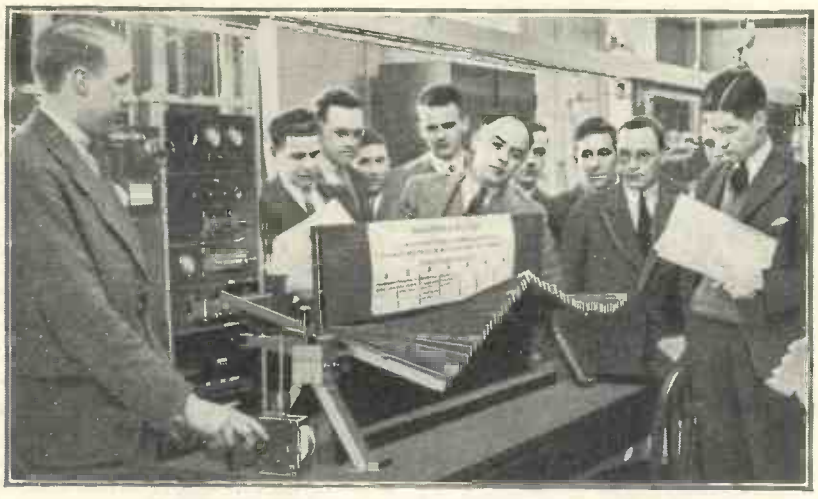
Next, how much output power is wanted? Can this power be got with the proposed high-tension supply? Assuming that it can, we can think about the design of the last stage; but first we have still to ask: What grade of quality is wanted? What type of loud-speaker is to be used?

With this information in hand, we can choose two or three types of valve as possibly suitable for the last stage. We get their curve sheets (the anode-current/anode-voltage type) and set to work. Study of the curve sheets, by well-known methods, will tell us what high-tension current is required for the power stage, what the load should be, that is, for a given loud-speaker, what ratio of transformer to use, the grid bias and the required "swing" of audio-frequency voltage from the previous stages; also, what will be the power in the loud-speaker, and what distortion there will be from the power valve.



EXPERIMENTING WITH THE TRANSMISSION OF RADIO PICTURES

At work in a New York office receiving pictures by radio from Honolulu, five thousand miles away. Very precise calculation is needed for the design of such apparatus



DEMONSTRATION OF WAVE FORMATION

By means of this ingenious apparatus, installed at the Post Office research station at Dollis Hill telephone workers are given practical demonstrations of electric wave formation

Detector Difficulties

Next we turn to the detector. Here there is a difficulty. The valve makers do not yet publish curves showing the performance of valves as detectors; so that unless one makes one's own curves (as I do) one can only be guided by experience.

THE DESIGNER AND HIS WORK—Cont.

If one has the curves for suitable valves, one can, by study of them, say what is the best value of high-frequency input volts, what low-frequency output this will produce for a given modulation, how much of this output will be usefully employed in the coupling resistor or transformer, and what high-tension voltage and current is required.

Similar Characteristics

Failing the curves, of course, one cannot design accurately; but luckily most valves likely to be used are fairly similar in their requirements, though they differ widely in the amount of distortion they set up.

We now know the output from the detector and the required input to the power valve, and so we can decide whether, with a suitable coupling, one can feed direct into the last stage, or whether an intermediate low-frequency valve is required; and, if the latter, what overall magnification that stage must have. In fact, Part 1 of the design—choice of valves and couplings—is done as far as the audio-frequency end of the set is concerned.

Before we can go on with the high-frequency end, we must ask some more questions: Does the user want short, medium, or extreme range? Moderate or extreme selectivity? Is simple control essential? Is cost important?

The answers to these will in most cases be incompatible. Everyone would like extreme range, marvellous selectivity, "A quality," and one-knob control, at a total cost of £5. It may be necessary to point out the difficulties, and get modified answers.

Number of Tuning Circuits

These will indicate to us whether we shall need two, three, or more tuning circuits, and how many (if any) stages of high-frequency amplification; and these two things in turn give us a broad hint whether to use a straight high-frequency amplifier or a supersonic circuit.

At this point there is a big divergence of practice. The man who is designing for a home constructor, either himself or anyone else, wants to use components that can be got easily and quickly, so he probably designs the high-frequency stages to fit some particular set of proprietary coils. On the other hand, a designer for production will have his own coils made to suit the valves he prefers to use.

The former will probably depend on previous experience to say whether one or two stages will "do the trick"; the latter, if conscientious, should deliberately calculate back from the detector input till he finds that the required input to the whole set is what he is likely to get from the type of station asked for.

In these calculations, the same two sets of facts—valve curves and Ohm's law—will be used as in the low-frequency calculations. Valve curves show what output each valve will generate for a given input, and Ohm's law gives the efficiency, selectivity, etc., of the couplings.

Part 1 of the design is now complete: all the valves and their couplings are specified. It remains to complete the schematic diagram by arranging the supply of low-tension, grid, and anode voltages, including any necessary decoupling components. Sometimes this is the trickiest part of the whole set, but as a rule it is fairly simple. It is just Ohm's law again, plus the curves of the rectifier, if an A.C. mains unit is being included.

When this has been done, we come to Part 3 of the job: turning the pretty conventional signs of our schematic into real components. This may be quite difficult. Perhaps we have found that the right value of some condenser is .15 microfarad. Will a .1 or a .2 do? That is, will the change affect the performance, and, if so, how? If the effect is negligible, we shall naturally use a stock component.

Suppose when the set is working this condenser has 200 volts on it, but that for a few seconds on starting up it has 300 volts. What grade of condenser, 400-volts test, 500, or 750, shall we use? Or again, we need a 50-henry choke to carry 30 milliamperes and with a D.C. resistance of 300 ohms at most. Is there one on the market, or shall we design one for the job?

Sometimes, especially with a new hand, it may be found that some component cannot in practice be made or bought at a reasonable cost, and the schematic may have to be altered.

Finally, one can get out a parts list, with the name, make, and price of everything definitely settled.

And then we can get to Part 4, the last part of the designer's job. We must arrange the components to fulfil at any rate these seven requirements (sometimes, of course, special circumstances impose other conditions as well):—

Points to Watch

1. The controls must come conveniently to hand, and if possible be symmetrically arranged.
2. The leads, especially grid and anode leads, must be short.
3. Stray reaction effects mustn't occur.
4. Plug-in or "pre-set" components must be accessible.
5. Wiring must not be difficult.
6. The set must be safe to use (that is as regards shocks).
7. The necessary panel, base, and cabinet must be of reasonable shape, and preferably one of the standard sizes.

When this has been done the design is *provisionally* finished. The set is then built, and if it performs as calculated, we pat ourselves on the back—as a rule no one else will do it for us! If it doesn't, we shan't need to kick ourselves: there is always someone ready for *that* duty. We just go on modifying the design till everything is O.K.

Main Requirements

It will be seen, then, that there are four main requirements for a set designer:—

First, clear information as to the performance required from the set; that is the answers to all the questions already asked.

Second, valve curves, and, since it may be desirable to check these, the instruments necessary to take them.

Third, Ohm's law for A.C. circuits. This is a bigger thing than one might guess; although in the long run it boils down to nothing but the current-voltage relation across any component at any frequency.

Fourth, judgment. Again and again it will be found that there is a choice between two alternatives, both technically possible, but each with its own advantages and drawbacks; and the choosing may call for clear thinking.

Components As I Know Them—2

The Iron-cored Transformer

By PERCY W. HARRIS, M.Inst.Rad.E

JUST as a wireless condenser does not condense so, if we use the word correctly, a wireless transformer very often does not transform. Like a condenser, this device, too, dates back far earlier than the first wireless set, as it is one more device taken from standard electrical engineering and specially adapted to the radio art.

Low-frequency transformers are used for several distinct purposes in a wireless receiver. If we are running our set from the A.C. mains then the first use of a transformer is to change the voltage from the mains into something more suitable for operating our rectifying and smoothing units.

Changing Voltage

We may change the voltage up or down, or we may, in some cases, not alter it at all, merely using the transformer to isolate the mains from any direct connection with the receiver itself.

The next use in a receiver is as a means of transferring the signals from one valve circuit to another—usually from the detector-valve circuit to that of the first low-frequency stage (the output stage, if there is only one valve following the detector).

The third use may be as a coupling device from the output valve to the loud-speaker, while if we are using a moving-coil loud-speaker it is very likely that some form of transformer is used in the loud-speaker unit itself as a matching device.

Each of these uses of a transformer in our typical set has its own particular conditions and problems.

It was found years ago that a coil of wire has around it an invisible magnetic field whenever a current is flowing through the coil, the strength of this field depending on the strength of the current, and thus changing with every change of current.

Furthermore, the field for a given strength of current will depend upon the material surrounding the coil, some materials proving, so to speak, particularly susceptible to magnetic-field formation. For example, with a given strength of current a coil with an iron core will have a very much stronger field than one with an air core. The strength of the field will also depend on the number of turns of wire in our coil, so we can have the same strength of field with an air coil and a very large number of turns as with an iron core and many fewer turns.

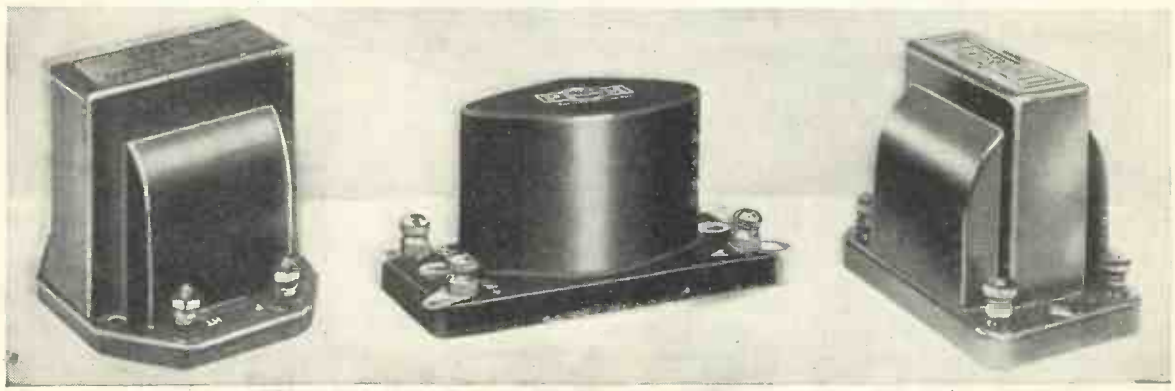
In the past few years new forms of iron, such as Permalloy and similar alloys, containing nickel in the mixture, have considerably improved transformer design, a strong field now being possible with less iron than before, enabling transformers to be made smaller and more efficient.

If, round about our coil carrying the current and forming a field, we wind a second coil, insulated from it, in such a way that the field from the first coil passes through the second, then any changes of field will induce a voltage in the second coil.

General transformer theory is available in a multitude of technical books and space will not permit me to deal with it fully here (otherwise the special points in this article could not be included), but it is sufficient to say that in a transformer made up of two coils of wire, both with the same number of turns and both so arranged that the field of the first core embraces all the turns of the second, the voltage applied to the first coil, which we will call a primary, will be reproduced at the same value in the second coil called the secondary, the efficiency of this transfer device

This is the second of a series of articles in which Percy W. Harris is discussing the various component parts of a receiver in a new and intimate way which will help to a better understanding of how every set works.

Readers of "Wireless Magazine" are invited to send their component queries to Mr. Harris, so that answers may be incorporated in future articles. Individual replies will not be sent, but readers are assured that every query will be taken into consideration in planning the future articles.



TYPICAL LOW-FREQUENCY TRANSFORMERS FOR INTERVALVE COUPLING

All these transformers have iron cores inside the primary and secondary windings. From left to right these models are a Lotus, a Mullard with a Permalloy core, and a Ferranti type AF8

THE IRON-CORED TRANSFORMER—Cont.

being so high that the loss of energy in passing through it is practically negligible.

Let us imagine, then, that we connect to the 220-volt A.C. mains a primary coil, and that we join some kind of circuit to the secondary coil. In this case we will consider the transformer as having the same

CHOKE-OUTPUT UNIT

Another iron-cored instrument—a loud-speaker choke-output unit made by the General Electric Co., Ltd.

number of turns in the primary as in the secondary.

Any circuits connected to the secondary will act in precisely the same way as if they were connected directly to the mains in the place of the primary of the transformer (I am making a fair number of assumptions in this case, such as that the design of the transformer is suitable for the load put on the secondary, and so forth, which would be the case in most commercial applications).

Distinct Advantage

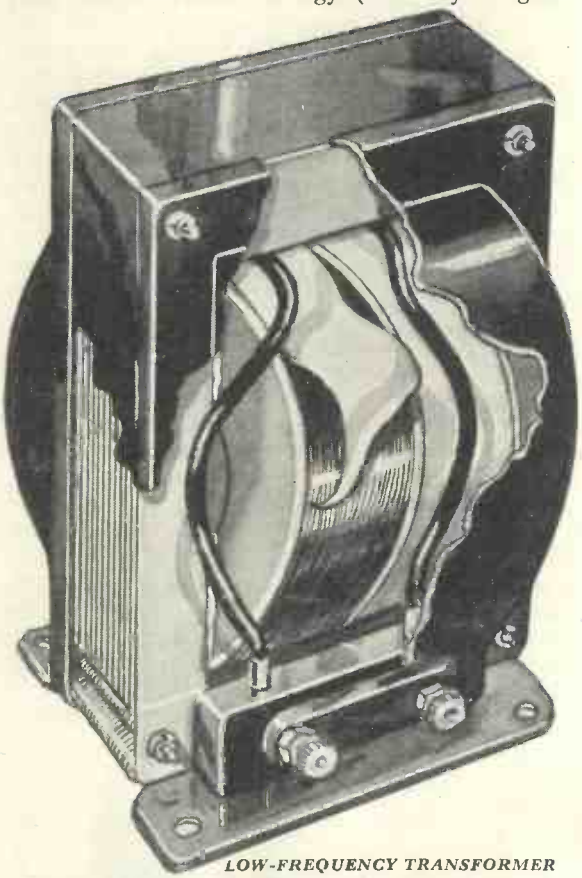
As the effect of the transformer on voltage and current is negligible you might think that there would be no special reason for using a transformer here (in a large number of cases there is not), but in some cases it is a distinct advantage to isolate the transformer from the set.

If, however, the mains voltage is different from what we require, then a transformer can be very easily designed to alter this voltage to any suitable figure. This is done by altering the ratio of the turns between the primary and the secondary.

If we have double the number of turns on the secondary, then the output voltage will be twice the input voltage (approximately). Similarly, if we halve the number of turns it will only be half the voltage.

When we are operating a mains rectifying and smoothing unit we frequently require three different voltages from our output—a high voltage for applying to the rectifying valve plates, 4 volts for heating the rectifying valve filament, and another 4 volts for the heaters of the A.C. mains valves.

You will notice that so far I have not spoken of "lines of force." I have avoided this deliberately because the "lines-of-force" analogy (like so many others in electricity) is liable to create a wrong impression, causing the reader to picture in his mind the state of strain to be actually something like the lines of a diagram drawn to show *direction* and not to suggest that the state of strain consists of strips, or rods, or something of that kind.



LOW-FREQUENCY TRANSFORMER

This dissected view of a low-frequency intervalve transformer shows clearly how the laminated iron core is arranged round the primary and secondary windings

In teaching electrical theory I have too often found that the student gathers the impression from text books that the lines of force are actually existent as separate if invisible entities, and that if we had some special kind of viewing apparatus the electromagnetic field through and around a coil of wire would look something like a bunch of hay splayed out at the ends.

Simple Experiment

This attitude of mind has been fostered by the experiment, often performed, of sprinkling filings on a sheet of paper above a magnet when the filings, which are individually magnetised, form themselves into rows.

Actually the electromagnetic field in and around the coil is as continuous as a jelly, although its density varies from place to place. I always prefer to think of the electromagnetic field around a coil as something jelly-like in a state of strain and, just as when a current flows in this coil the surrounding space is strained and just in the same way this strain in passing through an adjacent coil of wire will set up a current (more strictly a voltage) in it, so the strain, when collapsing on the cessation of the current in the first coil, will set up an opposing voltage retarding the fall of the current. In the same way the setting up of a strain in the space surrounding the coil will tend to retard a current rise.

Retarding Effect

This retarding both of rise and fall can be looked upon as a choking effect, and is of great importance in electrical engineering. If no current is taken from the secondary the

BY PERCY W. HARRIS, M.Inst.Rad.E.

choking effect in the primary will keep the current from the mains down to next to nothing and prevent waste.

Transformer Uses

To return to our uses of the transformer. The voltage set up in a secondary coil will be dependent upon the turns ratio between the primary winding and the secondary, and thus in a mains-unit transformer where we have three windings (one high-voltage and two low-voltage) the low-voltage winding will be a few turns of thick wire, and the high-voltage winding many turns of finer wire.

The size of wire used in a transformer is governed by the current which will have to flow in it and in transformers which have a very small output the windings can be of fine wire, which is cheaper and occupies a smaller space.

If you endeavour to get more current out of a transformer than it is designed to yield, then the resistance of the winding will hinder you and the transformer will get unduly hot, quite apart from the fact that you will get a voltage drop in the resistance which may be serious.

I mentioned just above that the state of strain set up in the adjacent space when a current has passed through a coil of wire tends to oppose both the rise and the fall of the current. The faster we try to make the rise and the fall or, put in another way, the higher the frequency of alternations of the current passing through the primary, the more this opposing force will be felt.

In the case of an ordinary mains transformer running from 50-cycle mains we are not likely to have any trouble because we have just the one frequency of 50 cycles to deal with.

Intervalve Couplings

The fact, however, is of great importance when we come to other transformers to be considered in this article, namely, those used to couple a detector valve to the first low-frequency stage.

Now think to yourself just what our problem is here. We have in the plate circuit of the detector valve (assuming we have got rid of the high-frequency component by means of a high-frequency choke and a shunting condenser) a direct current from the high-tension battery, rising and falling in intensity at all kinds of complicated frequencies.

At one moment we may have the higher harmonics of a violin note running up to 6,000 and 7,000 cycles a second, and the next moment a low note of an organ with a frequency of perhaps 100 cycles or less.

The function of the transformer here is to pass on the signals represented by this fluctuating current to the next valve, so that this latter can again magnify them. The input of the next valve must be connected in some way between the grid, or control, electrode and the filament, and this input must be in the form of voltage changes faithfully following the current changes in the primary, so that the signal can be handed on to another valve and to the loudspeaker.

For faithful reproduction, equal changes of current in the plate circuit of the detector valve must bring about equal changes of *voltage* between the grid and filament of the next valve, *no matter what the frequency may be.*

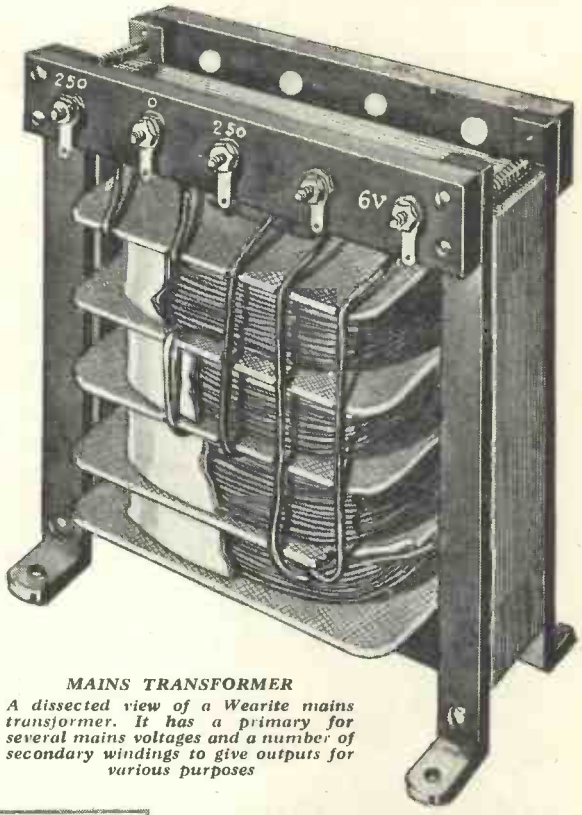
In the early days of broadcasting, before special apparatus had been evolved for a faithful reproduction of music, the low-frequency transformers used were simply those which had been a part of receivers designed for reception of wireless telegraphy and these were " peaked " at 1,000 cycles (about one octave higher than middle C on the piano).

Very Little Bass

They had practically no bass reproduction and fell off rapidly after 1,000 cycles, which accounted for the " tinny " sound of early broadcasting receivers.

Nowadays we want uniformity of reproduction, which is not so easy to get as transformer design. We must be able to get as nearly as possible " straight-line " reproduction from at least 100 to 6,000 or 7,000 cycles, with no objectionable peaks between.

Some of the problems to be solved in this connection will be dealt with in my next article.

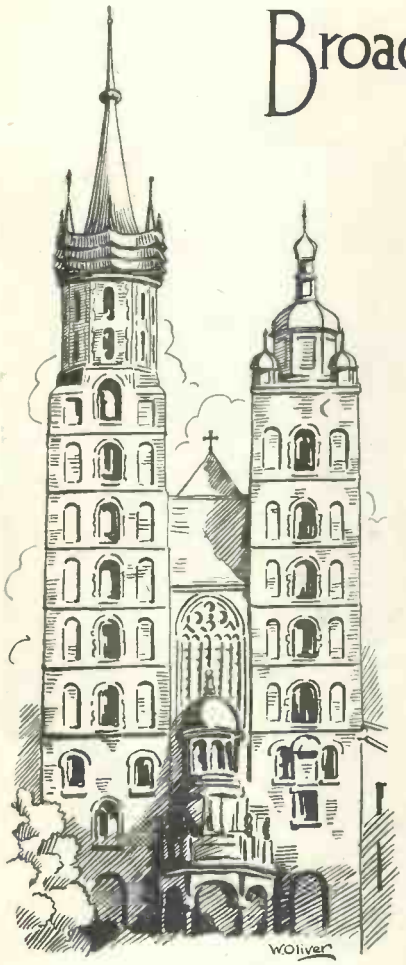


MAINS TRANSFORMER
A dissected view of a Wearite mains transformer. It has a primary for several mains voltages and a number of secondary windings to give outputs for various purposes

ANOTHER MAINS TRANSFORMER
Another type of mains transformer with fewer secondary windings. There is practically no limit to the number of secondaries that can be provided for different purposes

Broadcasting A BUGLE CALL

Notes on an interesting item in the Polish programmes



POLAND'S BUGLE CALL
Every day a bugle call is broadcast from the taller tower of St. Mary's Church, Cracow

HAVE you heard the remarkable bugle call that is broadcast every day from the Polish station at Cracow? If you have not, you should certainly make a point of tuning it in at the first opportunity.

This unique bugle call, which is of exceptional historic interest, is relayed from St. Mary's Church, Cracow, at noon and midnight by Central European Time (and British Summer Time), these hours being equivalent, of course, to 11 a.m. and 11 p.m. Greenwich Mean Time.

Low Power

As Polskie Raadjo Krakow is a comparatively low-powered station and works on a medium wavelength that is unfavourable for long-distance reception during the hours of daylight, you will not be able to receive the midday transmission direct from Cracow.

But if you have an efficient set that is capable of tuning to the long waves (1,000-2,000 metres), you should have no difficulty in hearing the noon bugle-call perfectly by way of the Warsaw high-power station on 1,411 metres, as this powerful transmitter shares the relay with Cracow and other Polish stations.

If you tune in to Polskie Raadjo Warszawa at about 10.58 G.M.T. (11.58 B.S.T. or C.E.T.) in the morning, you will hear the time signal, immediately after which the bugler sounds the *hejnal*, or "morning song," from one of the towers of St. Mary's Church. The call is simple and melodious, but rather lengthy, the transmission occupying several minutes.

This bugle call is of historic interest because it is a tribute to the memory of a sentry who was killed, about seven hundred years ago, while sounding an alarm to call the people of Cracow to defend the walls of the town against an attack.

The sentry was shot dead by an arrow in the act of encouraging the defenders by his bugling, and consequently the call was never finished. To commemorate this fact, the bugle call that is broadcast daily from the Polish stations ends abruptly on a curious stifled note.

St. Mary's Church, Cracow, from which this interesting ceremony is relayed, is a Gothic building overlooking the Rynek, an old market place in the centre of the ancient part of Cracow, and it has two lofty towers of dissimilar appearance and unequal height.

The bugle call is sounded from the taller of these two towers, and picked up by a suitably placed microphone.

For Seven Centuries

No doubt the original bugler who was shot after sounding the alarm would have been surprised had he known that a repetition of his bugle call would be sounded daily seven centuries or so after he fell a victim to the arrow.

But he would certainly have been even more surprised had he been told that, one day, the clarion notes of the bugle would not merely make people jump in Cracow, but would also ring out simultaneously from loud-speakers all over Europe and be heard by thousands of listeners of many different nationalities—thanks to the then undreamt-of marvels of broadcasting!

W. Oliver.

*F*ather *W*illiam *U*p-to-date

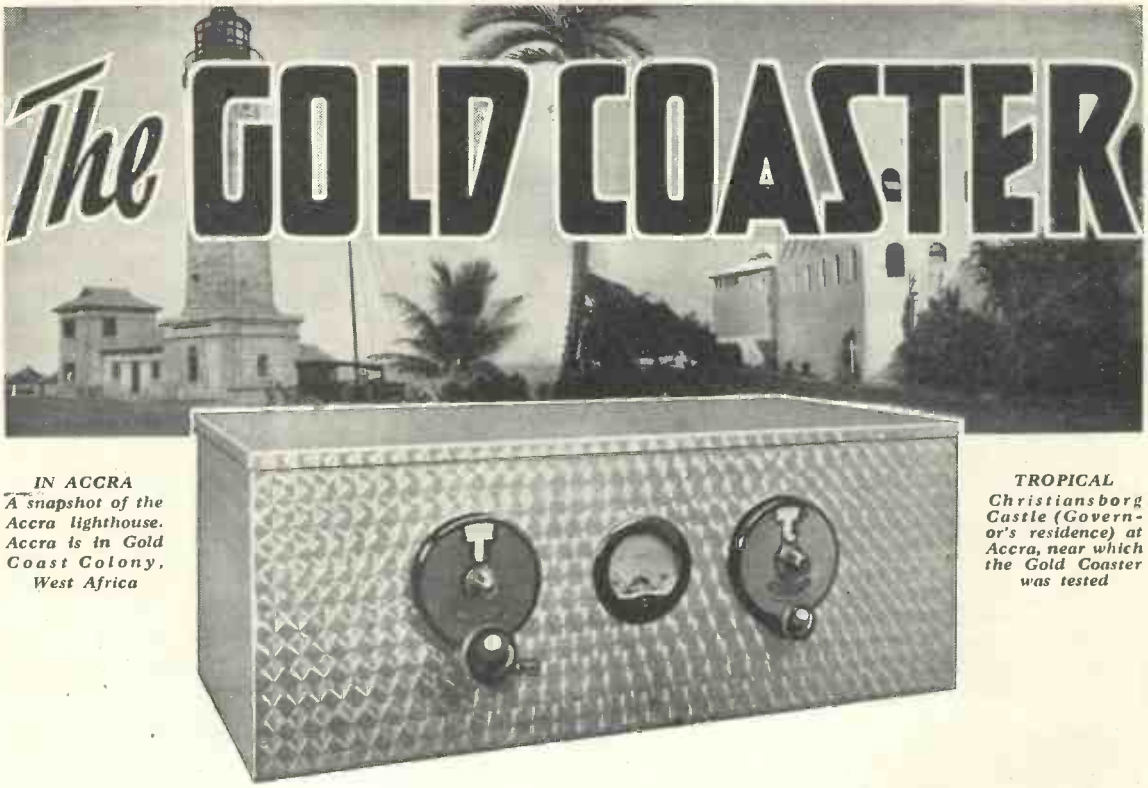
"You are old, Father William," the young man said,
"Though your hearing is good, and your sight,
Yet you oscillate madly for hours upon end,
Do you think at your age it is right ?"

"In my youth," said the sage, "with tin whistles and drums
I half turned my grandfather's brain,
Now I find with a set I can make much *more noise*
Why, I do it again and again !"

"As your head," cried the youth, "vacuumic appears
I alas ! with reluctance am forced
To make a short-circuit, cut short your fool tricks,
For I'll soon have your licence endorsed !"

LESLIE. M. OYLER

The GOLD COASTER



IN ACCRA
A snapshot of the Accra lighthouse. Accra is in Gold Coast Colony, West Africa

TROPICAL
Christiansborg Castle (Governor's residence) at Accra, near which the Gold Coaster was tested

ACTUALLY TESTED UNDER TROPICAL CONDITIONS AT ACCRA, GOLD COAST

THIS month the "Wireless Magazine" Technical Staff is able to give full constructional details of a short-wave receiver that has actually been tested under tropical conditions in Accra, Gold Coast Colony, West Africa. Here is the report received from Mr. George L. Hutton, who has had the set in use for several weeks :

"You have done it! Congratulations. The set is the best four-valver I have heard out here.

"Chelmsford comes in at 13 degrees on the aerial dial. I find that it is not much good going above Boundbrook owing to atmospherics. At this time of the year the ether is full of atmospherics caused by storms over the Sahara desert.

"The chief stations I get are Pontoise, Rome (now moved up on a higher wavelength, but still at full loud-speaker strength), Chapultepec, Chelmsford, Paris, Saigon, Zeesen, Boundbrook and Rabat (Radio Maroc). Of course, all these stations are not always on together, but they all come in at full loud-speaker strength, with something to spare, so I am never at a loss for music or news.

"With the above stations it is quite unnecessary to stay up late at night to hear the Yankee advertising programmes, of which Chicago, Philadelphia, and Schenectady are very strong.

"The set is ideal for tropical use, being fully enclosed in a metal case. You are, I think, aware of the humidity of Accra being very strong; it has already affected the nice polish on the aluminium case, but the valve heaters drive out any damp that may have collected while the set is not in use. The tropics call for high-class components.

"Hum is not noticeable when on a station. The tuning dial makes tuning simple, especially out here, where you need micrometer movement. Chelmsford and Paris are very close, but they are very easily sorted out.

"I am working on a 60-ft. aerial, 50 ft. high, coming down to the bungalow roof, 14 ft. high. No earth is actually required, although I use one because of the mains unit.

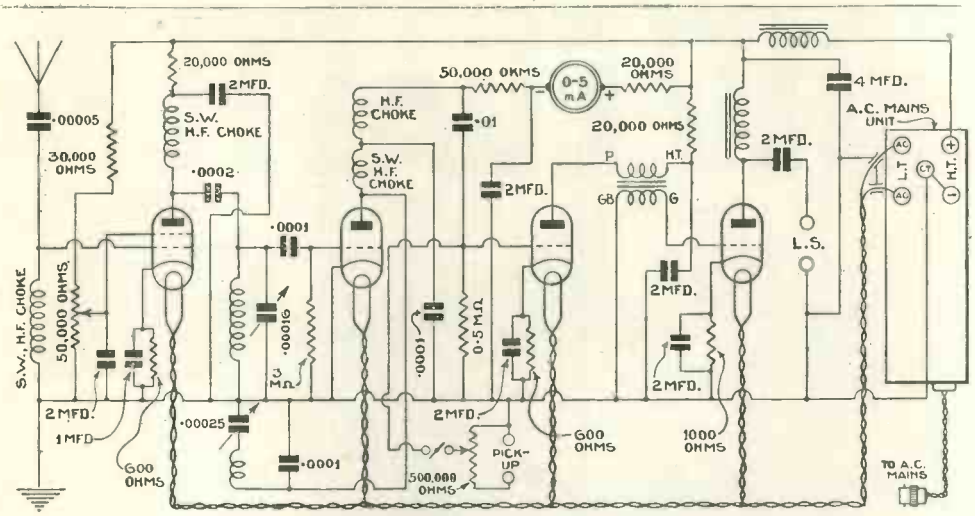
"I have much pleasure in congratulating the "Wireless Magazine" Technical Staff on the workmanship and success of the set."

Although we cannot make any claims for what the set will do in other places overseas, in view of its good performance at Accra we believe that it will be found to be quite satisfactory in remote corners of the British Empire, even where reception is notoriously bad.

The "Wireless Magazine" Technical Staff will particularly welcome reports from overseas readers who build up the Gold Coaster.

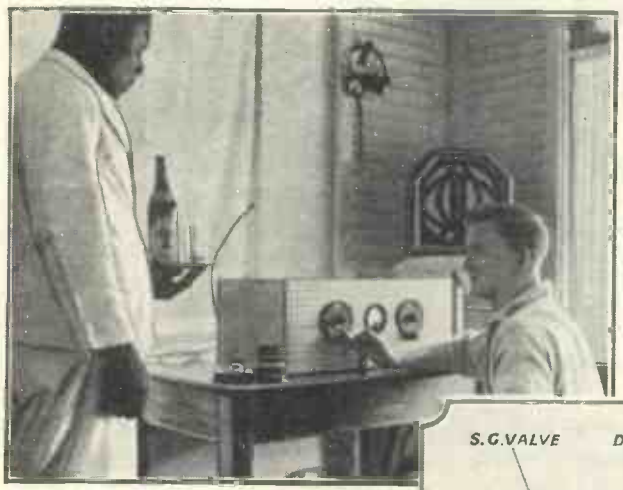
An All-mains Short-waver for Overseas Listeners Specially Designed by the "W.M." Technical Staff

THE GOLD COASTER—Continued



The circuit of the Gold Coaster incorporates a screen-grid high-frequency amplifier, leaky-grid detector, resistance-coupled low-frequency stage and a transformer-coupled power valve. All high- and low-tension and grid-bias are taken from the mains

THE history of this short-wave receiver began over a year ago, when a member of the staff of the Government printing establishment in Accra, Gold Coast Colony, came over to England for several weeks' leave.



THE SET ON TEST

Mr. George L. Hutton, of Accra, testing the Gold Coaster under real tropical conditions. He obtained excellent results

Ideal Receiver

This printer was a keen radio enthusiast and in company with a member of the "Wireless Magazine" staff he outlined what he considered to be the ideal receiver for West Africa.

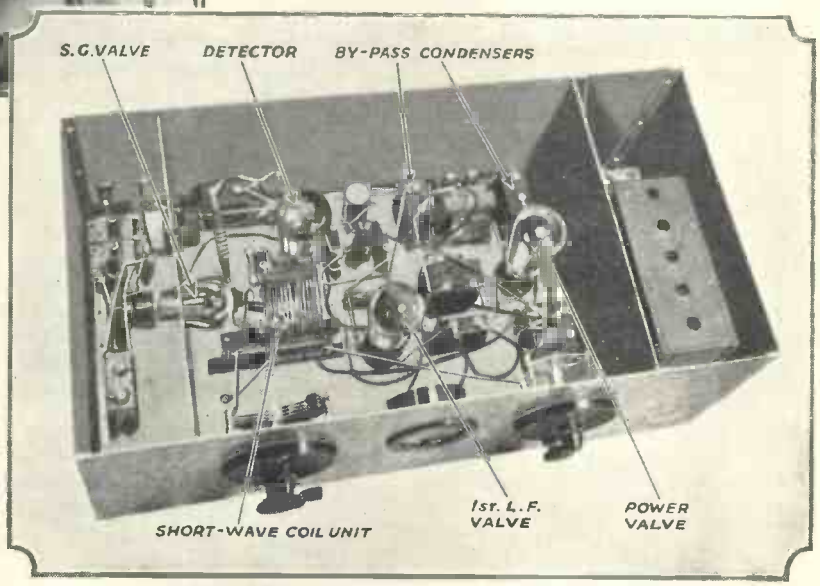
As a result of this conversation the "Wireless Magazine" Technical Staff started experimental work on an all-mains short-wave set that would be especially suitable for use in the tropics.

Many weeks went by in experimental work, but at last the object was achieved and the set was despatched to the Gold Coast for our printer friend to carry out extensive tests. The result of these will be clear from the report printed at the beginning of this article.

We believe that this is the first description of a constructor's short-wave set to be published in this country *after* extensive tests have been made under tropical conditions. We are able to present details of the Gold Coast Four with the fullest confidence that it will meet the needs of all the overseas readers of "Wireless Magazine" who have A.C. installed in their homes.

Those who live in the British Isles may be surprised that a short-wave set intended for use overseas should have been designed for mains operation. But the fact is that many of the Dominions and Colonies of the British Empire are far more advanced in the way of electrical development than is the Old Country. Moreover, dry batteries present such a difficult problem to the listener in tropical countries that they are best left alone.

Although the Gold Coaster has been specially designed for tropical conditions there is no reason whatever why it should not be used in



COMPLETELY ASSEMBLED AND READY FOR USE

Here is a view of the Gold Coaster all ready for use. It is a real loud-speaker short-wave set designed for tropical conditions

A SHORT-WAVE SET FOR THE TROPICS

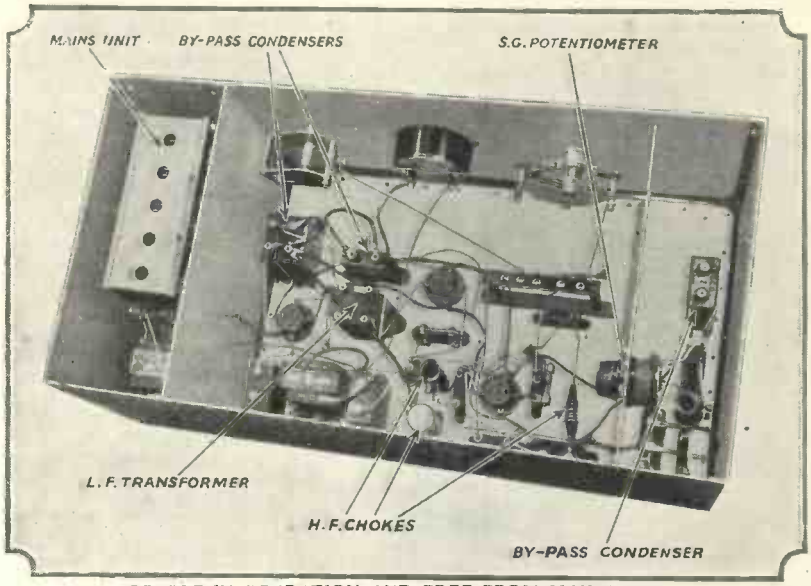
the British Isles if readers so desire.

The first problem that presented itself was the design of a cabinet. Tropical conditions mean a day temperature of something like 100 degrees in the shade and a damp atmosphere at night. Ordinary wood would warp in a day or two. The obvious thing seemed to be stout aluminium or teak. Aluminium was decided on because of the question of weight.

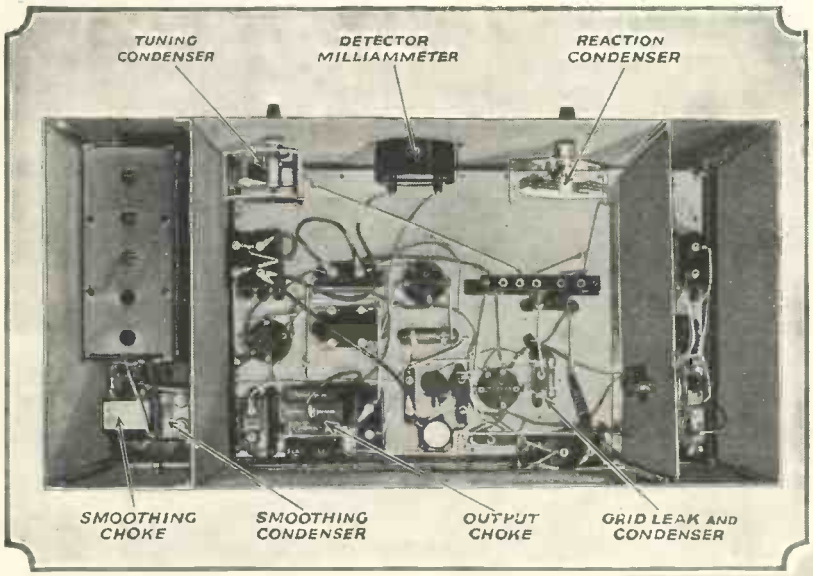
Paint for Protection

It will be seen from the test report, however, that even aluminium needs the protection of a coat of tropical paint!

Reliability was the first essential of the design, of course, and only components of the highest grade have been incorporated. For instance, the preliminary tests in West Africa proved that ordinary spaghetti resistances will not stand up to tropical conditions and arrangements were therefore made with the Lewcos people to produce a special type of spaghetti resistance for use in the tropics.



STABLE IN OPERATION AND FREE FROM MAINS HUM
Every necessary feature to ensure complete stability in operation has been incorporated in the Gold Coaster, which will meet the needs of most overseas listeners who have A.C. mains available



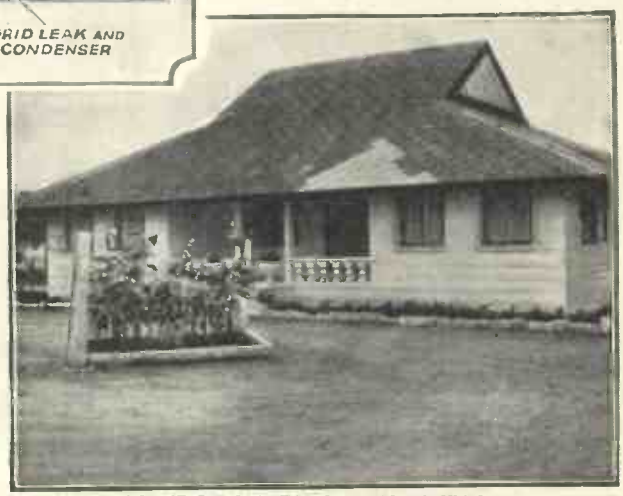
RADIO OR RECORDS AT WILL
The Gold Coaster will give excellent short-wave reception or it can be used for the electrical reproduction of gramophone records when desired

The need for absolute reliability ruled out a short-wave super-het, which would have been rather complicated if it was to be of the highest possible efficiency. We pinned our faith to a perfectly straightforward four-valve receiver, using a screen-grid high-frequency amplifier, a leaky-grid detector, a resistance-capacity coupled low-frequency stage and a transformer-coupled power valve.

The grid circuit of the screen-grid valve is untuned and its real value lies in the fact that it removes the aerial damping from the grid circuit of the detector valve. Thus there are only two tuning controls, one for the detector-grid adjustment and another for controlling reaction.

Simple Operation

This system has the advantage of simplifying the operation. Were the aerial circuit actually tuned it would be necessary to use a semi-aperiodic primary coil. This, with the tuned-grid coil which is essential, would mean that two coils would have to be changed every time it is desired to alter the wavelength range of the



SCENE OF THE WEST AFRICAN TEST
The bungalow in Accra, Gold Coast Colony, where the Gold Coaster was subjected to a prolonged and thorough test

THE GOLD COASTER—Continued

SIMPLE CONTROLS
It will be clear from this photograph that the controls of the Gold Coaster are particularly simple. On the left is the dial of the grid-tuning condenser (which is provided with a special micrometer adjustment) and on the right is the reaction control. The detector milliammeter is seen in the centre

receiver. As it is, in the Gold Coaster there is only one coil to change at a time.

Wavelength Range

The wavelength range covered by this receiver is from approximately 14 to 100 metres. This is accomplished by using three coils, the individual wave ranges being as follows :—

Coil D2 .. 14 to 38 metres.
Coil D3 .. 28 to 63 metres.
Coil D4 .. 42 to 100 metres.

Three additional coils are also available for the following wavelength ranges :—

Coil D1 .. 10 to 17 metres.
Coil D6 .. 230 to 500 metres.
Coil D8 1,000 to 1,900 metres.

Circuit Features

It will be seen from the circuit diagram that there is a .00005-microfarad fixed series condenser in the aerial lead; this, of course, is normal practice. In place of the usual aerial coil there is a short-wave choke. In the anode circuit of the screen-grid valve is another short-wave choke. This should be of a different type from the first to avoid resonance between the two.

The voltage on the anode of the screen-grid valve is controlled by a fixed resistance of 20,000 ohms, with which is associated the usual 2-microfarad by-pass condenser. Voltage on the screen of this valve is controlled by a fixed resistance of 30,000 ohms in series with a 50,000-ohm potentiometer. Another 2-microfarad condenser is connected between the slider of the potentiometer and the cathode.

Coupling between the anode circuit of the screen-grid valve and the tuned-grid circuit of the detector is made by means of a .0002-microfarad condenser. Next comes the tuning coil itself, tuned by a .00016-microfarad variable condenser of a special short-wave type. The grid leak and condenser values are 3 megohms and .0001 microfarad respectively.

In the anode circuit of the detector are two high-frequency chokes in series, the first being of the short-wave type and the second of the standard broadcast variety.

The second choke is included in case it is desired to use the set with coils D6 and D8 for ordinary broadcast reception.

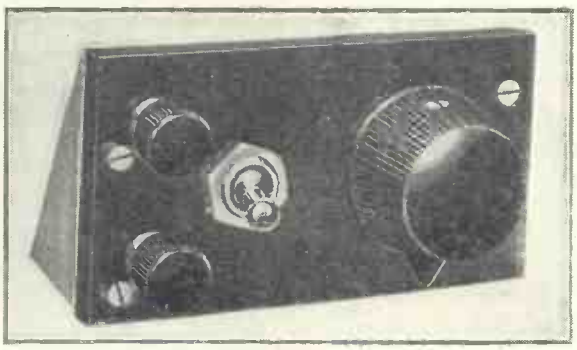
Reaction is controlled by means of a .00025-microfarad variable condenser in series with the reaction coil, which in each case actually forms part of the grid-coil assembly. There is a fixed .0001-microfarad condenser across the reaction coil and the detector cathode.

In order to facilitate the tuning of the set—which is critical, as all short-wave receivers are—it was decided to incorporate a detector-anode meter. When this gives the greatest dip for any given station one knows that the signal is coming in at its maximum strength.

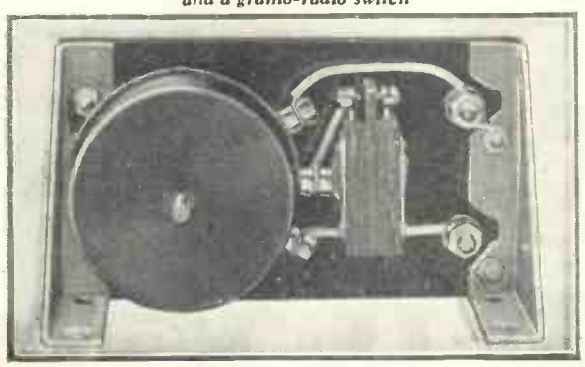
The remainder of the components in the anode circuit of the detector valve are therefore the 50,000-ohm resistance and .01-microfarad condenser for the resistance-capacity coupling to the next valve; the milliammeter, which reads up to 5 milliamperes; and a 20,000-ohm resistance and a 2-microfarad condenser for decoupling.

It will be seen also that there is a .0001-microfarad high-frequency by-pass condenser across the anode and cathode of the detector valve, and that the first low-frequency amplifier has a grid leak of .5 megohm.

The transformer coupling between the first low-frequency valve and the power valve follows standard practice, but it should be noted that a 20,000-ohm resistance and 2-microfarad condenser are provided for decoupling at this stage.



ADAPTOR UNIT FOR GRAMO-RADIO
This unit is screwed to the back of the cabinet if it is required. It consists of a volume-control potentiometer and a gramo-radio switch



VERY SIMPLE TO MAKE
Although shown in the layout as a part of the design, this unit can be omitted if it is not desired to play gramophone records

As is the usual practice in mains receivers, the power valve is provided with a choke-capacity output circuit to isolate the loud-speaker from the steady anode current that is flowing when the set is switched on.

Power Supply

High- and low-tension supplies are obtained from a complete Regentone S60 unit, as used so successfully in previous "Wireless Magazine" designs. This gives a high-tension output of approximately 30 milliamperes at 180 volts from a Westinghouse metal rectifier. The mains transformer incorporated in the unit also gives a 4-volt A.C. supply for application to the valve heaters.

Ordinary smoothing is provided inside the unit (readers should remember that when comparing costs), but for a short-wave set extra smoothing is needed to cut hum out completely. In the Gold Coaster an additional smoothing choke and 4-microfarad condenser are incorporated, and the set is to all intents and purposes absolutely hum-free.

It will be seen from this description that no feature necessary for stability of operation has been omitted but, on the other hand, the design has not been unnecessarily complicated

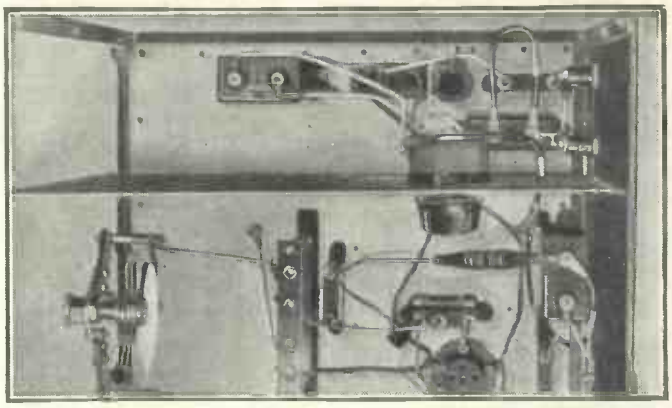
All grid bias—for the screen-grid valve, first low-frequency amplifier and power valve—is obtained automatically by means of resistances placed in the cathode circuits. These resistances are respectively 600, 600 and 1,000 ohms; these values are suitable for the particular valves used.

The first 600-ohm resistance is provided with a 1-microfarad by-pass condenser, while the other two resistances have 2-microfarad bypass.

Gramo-Radio Unit

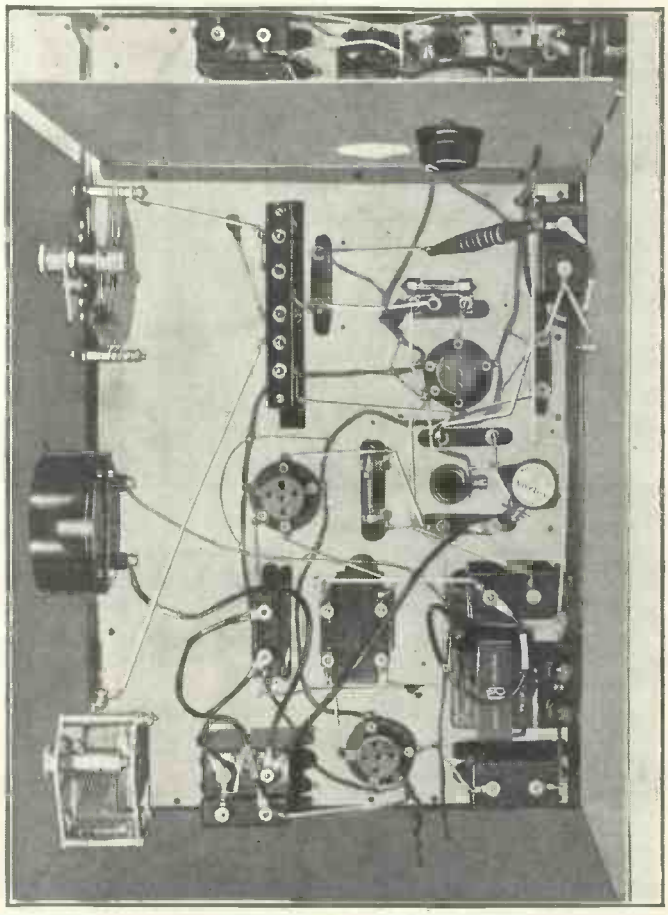
The Gold Coaster was originally designed as a straight radio receiver, but following on a request from our West African correspondent, we have arranged an additional gramo-radio unit by means of which records can be reproduced electrically when desired. Those who do not desire to play records can omit this additional unit, which is screwed to the back of the cabinet (inside).

All the essential details for the construction of the Gold Coaster are included in these pages, but those



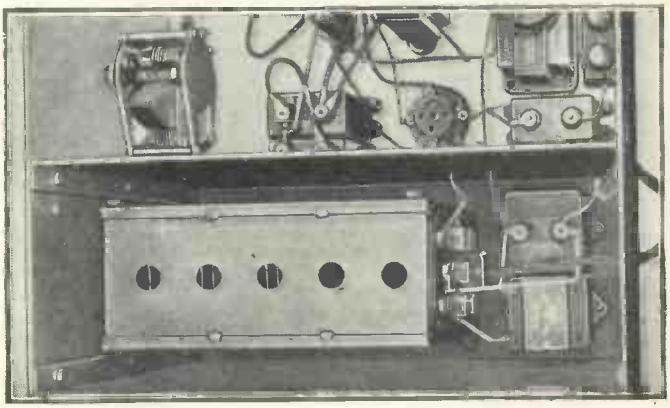
SCREEN-GRID ASSEMBLY

The right-hand compartment contains the screen-grid valve and its associated by-pass condensers. The use of this valve removes the aerial damping from the grid of the detector valve



MAJOR PORTION OF THE RECEIVING APPARATUS

The centre compartment of the aluminium case contains the major part of the components needed for the construction of the Gold Coaster. A special type of tropical spaghetti resistance has been developed for use in this receiver, which has been thoroughly tested under tropical conditions in West Africa. It will be noted that the wiring is short and direct, to avoid unwanted capacity effects



MAINS GEAR

This is the left-hand compartment (looking from the back) of the Gold Coaster. It contains the complete mains unit and the additional smoothing gear needed for short-wave working

THE GOLD COASTER—Continued

COMPONENTS NEEDED FOR THE GOLD COASTER

CHOKES, LOW-FREQUENCY
1—Varley Nichoke 2, 10s. 6d.
1—R.I. Hypercore, type DY22, 17s. 6d.
CHOKES, HIGH-FREQUENCY
1—Wearite short-wave, type HF3, 4s. 6d.
1—Varley Multi-cellular Junior, 3s 6d
2—Igranic short-wave, 4s.
COILS
1—Eddystone Duplex short-wave coil set, 19s.
CONDENSERS, FIXED
1—T.C.C. .00005-microfarad, type 34, 1s. 6d.
2—T.C.C. .0001-microfarad, type 34, 3d.
1—T.C.C. .0001 microfarad, type SP., 2s. 4d.
1—T.C.C. .0002-microfarad; type 34, 1s. 6d.
1—T.C.C. .01-microfarad, type 40, 1s. 9d.
3—T.C.C. 1-microfarad, type 50, 8s. 6d.
5—T.C.C. 2-microfarad, type 50, 19s. 2d.
1—T.C.C. 4-microfarad, type 61, 6s. 3d.
CONDENSERS, VARIABLE
1—Eddystone .00016-microfarad short-wave, 10s. 6d.
1—Polar .00025-microfarad, type QJ short-wave, 9s.
DIALS, SLOW-MOTION
1—Igranic Indigraph, 5s.
1—Igranic Indigraph with micrometer drive, 9s. 6d.
HOLDERS, VALVE
3—Clix five-pin with terminals, 2s. 6d.
1—W.B. universal screen-grid, 1s. 3d.
HOLDER, GRID-LEAK
1—Lissen, type LN160, 6d.
MAINS UNIT
1—Regentone, type S60, £4 5s.
METER
1—Ferranti 0-5 milliammeter, flush-mounting type, £1 15s.
RESISTANCES, FIXED
2—Lewcos 600-ohm spaghetti, tropical type, 9d.
1—Lewcos 1,000-ohm spaghetti, tropical type, 9d.
3—Lewcos 20,000-ohm spaghetti, tropical type, 4s. 6d.
1—Lewcos 30,000-ohm spaghetti, tropical type, 1s. 6d.
1—Lewcos 50,000-ohm spaghetti, tropical type, 1s. 6d.
1—Dubilier .5-megohm grid leak, 1s. 9d.
1—Dubilier 3-megohm grid leak, 1s. 9d.
RESISTANCE, VARIABLE
1—Colvern 50,000-ohm potentiometer, 5s. 6d.
SUNDRIES
Glazite insulated wire for connecting.
Length of metal-braided cable.
3—Baseboards to fit.
1—Sheet of aluminium foil for baseboard.
Length of twin flex.
TERMINALS AND PLUGS
4—Clix insulated plugs and sockets, marked:—Aerial, Earth, L.S. (2), 2s.
TRANSFORMER, LOW-FREQUENCY
1—R.I. Hypermu, £1 1s.

ACCESSORIES

CABINET
1—Parex special, £1 15s.
LOUD-SPEAKER
1—Celestion D12, £5.
VALVES
1—Mazda AC/SG, 19s.
2—Mazda AC/HL, £1 7s
1—Mazda AC/P, 15s.

PARTS NEEDED FOR THE PICK-UP ATTACHMENT

RESISTANCE, VARIABLE
1—Varley 500,000-ohm potentiometer, 6s. 6d.
SUNDRIES
1—Piece of ebonite 3½ in. by 2 in. by $\frac{3}{16}$ in.
2—Small angle brackets.
Wire for connecting.
SWITCH
1—Bulgin single-pole change-over, type S81, 2s.
TERMINALS
2—Belling Lee, Junior type, marked: Pick-up, 4d.

who desire one can obtain a full-size blueprint. This can be had for half price, that is 9d., post free, if the coupon on the last page of the issue is used by August 31. An appropriate extension of time will be made in the case of overseas readers.

Applications for blueprints should be addressed to WIRELESS MAGAZINE, Blueprint Department, 59-61 Fetter Lane, London, E.C.4. Ask for No. WM292.

Constructional Details

There is nothing complicated about the actual construction. Full details of the aluminium case are included in these pages, but constructors are recommended to obtain one already assembled and drilled.

The box actually has three compartments. The first contains the screen-grid valve and its associated by-pass condensers. The second compartment contains the major portion of the set, while the third compartment houses the mains gear.

To facilitate construction three baseboards are used. The components can be screwed in position on each before they are placed in the cabinet. It will also be possible to carry out some of the wiring before the baseboards are placed in the case.

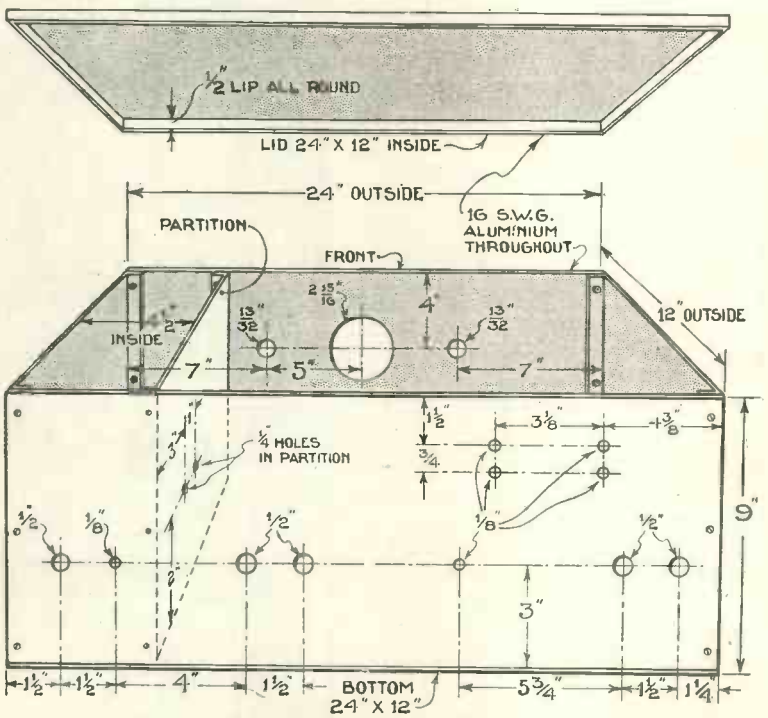
It will be noted that every connection (both on the blueprint and the quarter-scale diagram included in these pages) is numbered in the best order of assembly. As each lead is put in position the corresponding number should be crossed through on the blueprint; in this way it will be impossible to make a mistake.

Metal-braided Leads

Metal-braided wire is used for the heater connections and each piece of braiding should be earthed to the cathode wiring by means of a piece of wire twisted round it and, if possible, soldered to the braiding.

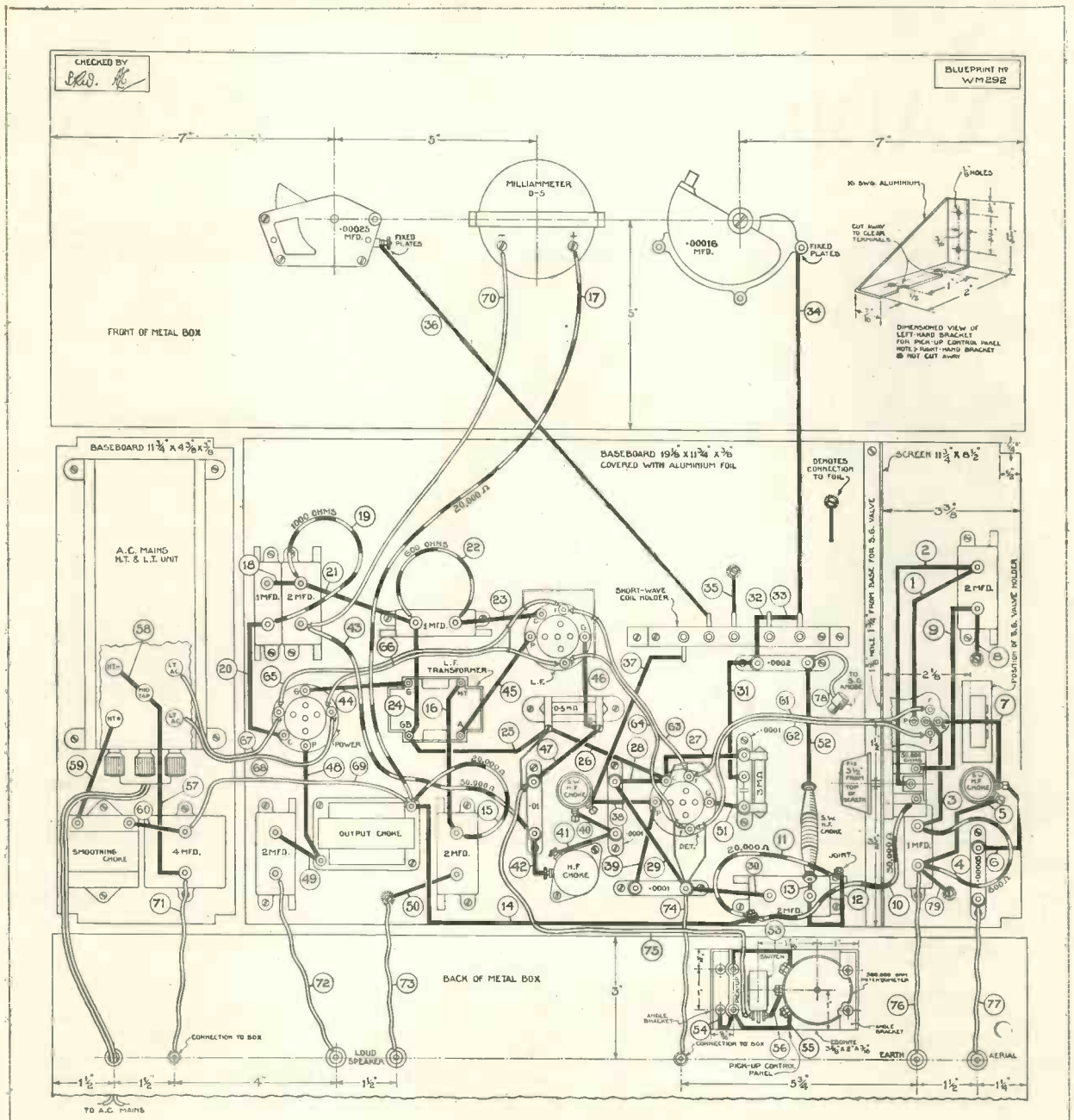
Those who do not want the gramo-radio attachment can omit the special unit (shown by the photographs on page 56 and seen in the right-hand corner of the layout diagram). If this unit is omitted, the connections numbered 53, 54, 55, 56 and 75 are also omitted, of course.

As shown here the set does not include a fuse. Those constructors who desire to incorporate one can



DETAILS OF THE ALUMINIUM CASE FOR THE GOLD COASTER

Constructors are recommended to obtain this case already assembled and drilled. If made at home it should be constructed of stout-gauge aluminium sheeting



QUARTER-SCALE LAYOUT AND WIRING DIAGRAM OF THE GOLD COASTER

If desired a full-size blueprint can be obtained for half price, that is 9d., post free, if the coupon on the last page is used by August 31. An appropriate extension of time will be made in the case of overseas readers. Ask for No. WM292

easily accommodate it in the compartment that houses the mains gear.

In view of the fact that automatic grid bias is incorporated it is desirable that only the specified valves should be used. This does not mean that other valves would not work, but should other types be substituted different values of grid-bias resistances would probably be required. This would mean fresh calculation on the part of the constructor.

The operation of the Gold Coaster is not at all difficult. It will be found, though, that both grid tuning and reaction controls must be worked in unison. The left-hand condenser should therefore be moved step by step (and very small steps at that !), while the reaction control is adjusted so that the set is always on the verge of oscillation.

When the set begins to oscillate the milliammeter needle will move; here the operator has a visual indication of what is happening although he may not be able to hear anything.

A leaky-grid detector consumes less current when it is actually rectifying a signal and the greater the signal strength the greater will be the dip of the needle. By watching the milliammeter, therefore, it is possible to *see* when a signal is being tuned in at its maximum strength.

The milliammeter will also show whether a station is up to its usual strength or not, if a note is kept of the dip for various transmitters.

Wireless Magazine, August, 1932

RADIO IN THE SUMMER

By ALAN HUNTER

HEAT waves may come and go, but wireless waves, so they say, go on for ever. Even in the summer months, through which we are now perspiringly passing, there are plenty of vibrations in the ether. The question is whether we are making the right use of them.

By the Seashore

If we are to believe the advertisements of portable sets, no river party is complete without its suit-case radio, no picnic party happy unless Henry Hall is pouring forth his sweet music from a loud-speaker. And even by the seashore, in spite of ships' morse interference, devotees of the broadcasting cult are depicted as not forsaking the Children's Hour—only subscribing to it under a different environment.

But why go on—you must have seen these happy pictures yourself, and wondered just who indulges in such untimely listening. For if you are an ordinary sort of soul you would probably never think about radio sets or broadcasting when indulging in such natural pleasures of summer as punting or picnicking.

But then our English summer is not just one long heat wave after another, and there is probably as much leisure time available for the delights of broadcasting in the so-called summer months as in the winter. Well, the B.B.C. certainly makes an effort to lighten its programmes during these long hours of daylight, cutting out some of the more portenteous talks, and inserting more topical and "sporty" broadcasts, with quite a fair sprinkling of light music.

Which ought, of course, to satisfy us—but most of us will be turning the knobs to see what the foreigners have to offer. The first somewhat disconcerting discovery is that many—should I say most?—of the foreigners have disappeared.

What has happened to them? Well, they are still transmitting, as you may prove by raking the ether late at night—after, say, 11 p.m. While it is still daylight even the powerful foreigners remain silent or are very weak. This is my experience, anyway.

During the latter part of the winter we heard many so-called experts prophesying that the enormous power of certain foreigners would ensure their all-the-year-round reception over here. Has it? I think not! The foreigners that come over at good strength during the early evening just now are not the super-power stations, but the stations within 400 miles.

Limited Range

Which may or may not prove anything, but I think it indicates that there is a quite definite limit to the direct-ray range of medium-wave stations, irrespective of their power. I mean, if a station is more than 500 miles away, it does not matter much whether the power is 20 kilowatts or 50 kilowatts—you will not get good daylight reception during the hot days.

I substantiate this contention by pointing out how well the comparatively nearby foreigners come in with quite low power. Such stations as Brussels and Hilversum are relatively close at hand, and come in during broad daylight on less than 20 kilowatts.

On the other hand, those super-power giants of the distant ether, such as Prague, do not seem to be making much of a show during daylight. Though it must be admitted that if you tune in after dark, even now, such stations can be well received.

No Need for Sorrow

I do not see the need for sorrowing at the loss of the foreigners. Apart from the fact that the loss is only temporary, there are present compensations. Think of those horrible heterodynes, and be thankful that for another month or so at least we shall be free from their baneful influence.

That surely is one of the advantages of radio in the summer—the absence of heterodyne interference with the select few stations left for our reception.

While revelling in the freedom from heterodynes we must not forget—indeed we are not allowed to forget—the prevalence of atmospherics, especially apt to be troublesome on the long waves—just where most of the strong signals are to be found.

No bright genius has yet discovered a cure for atmospherics, which, like the poor, have always been with us. Still, there are ways and means of modifying the nuisance, such as low aerials and even frame aerials.

And with the increasing use of adaptors for short-wave reception there is opened up to the average listener a paradise of signals free from atmospherics. It is a fact that sometimes when atmospherics entirely spoil long-wave reception, and make even medium-wave signals tiresome to listen to, there is absolutely no sign of them on the short waves, by which I mean waves below 100 metres.

Overseas Listeners

Overseas listeners often write to say that the short waves offer the only bearable reception of broadcasting when atmospherics render reception on any other waves impossible. There is no reason why we should not find equal relief through such short-wave stations as Zeesen and Moscow.

Whatever type of set is used in the winter there is undoubtedly a tendency to think about portables in the summer. Not perhaps for the first time I feel it necessary to point out that there are limitations in portables. The only unlimited thing about a portable is its weight!

Seriously, though, we must get the "low down" on portables, as my American friends would say, otherwise a certain amount of acrimonious discussion must inevitably ensue between the purchaser of the portable and the poor defenceless salesman.

I suppose you know portables have improved? I mean in performance, not in portability. Thank goodness most makers have given up the idea of trying to materialise a real portable, and have instead resigned themselves to the fact that, however light in weight you may make your set and loud-speaker, the batteries must inevitably weigh heavily against you.

A Digression

If I might be allowed a digression at this point I would suggest that, while true portability is perhaps impossible because of the batteries, there is no reason why the so-called suitcase portables should not be more conveniently shaped than at present. Ever tried carrying one of these suitcases? Nearly dislocates your knee-cap! Sure something slimmer might be evolved?

But, as I was saying, portables have improved, due to better valves, by which I mean valves that do a job of work for less current consumption than before. We have to be especially grateful to the low-consumption pentode, which provides a sensitive cone loud-speaker with enough milliwatts to give reasonable volume, all for the expenditure of 4 or 5 milliamperes high tension.

Thus at one stroke two drawbacks of the portable have been removed. The drain on the high-tension battery has been relieved, and the undistorted output has been increased.

Then the modern portable is sensitive, because it employs highly effective screen-grid valves, which turn the diminutive signal picked up on the frame aerial into a respectably loud and by no means unpleasing noise at the loud-speaker end.

Prices, too, are much lower in the portable market than I can ever remember—even in the "boom" days of portables there was never such value as now. For something around 12 guineas you have more or less the pick of the market—portables that will give pleasure not only during these summer months but in the following winter.

Suitability of Portables

One of the troubles the portable has had to cope with is the widespread belief that it is the ideal type of set for use in the open air. As a matter of technical fact the portable is the least suitable for open-air reception, simply because its output is necessarily limited by the small power valve, which was chosen by the makers to economise in anode current.

I do not mean to suggest that you cannot use a portable in the garden—obviously any set can be so used, but I would like to emphasise the importance of refraining from overloading the small power valve. There is a great temptation to do this—to turn up the volume control to the limit—but the resulting distortion is no more bearable *to your neighbour* than to you.

Outdoor wireless is quite frankly a job for a public-address system. That is, if you want to do the thing really well. But a lot of fun can be extracted from a loud-speaker extension from a good-sized set, preferably one with an output valve giving not less than 2 watts undistorted output to the loud-speaker.

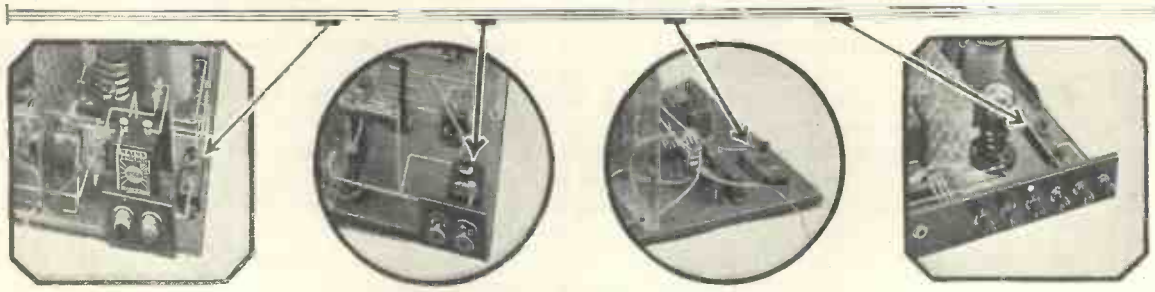
A Salutory Lesson

One of the most salutory lessons you may learn about power output is brought home by taking what is thought to be a powerful set into the open air. It takes a lot of persuasion, at first, to believe that the set is really going full out, so weakly does it sound compared with indoor reproduction.

If you do indulge in outdoor reproduction, please remember the neighbours. While you may be thoroughly enjoying the light music from Regional the man next door may be trying to concentrate on the fat-stock prices from National.

In wireless, as in all things, each one to his taste.

THAT AERIAL-SERIES CONDENSER



By E. H. CHAPMAN, M.A., D.Sc.

Almost every modern receiver incorporates an aerial-series condenser—usually of the variable type, but sometimes of fixed capacity. This condenser has an effect on the tuning range, although many operators overlook this fact. Here the effect of the aerial-series condenser is investigated in detail. The results are of importance to every listener

THE great need for selectivity in receivers has led to the almost universal use of a condenser in series with the aerial lead.

Sometimes this aerial-series condenser is of the fixed type, a common and useful value being .0001 microfarad. At other times it is of the pre-set variety—that is to say, it is capable of being set to a best value and left at that best value.

Variable Type

In many receivers the aerial-series condenser is of the variable type,

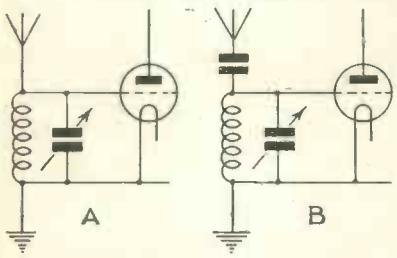


Fig 1.—(a) Simple tuning circuit without series condenser and (b) the same circuit with a series condenser

having a lower maximum value than variable condensers used for tuning.

Whatever the type of aerial-series condenser, though, that condenser has a decided effect on the tuning of the receiver to which it is attached, and it is a matter of interest to see what this effect is.

Let us consider first of all a simple case. A coil and variable condenser were placed in circuit as shown in Fig. 1a. Readings were taken on the condenser dial of three stations, as follows :—

Radio Paris, 55 degrees.
Daventry National, 30 degrees.
Eiffel Tower, 5 degrees.

An aerial-series condenser of .0001 microfarad was placed in the aerial lead to the set, as shown in Fig. 1b, and the readings on the tuning condenser dial of the same three stations were respectively 89, 75 and 66 degrees.

Comparing these readings with the previous readings of 55, 30 and 5 degrees, we see that the insertion of the .0001-microfarad condenser in the aerial lead shifted the reading of each one of the three stations up the scale of the tuning dial.

There is something more than a mere shift of dial readings, however, even in this simple case. Let us put down the readings in two columns and examine them closely:—

	Without series condenser	*With .0001-microfarad series condenser*
Radio Paris	55	89
Daventry National ..	30	75
Eiffel Tower ..	5	66

We notice that in the first column the Eiffel Tower and Radio Paris readings are separated by 50 scale divisions, whereas in the second column the readings of the two Paris stations are separated by 23 scale divisions. What does this mean?

A moment's thought will show that the effective range of the coil in circuit has been increased since the readings of Radio Paris and Eiffel Tower are brought so much closer together.

Hence we have the *two* effects of an aerial-series condenser, namely (*a*) an alteration in the readings of stations on the tuning dial, and (*b*) an increase in the effective range of the tuning coil in circuit.

Let us consider another case. Readings of seven long-wave stations were taken with a .0002-microfarad aerial-series condenser. A second set of readings was taken with a .00005-microfarad aerial-series condenser. The readings were :—

Aerial-series condenser	*Radio Paris*	*Daventry*	*Eiffel Tower*	*Warsaw*	*Motala*	*Kalundborg*	*Oslo*
.0002-microfarad	92	80	73	70	65	42	33
.00005- „	99	89	83	81	77	61	55

With the .0002-microfarad aerial-series condenser the Oslo and Radio-Paris readings are separated by 59 scale divisions on the tuning dial. With the .00005-microfarad series condenser the readings of these two stations are brought closer together, being separated by 44 scale divisions on the dial.

Again, we see the two effects of the aerial-series condenser, the change in readings, and, since the

readings of Oslo and Radio Paris are brought closer together, the increase in the effective tuning range of the coil in the circuit.

Perhaps a better method of analysing the effect of an aerial-series condenser is to exhibit the readings obtained in the form of a diagram. This is done in Fig. 2 for the readings given in the last case.

When the two curves in this diagram are examined carefully, it is seen that the curve to the right is steeper than the curve to the left. This, of course, is a clear indication that the corresponding tuning range is the greater of the two, since the steeper the curve the greater the tuning range covered.

Effect on Medium-wave Coil

Let us now consider the effect of an aerial-series condenser on a coil covering the medium band of wavelengths. Here are readings taken with a tuning condenser of .0003 microfarad placed across a coil of standard pattern, (i) with an aerial-series condenser of .0002 microfarad, (ii) with an aerial-series condenser of .0001 microfarad, and (iii) with an aerial-series condenser of .00005 microfarad :—

Station and Wavelength	*Aerial-series condenser*		
	.0002	.0001	.00005
North Regional 480m.	63	75	81
Midland „ 399m.	33	48	59
London „ 356m.	2	32	45
North National 301m.		0	26
London „ 262m.			10

These readings are illustrated graphically in Fig. 3 and the same effects are noticed as in the two previous cases, namely, a shifting of the readings of each station on the tuning dial and an increase in the tuning range of the coil in circuit.

It is an easy matter to work out, for any set, a series of curves such as those given in Fig. 3. Such a set of curves may prove extremely useful. For example, it may be desired to know the value of an aerial-series condenser which would bring London National (260 metres) within the range of the coil used.

Reference to the curves in Fig. 3 will show that, for the set employed in that case, London National would be brought in with a .00005-microfarad aerial-series condenser, but would be lost with a .0001-microfarad aerial-series condenser.

Perhaps the most important point of all regarding an aerial-series condenser of the variable type is that any movement of the knob of that condenser will shift the readings of the different stations on the dial of the tuning condenser.

It is possible to determine the limit of these changes in reading for any particular station. For instance, in the set used for the tests described in this article, the use of a variable condenser of .0001 microfarad maximum causes the reading of North Regional to vary between 75 and 87 degrees on the dial of the aerial-coil tuning condenser.

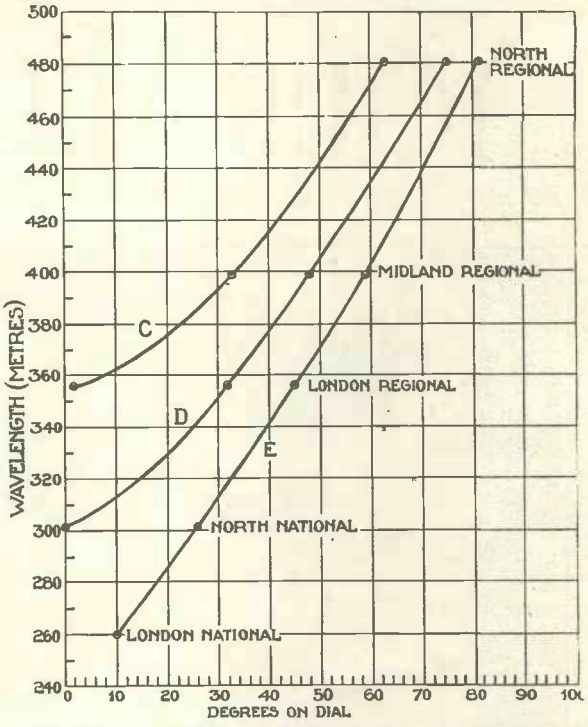


Fig. 3.—Set of medium-wave readings with series condensers of (c) .0002 microfarad, (d) .0001 microfarad and (e) .00005 microfarad

Nobody need hesitate to use an aerial-series condenser. Such a condenser does add to the selectivity of a receiver, and it is not a difficult matter to work out the effect of an aerial-series condenser as is done in this article.

Reduced Signal Strength

A word of warning may be added, however, regarding the use of an aerial-series condenser. Such a condenser reduces signal strength. Selectivity, desirable as it is, can be gained only at the expense of volume.

Some idea of the magnitude of this loss of volume may be gathered from the following statement. With the writer's aerial, the insertion of a .0002-microfarad aerial-series condenser reduces the signal strength of Daventry National to three-fifths the original strength when no aerial-series condenser is used, and a .0001-microfarad aerial-series condenser reduces the strength to one-fifth the original.

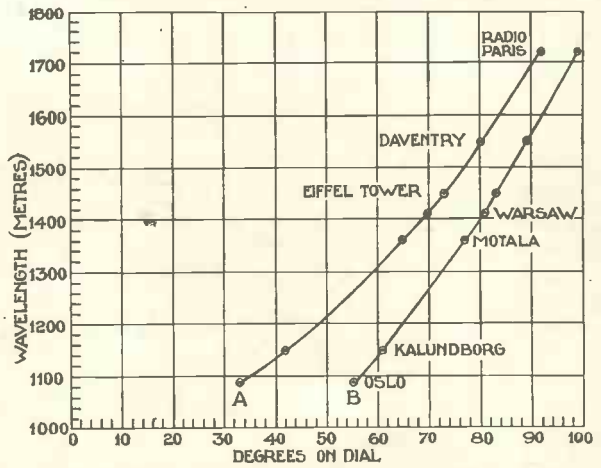


Fig. 2.—Readings of seven long-wave stations with (a) a .0002-microfarad series condenser and (b) with a .00005-microfarad series condenser

YOUR MILLIAMMETER

W. JAMES Explains How to Extend the Range

LEARNING RADIO FROM A TO Z

A radio class in progress at the Northern Polytechnic, London. Here theory is combined with practice

A MILLIAMMETER is a very useful instrument and you can easily adapt it to read heavier currents than marked on the scale and to read voltages as well.

Let us suppose we have a meter reading to 5 milliamperes. This is suitable for reading the anode current of detector and screen-grid valves, but is not suitable, as it stands, for showing the current passed by a power valve.

We can get over this very easily. Get a piece of resistance wire from an old filament resistance or other component of like nature. Join the meter to the detector valve.

Removing Valves

The other valves in the set are not required during these tests, so you can take them out if the set is a battery one. A mains set needs more careful handling and the valves ought not to be taken out.

Note the value of the current. Let us suppose the current is 3 milliamperes. Now connect a piece of resistance wire across the terminals. The meter will indicate that less current is passing through it. The current in the *circuit* has not changed, but part is now flowing through the resistance wire and the rest through the meter.

Adjust the length of the resistance wire until the meter reads exactly half of what it read without the resistance wire. Then half the total current is passing through the wire and half through the meter. The correct current in the circuit is, therefore, exactly twice that shown by the meter.

You have in effect doubled the range of the instrument. Of course, a piece of resistance wire by itself is not very satisfactory, so it had better be fitted between a pair of terminals mounted upon a piece of ebonite.

With this resistance the range is doubled. It can easily be trebled by connecting a resistance that will make the meter read one-third of the actual current, and so on.

We can use the meter to read voltages by connecting a resistance to one of the terminals as shown.

The resistance must have such a value that the current passing through it does not exceed 5 milliamperes, the full-scale reading of the meter used alone. Now a battery of 100 volts will send 5 milliamperes through a resistance of 20,000 ohms.

Voltage Readings

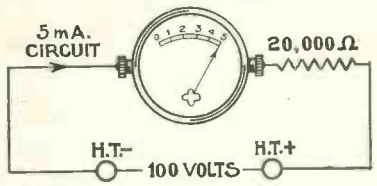
If, therefore, we connect a resistance of practically this value between the meter and the battery, the needle will move to 5 divisions and this is actually the reading for 100 volts. You therefore note the fact that the voltage is twenty times the reading.

If you wished to read up to 200 volts a resistance of 40,000 ohms should be used and the scale multiplied by forty.

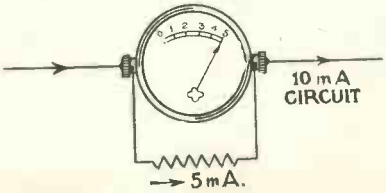
The resistances sold for wireless purposes are usually accurate to about 10 per cent., so very accurate results are not possible unless one starts off with a known voltage and adjusts the resistance to suit.

METHODS OF EXTENDING MILLIAMMETER RANGE

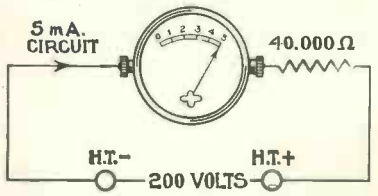
A simple milliammeter reading up to 5 milliamperes



Using a 0–5 milliammeter for reading up to 100 volts



Doubling the range by passing half the current through a shunt resistance



Using a 0–5 milliammeter for reading up to 200 volts

THE RADIO GRAMOPHONE IS IDEAL FOR SMALL DANCES

Standard radio gramophones are ideal for providing music for small dances. Here is the H.M.V. automatic record-changing radio gramophone (Model 522) being used for the purpose

Gramo-Radio Notes and News

HOW will radio gramophones develop during the new season? That is a question to which many people would like to know the answer. At the present moment we can only speculate on what will happen; we shall have to wait until the doors of Olympia open on Friday, August 19, to find out the real answer.

Increased Power Output

One of the most notable tendencies, of course, is to increase the power of the output stage. Although record quality is not so good as radio quality, listeners seem to prefer records to be reproduced at a higher level of volume than they use for radio.

Improved valves and cheaper metal rectifiers make it possible for manufacturers to give large outputs without increasing the price of their instruments.

◆ ◆ ◆

Burmese Colour needles will be known to most gramo-radio fans, particularly those who have dabbled in home recording. Keith Prowse and Co., Ltd., now announce an improved needle of this type. The price is 1s. for a packet of five and 2s. for twelve. Special B.C.N. needles for use with pick-ups are available at 2s. for a packet of ten.

◆ ◆ ◆

Constructors who are on the lookout for a powerful radio gramophone should note the Percy Harris Radiogram described in this issue. This set is particularly good for record reproduction as two properly designed stages of low-frequency amplification are used when the pick-up is in circuit.

As most sets nowadays have only one low-frequency stage it is usually necessary to switch the pick-up into the grid circuit of the detector valve and apply bias to this so that it will amplify. In the Percy Harris Radiogram this compromise is avoided.

◆ ◆ ◆

It is not generally known that the Columbia Graphophone Co., Ltd., in conjunction with the Oxford University Press, are producing a history of music. The printed matter is being prepared by Percy Scholes who, with his collaborators, has already covered the history of music (with records of period examples) from the sixteenth century, through the beginnings of opera and oratorio, to the death of Bach and Handel (1600-1759).

The third volume of "The Columbia History of Music" has now been completed. It deals with the period 1714-1878 and embraces the music of Bach's sons, Beethoven and Schubert. The price (£1 3s. 6d.) includes eight double-sided records of musical examples and the book by Percy Scholes in a special gilt-lettered album. The two previous volumes are available at the same price.

◆ ◆ ◆

Two New Pick-ups

A new pick-up has recently been marketed by British Radiophone, Ltd., of Aldwych House, Aldwych, London, W.C.2. It is priced at £1 2s. 6d. and is incorporated in the Percy Harris Radiogram described on page 24 of this issue.

◆ ◆ ◆

A feature of another new pick-up is an adjustable damper. This model is made by the British Clarion Co., Ltd., of Miller Street, London, N.W.1, and sells at £1 1s.

The Needle and the Record

By P. WILSON, M.A.

This month we are glad to welcome P. WILSON, M.A., to the pages of "Wireless Magazine." Mr. P. Wilson's name will be new to many of our readers, but he is one of the best-known authorities in the gramophone world. Readers will find his contributions of the greatest value for, although an expert in every branch of gramo-radio, he writes very simply from the amateur and experimental point of view

WHAT happens to a gramophone needle when it is tracking in the groove of a record? What is it that determines the nature of the vibrations that are imparted to it? What are the factors that cause record wear?

Are there any simple tests that can be applied, without the use of elaborate and expensive instruments, to ensure that there is a minimum loss in the transmission between record and needle?

And are the conditions for this minimum loss the same as those for minimum record wear! If not, wherein lies the difference?

All these are questions which anyone who takes more than a passing interest in record reproduction must have asked himself.

Answers Not Easy

Unfortunately, complete or even tolerably complete answers to them are not easy to find. Record manufacturers give a number of hints, but these, if they are not regarded as obvious and therefore ignored, are often treated with suspicion as coming from a tainted quarter.

I have even heard it seriously contended that the advice to use each needle once only is dictated by a desire to sell more needles; and, on the other hand, some folks have naïvely explained to me that it is in the interest of the record makers that records should wear out quickly since then there is a larger sale.

Such people have been surprised, almost pained, when I have assured them that these views are completely mistaken. It is true that the gramophone companies have not always been the first to appreciate the significance of a number of features in the art of playing a gramophone record.

Perhaps that is only to be expected, since many of the rules owe their origin in the first instance to keen listening which only an enthusiastic amateur has the patience to undertake; and even in his case it is only after months and months of experience that a real and trustworthy conviction can be established, for the ear soon gets tired and leads one into the most grievous errors.

Nevertheless, the companies are keenly concerned that their records should be reproduced properly and should not wear quickly, and if sometimes they show impatience with suggestions made by amateurs it is only because they fully realise how easy self-deception is.

As an amateur myself, I have come into fairly close contact with most of the professional experts—the real professional experts, I mean—and have always found them ready to test out conclusions based on reasonable evidence.

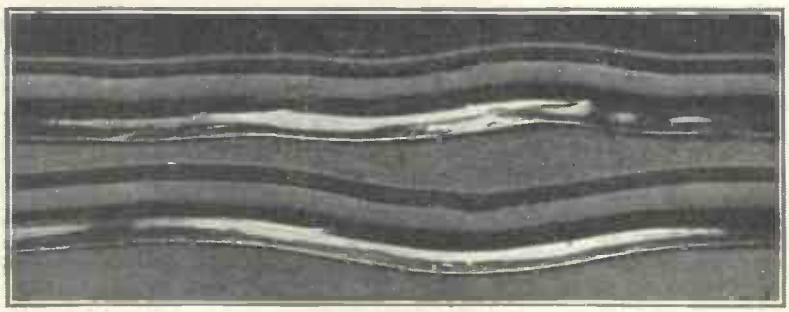
It is recognised, I believe—and if it is not it certainly should be—that the amateur can play a very definite part in discovering the best gramophone technique.

With the quality of the records he has, and can have, little to do; indeed, it is only after long experience of the art of reproduction that one can safely pass any opinion on the quality of recording.

Finding New Effects

Again and again one finds that there is more in the recording than one thought possible. I well remember the first occasion when I discovered the tinkling notes of a triangle in a record made by the acoustic recording process some ten years or so ago.

I had been playing about with some soundboxes trying to test out a theory I had formed about the way in which a gramophone needle should make contact in the groove, when lo! the triangle appeared and startled both my wife and myself.



RECORD GROOVES AS THEY APPEAR WHEN MAGNIFIED
Models of two modern H.M.V. record grooves. It is not difficult to understand how a badly designed pick-up would batter down the walls between the grooves!

I have had the same experience many times since, particularly since I began some six years ago to experiment with pick-ups; but never have I had quite the same thrill.

Again, I shall never forget the horror I experienced in 1925 when I went to Savoy Hill to watch the first B.B.C. broadcast with a pick-up instead of a gramophone and soundbox.

The pick-up armature was gripped between pads of hard rubber, as in a vice. This was called "damping" in those days; the

difference between real damping with a resistance load, which leaves the armature a substantial freedom of movement, and stiff spring control, which puts any armature resonance at a very high frequency and at the same time makes the needle almost rigid at low frequencies, had not then been made clear.

Curls of Record Material

The result was that from every record that was played one could see curls of brown record material being turned up by the needle.

You can imagine how heart-rending such a sight was to an ardent gramophile accustomed to cherish the records he had bought from a not too well-lined purse.

For many months after that I conducted experiments to satisfy myself exactly in what manner a gramophone needle does make contact with the groove.

At that time nothing very convincing had been published on the subject that I could find. But it soon became apparent that until one had definite information on this fundamental point, all one's theories and hypotheses to account for the observations one might make were gropings in the dark.

Much to Be Done

Much has been done in this line since then, but a good deal more remains to be done. I can assure readers of "Wireless Magazine" that the joy of discovery of this kind is one of the most satisfying things I have ever experienced.

To take a pick-up to pieces, make a few adjustments, put it together again and listen intently to see if one can notice any improvement may seem a fearsome task to some.

But if it is backed by some thought and carried out in a proper scientific manner, with an analysis wherever possible of the differences observed, it has a peculiar attraction which grows on one.

Investigation of this kind would be far too costly a matter for any commercial firm to undertake; it is just one of those cases (short-wave radio is another) where the fundamental research must be done by the amateur for the love of the thing.

But please do not misunderstand me. I am not now concerned to make a plea that every amateur should burden himself with the task of going over all this ground again, though assuredly if he would like to do so he will learn more about the goodness or badness of a pick-up, or of particular records, than he ever could hope to do by merely reading a book or a series of articles.

What I do urge is that every amateur experimenter should try to familiarise himself with some of the simple principles that have been discovered through the laborious experiments of others.

Besides giving him a safe starting point for such work as he himself may decide to do, such a course will enable him to clear his mind of many of the specious fallacies that crop up from time to time.

I hope in these articles, without being pontifical, to give a general idea of these fundamental principles and thereby to answer as fully as may be all the questions with which I started this article and many others of equal importance.

IMITATING NEEDLE DRAG

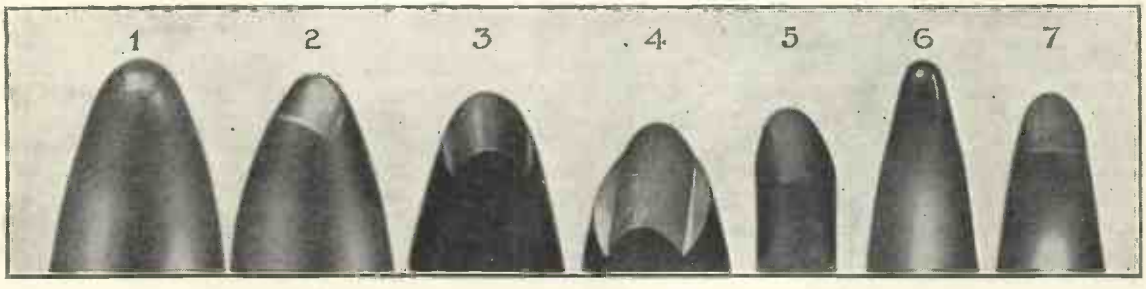
Hold a pencil vertically on a piece of paper and pull it backwards and forwards. It will be at once apparent why a vertical needle position cannot be employed

I hope readers will forgive me if I seem to make the articles too personal in tone; for I am sure that by so doing I shall be able to make them more informative since I shall have the opportunity of indicating how I, at any rate, have found it possible to find a path through many doubts and perplexities.

"Featherweighting"

But, again, let me repeat, the greatest danger is that of jumping to hasty conclusions. If I may take a topical illustration which has been exercising the minds of many readers in recent months I should choose that of "featherweighting."

There are a number of things to be said, and most of them have been said, in its favour; but the subject is not quite so obvious and



HOW NEEDLE POINTS WEAR AFTER PLAYING A FEW DISCS

1.—Unworn loud needle. 2.—Loud needle after playing one 12-in. side. 3.—Loud needle after playing three 12-in. sides. 4.—Loud needle after playing six 12-in. sides. 5.—Wire point of Tungstyle needle after playing twelve 12-in. sides. 6.—Unworn Sympathetic Chromic needle. 7.—Sympathetic Chromic needle after playing one 12-in. side. (Note: The relative wear of these needles has been slightly exaggerated for clearness. In particular notice the "shoulders" on specimens 3 and 4)

THE NEEDLE AND THE RECORD—Cont.

simple as we have been led to suppose, and quite a number of qualifications should be made.

That is why some have found featherweighting a success, while others—well, shall we say?—have not been so fortunate. The reason stands out quite clearly when we study this fundamental question of needle contact.

Many Years Ago

Captain Barnett sprang the same idea on me many years ago when we were both interested in gramophone soundboxes; and the same story of success and otherwise was told then. But, at the least, one learnt much from the discussion.

Another example one might choose is the controversy on fibre needles. The first reaction everyone has, when first introduced to fibres, is that of course the idea is absurd. It certainly was my own reaction and I clung to the belief for many a long day.

Like everyone else, when first starting to play with the idea, I found difficulty in making fibres stand up to any but the lightest recordings and always there was a shortage of high notes. But now (dare I confess it?) I rarely use any needles but fibres, save for experimental purposes, and experience no difficulty whatever on either score.

Indeed, at a public demonstration of electrical reproduction some little time ago, when I was the actual operating mechanic, Christopher Stone, who was doing the announcing and the backchat, remarked in his bland manner that in order to be on the safe side that evening we would use nothing but fibres.

And to his surprise and my relief (I confess), since some of his records were real brutes, there was no sign of a mishap.

My first real insight into what happens to a gramophone needle when it is tracking in a groove was obtained when my friend, Mr. G. W. Webb, introduced me to his models.

I had examined needles under a microscope and sections of a record under a microscope, but could not think of any satisfactory method of observing both needle and record in actual playing conditions. I had had to try to deduce what had really been happening from the appearance of each before and after playing. And my deduction was to a large extent wrong.

Incidentally, a method has now been worked out by means of slow-motion pictures of doing what I so very much wanted to do in those early days. The result is to be seen in the "Gaumont Mirror," No. 84, which was released in May this year.

I am glad to say that Mr. Warneford's pictures fully corroborate what we learned from Mr. Webb's models and, later, from the more elaborate models constructed by the Gramophone Company.

Mr. Webb's idea was simply this: to take accurate measurements of needle points and record grooves under the microscope, to make models magnified some two hundred times and then to construct a simple mechanical arrangement so as to simulate a record groove passing under a needle.

The ultimate form of the apparatus was quite simple, as readers will see from the photograph which is here reproduced. The needle points were cast in solder and then turned and polished.

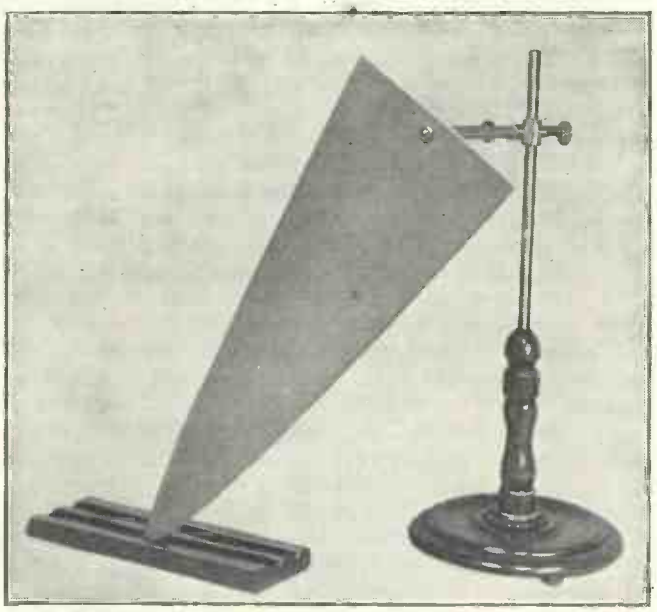
Model of a Groove

The model of a groove (it was actually copied from a H.M.V. record) was made in plaster of Paris and then painted with black enamel.

The transverse flexibility of needle and armature was imitated by means of a sheet of tinplate. And the freedom of motion in a vertical direction, corresponding to the up-and-down motion rendered possible in actual practice by the joint in the tonearm (or carrying-arm of a pick-up), was secured by hinging the upper end of the tinplate on an arm projecting from a chemical retort stand.

The tapered end of the tinplate was drilled in such a way that the needle-point models could be readily attached and detached. Later, we found it desirable to reduce the size of the needle attachments to as small dimensions as were consistent with firm fixing; the object of this was to reduce any chance that the concentration of a large proportion of the mass of the "artificial needle" at the actual tip would vitiate any of the experimental conclusions.

Models of various needles were made, of course, both worn and unworn. A good deal of time was spent in making the models, but the surprise we got when they were put into use was worth it all.



WATCHING WHAT HAPPENS

Assembly of stand, needle and groove to simulate actual playing conditions. A number of interesting demonstrations can be made with this apparatus; see further articles by P. Wilson that will appear in following issues of "Wireless Magazine"

Choosing Your Records

Here are reviews of the latest releases by WHITAKER-WILSON, the "W.M." Music Critic. Outstanding records are indicated by an asterisk (★) against the title

SACRED MUSIC

★**Wedding Music at St. Margaret's, Westminster,** Bells, Organ, and Choir, 2s. 6d. **H.M.V. B3120**

Contains bells, wedding march, and suitable music for weddings. There is probably a use for this sort of record.

CLASSICAL ORCHESTRAL MUSIC

★(*a*) **Midsummer Nights' Dream Overture** (Mendelssohn), (*b*) **Rosamunde Overture** (Schubert), San Francisco Symphony Orchestra, 6s. **H.M.V. D1568**

If you want a good record of the Mendelssohn "Wedding March," I can recommend this one. The more so because of a splendid rendering of the *entr'acte* from the *Rosamunde* Overture, by Schubert. Both are beautifully done.

PIANO SOLOS

★**Hungarian Rhapsody No. 2** (Liszt) (d.s.), Ignaz Friedman, 4s. **COL DX350**

This is the most popular of Liszt's Rhapsodies. You will probably know its plot as played in an orchestra; he personally arranged all of them. Here, however, you have it in the original form—piano solo. It

Ignaz Friedman

is an amazing piece of recording: personally, I think Friedman's tone is too heavy, but do not be put off by my opinion. I belong to the Pachmann school of playing, which does not include these sorts of works. Do ask to hear it—simply for the recording, which beats anything I have heard for a long time.

★(*a*) **Schatz,** (*b*) **Die Fledermaus,** Ernst von Dohnanyi, 4s. **H.M.V. C2363**

I recommend this as likely to appeal to lovers of good piano music, not necessarily classic in style. Dohnanyi's playing is good from the recording point of view. He is brilliant, but not too noisy. Very attractive.

CHAMBER MUSIC

★**Concerto No. 5, Op. 73 (The Emperor)** (Beethoven),

Arthur Schnabel

Arthur Schnabel and the London Symphony Orch., conducted by Dr. Malcolm Sargent, 6s. each. **H.M.V. DB1685-6-7-8-9**

The concerto is, of course, one of the most popular. It should be included in every serious collector's library. There are five double-sided discs. The recording is first-rate and I, personally, like Schnabel's rendering, which I have found myself sorting from all the others I have heard. I strongly recommend the album.

★(*a*) **Waltz in A major** (Brahms), (*b*) **Tambourin Chinois** (Kreisler), Sylvia De Gay, 1s. 6d. **WIN 5499**

I recommend this, not only as violin music, but as something for amateur violinists to imitate. The rhythm of the Brahms, particularly, is good for young players to hear in these days when foxtrots have negatived the true sense of rhythm.

LIGHT ORCHESTRAL MUSIC

(*a*) **Carnival of Venice—Theme and Variations,** (*b*) **Il Bacio—Theme and Variations,** Jack Mackintosh, 4s. **COL DX358**

A very agile cornet-player is Jack Mackintosh. The instru-

Jack Mackintosh

ment records taste, his variations on a theme are particularly clear. I imagine this will be popular.

The Gay Nineties (d.s.), Debroy Somers Band with Raymond Newell, 4s. **COL DX352**

This is a waltz medley on two sides of a 12-in. record. It contains *Daisy Bell, She was one of the Early Birds, Two Lovely Black Eyes, Comrades, Little Annie Rooney.* These are all on one side. The others are just as attractive. I wish present-day tunes were as good as these. The sooner we leave Americanised art, the sooner shall we produce music as attractive as that of the Gay 'Nineties.

★(*a*) **Love, Here is My Heart,** (*b*) **Casino Dances,** Albert Sandler and his Orch., 2s. 6d. **COL DB840**

This will be a good seller. It is one of the best light-orchestral records I have handled for a long time. There is no need to recommend it further—buy it.

(*a*) **Spring's Delight,** (*b*) **Deutschmeister Regimental March,** Marek Weber and his Orch., 2s. 6d. **H.M.V. B4196**

Spring's Delight is very taking. There are some good trumpet and xylophone effects. In some respects I prefer the military march, but both are attractive. One of the most satisfying light-orchestral records I have recently heard.

Strauss Waltzes (d.s.), Otto Lington and his Lingtonians, 2s. **WIN L5493**

Lovers of Strauss—and there are many—should buy this. Two shillings for a disc so well recorded is not out of the way.

LIGHT SONGS AND BALLADS

Treasures from Schubert, Manuello and his Orch., 2s. 6d. **COL DB838**

Played as a light-orchestral selection. It is a medley, of course, but a good one. Various songs, part of *Marche Militaire,* bits of the *Unfinished Symphony,* all "appear." I dislike these medleys, but Manuello's orchestra is very good.

(*a*) **Deep River,** (*b*) **De Blin' Man Stood on de Road an' Cried,** Marcus Browning, 1s. 6d. **WIN 5500**

I am tired of *Deep River,* but the other is quite worth hearing. They are strange effusions, these so-called Negro spirituals, but there is an appeal about some of them. Marcus Browning is one of the best exponents of this particular style of song. This is a very good specimen of his singing.

★(*a*) **Love Everlasting,** (*b*) **I Want Your Heart,** Ina

Ina Souez

Souez and Orch., 2s. 6d. **COL DB839**

Her voice records well; it is full in tone. Her diction is good also. As a light-song record this has a great deal to recommend it. The orchestral accompaniment is most attractive. I enjoyed it thoroughly.

★**Medley,** Ellaline Terriss and Seymour Hicks (d.s.), 4s. **H.M.V. C2432**

This contains well-worn numbers *Honeysuckle and the Bee, Church Parade,* and *I want yer, my Honey* are good specimens. There is some amusing patter, but the intimate style in which they sing the songs is what really appeals. A very attractive disc.

The Open Road—a Hiking Medley (d.s.), Debroy Somers' Band, 4s. **COL DX356**

This hiking medley is based upon what are described as outdoor melodies. I suppose that means songs with lyrics about the open air. It is quite good, but by no means outstanding.

★**Songs of the Shows No. 2** (d.s.), Olive Groves, George Baker and Orch., 2s. 6d. **DECCA K658**

Naturally, such a popular wireless feature should be recorded. John Watt acts as compère and this record is very much the same as one of the broadcast shows. I think you will find all—or at least, a good many—of your old favourites. It is all very well done.

★(*a*) **Vienna, City of My Dreams,** (*b*) **Les Millions D'Arlequin,** Charles Kullum and Orch., 2s. 6d. **COL DB841**

A fine voice and some fine recording. The songs are light in type, but a bit above the average. Rather operatic in style, especially the second. A find record.

MILITARY BAND MUSIC

★(*a*) **Hands Across the Sea,** (*b*) **The Royal Welsh Fusiliers,** Sousa's Band, 2s. 6d. **H.M.V. B4206**

This is an excellent specimen of the Sousa of the old days. I wonder it has not appeared before. Anyhow, it is quite worth hearing.

CHOOSING YOUR RECORDS—Continued

NOVELTY RECORDS

(*a*) **Espana** (w.), (*b*) **Dolores** (w.), The Two Willards, 2s. 6d.
H.M.V. B3964

Both these are harmonica duets. They do not impress me because I do not like the tone of the instrument, but if you *do*, then buy a copy because the playing is good.

HUMOROUS RECORDS

★**It Isn't Cricket** (d.s.), Clapham and Dwyer, 2s. 6d.
COL DB845

I have heard them do this before. The title has nothing to do with the substance of it, that is their way. They do their best, but Clapham upsets everything as usual. It is very amusing.

(*a*) **The Sport of Kings**, (*b*) **OI**, Flanagan and Allen, 2s. 6d.
COL DB816

These two are very amusing and have some originality about them. Not all their lines are strong, but they are occasionally very funny. Worth hearing, at all events.

★**A Trip to Brighton** (d.s.), Mabel Constanduros and Michael Hogan, 4s.
H.M.V. C2436

This is recorded on the Southern Railway. It is really splendid and very characteristic of both of them. I wish I had travelled with them! It ought to sell in hundreds!

ADDITIONAL RECORDS REVIEWED BY CHOPSTICK

LIGHT ORCHESTRAL MUSIC

★**Good-night Sweetheart** (d.s.) Otto Linton and His Lingtonians, 2s.
WIN L5494

Not suitable for dancing. Ray Noble's greatest success is played as "a symphonic jazz arrangement" by a popular Continental band. This is a rather unusual type of record, the tactics adopted by the orchestra being so different from similar arrangements played by leading British bands. It will teach them that it is not necessary to be noisy about a symphonic arrangement. Excellently recorded.

LIGHT SONGS

★**Songs of the Shows** (d.s.), Olive Groves, Elsie Carlisle, Max Winn, Al Bowley and Orch., 2s. 6d.
DECCA K645,

This is a good recording of one of John Watt's broadcast successes. The theme songs recalled are taken from the films *The Broadway Melody*, *The King of Jazz*, *Congress Dances*, *Sunny Side Up*, and *The Love Parade*. It is very pleasant to have on record some of the most popular songs from famous films because it is very doubtful whether they will be revived again, except in these medleys. Get this disc.

NOVELTY RECORDS

(*a*) **Rhapsody in Blue**, (*b*) **Indian Love Call**, Eddie Peabody, 2s. 6d. **COL. DB812**

Eddy Peabody is certainly very clever, but I cannot understand what inspired him to play (*a*) unaccompanied, or why he took the trouble to make a record of (*b*). Both of these works are excellent in their own sphere of music, but as banjo solos they are failures.

CINEMA ORGAN

★(*a*) **Just Humming Along**, (*b*) **Rain on the Roof**, Quentin Maclean, 2s. 6d.
COL. DB821

This was recorded at the Trocadero Cinema, London, on the largest Wurlitzer organ in Europe. Unlike many cinema organists, Maclean is a musician. His version of (*b*), the popular tune which every one knows, is a triumph of variation and recording. Besides all this, it is an excellent test record.

(*a*) **With All My Love and Kisses**, (*b*) **Day by Day**, Harry Davidson, 1s. 6d.
WIN 5502

There are no fancy frills with Harry Davidson's playing on the Commodore Cinema instrument. It is good, solid tone, with very little variation and no vocal chorus to spoil it. Combined with Edison Bell's excellent recording of the pedal notes, this is an unusual cinema-organ record. Both tunes are too well known to need comment.

DANCE MUSIC

(*a*) **Dreams That Grow Old**, Ray Noble and his New Mayfair Orch. (*b*) **By Special Permission of the Copyright Owners, I Love You**, (f), Nat Schilkret and his Orch., 2s. 6d.
H.M.V. B6192

Two numbers from the new show at the Prince Edward Theatre, *Fanfare*. Both numbers are quite snappy, but apart from that there is nothing outstanding in them to warrant recommendation. The most pleasing point about this disc is the excellent piano and drum duet in (*a*). Of course, Noble! By the way, (*b*) is the actual name of the tune.

★(*a*) **Good Evening** (f), (*b*) **The Echo of a Song** (f), Ray Noble and his New Mayfair Orch., 2s. 6d.
H.M.V. B6193

There are few dance bands which come up to the New Mayfair standard. The pianist is exceptionally good and the only weak point is the vocalist. Both of these numbers are present-day favourites, and listeners and dancers cannot do better than to get this version of them. The attraction of this band is probably due to the fact that their arrangements are very fresh and a change from the average style.

(*a*) **Good-night Vienna** (tango), (*b*) **"Auf Wiedersehen," My Dear**, Commodore Grand Orch., 1s. 6d. **WIN 5495**

Two favourites played in the splendid tuneful style of the Commodore Orchestra, though I must admit that I am tired of (*a*). As I have criticised Edison Bell's recording rather unfavourably this month, I hasten to say that this is well up to their excellent standard. Both sides are suitable for dancing. (*b*) is played as a very slow foxtrot.

(*a*) **In Santa Lucia** (tango), (*b*) **Three Little Times** (tango), Parisian Tango Band, 1s. 6d. **WIN 5497**

The Parisian Tango Band has a vocalist who sings in German. (*a*) is a new tune to me and is quite pleasant, but the recording is rather flat for Edison Bell. Quite a suitable disc for dancing, but the time is a shade too fast.

★(*a*) **It Ain't No Fault of Mine** (f.), (*b*) **Tan, Tan Tivvy Tally Ho** (f.), Ray Noble and his New Mayfair Orch, 2s. 6d. **H.M.V. B6194**

Excellent. Two comedy numbers played in quick-step time with good clean humour. Syncopated guitars, rash trumpetting, real oboe playing, and a demonstration of how *not* to play a hunting horn, are some of the unusual features of this rollicking disc. It is certainly one of the jolliest records issued for months. If you do not enjoy it, "it ain't no fault of mine."

★(*a*) **Lovely Carmelita**, (*b*) **Plegaria**, Geraldo's Gaucho Tango Orch., 4s.
COL. CB453

This is one of the most outstanding tango records yet

Geraldo

released. The time is ideal for dancing. Both of the tunes have vocal choruses by a singer with an exceptionally powerful voice. It is good to hear the delicate blending of the singer and the accordions on (*b*). A record recommended without reserve.

(*a*) **Never Hitch Your Wagon to a Star** (f.), (*b*) **Good Evening** (f.), The B.B.C. Dance Orch., 2s. 6d.
COL. CB461

(*a*) is a most uninspiring production and (*b*), although better, is inferior to other versions I have heard this month. The band has some splendid instrumentalists, but with such poor arrangements the overall effect is distressing.

★(*a*) **Paradise** (w.), (*b*) **The Voice in the Old Village Choir** (w.), Savoy Hotel Orpheans, 2s. 6d.
COL. CB463

Both of these beautiful waltzes are played in perfect time and in the melodic style associated with the Orpheans. I thoroughly recommend this disc either for dancing or merely listening. The Orpheans are now under the sole command of Carroll Gibbons, the famous pianist. This record has one very unusual point: there is no trace of any piano work by Gibbons.

(*a*) **Rusticanella** (quickstep), (*b*) **An Old Violin** (w.), New B.B.C. Dance Orch., 2s. 6d.
COL. CB456

An ideal record for those who prefer dance tunes without any "pep" in them. (*a*) is conspicuous for the solo playing of Harry Robbins at his xylophone and Mathews, the young boy oboeist. The waltz on (*b*) is played in faultless time, but the tune and vocalist are most depressing.

★(*a*) **Stop the Sun, Stop the Moon** (f.), (*b*) **When Yuba Plays the Rumba on the Tuba** (f.), Ambrose and His Orch., 2s. 6d.
H.M.V. V6190

Ambrose in his noisiest mood. One of the finest recordings of a trumpet solo will be found on (*a*). You will find (*b*) a good loud-speaker rattler. The tuba player blows from the beginning and keeps on—right at the "mike"—until the end. Besides being splendid for dancing, it is an ideal test record for gramo-radio. I do not recommend it on its musical qualities, but for its noise.

(*a*) **The Turning of the Tide** (*b*) **Day by Day**, Geraldo and His Accordion Band, 2s. 6d.
COL. DB828

Two very invigorating tunes played as only Geraldo can play them. Piano-accordion syncopation is rather trying to the nerves at first, but not half as much as the vocalist who fails to pronounce the G's at the end of his words. This one ought to take elocution lessons. This, by the way, is one of the bands attached to the Savoy Hotel.

(*a*) **The Turning of the Tide** (quickstep), (*b*) **Nobody Else But Elsie** (f.), New B.B.C. Dance Orch. directed by Henry Hall, 2s. 6d.
COL. CB450

The best disc yet made by Henry Hall and company. This one is not in his usual "sweet" style. Undoubtedly, this band is making a name for perfect dancing time. Both (*a*) and (*b*) are rendered in faultless time. Hall has got a splendid trumpeter in Wilson, and Rosing's voice comes over better on the record than on the wireless. Dancing fans should make a point of getting this.

Broadcasters Who Do Things!

Here WHITAKER-WILSON, who contributes a page of broadcast criticism every week to our contemporary "Amateur Wireless," names some of the broadcasters he would encourage to appear more frequently if he were in charge of programme compilation at Broadcasting House. Most listeners will agree with his choice

YOU must not suppose that the life of a broadcast critic is all joy. There are times when he wonders why he was ever born. At least, that has been my thought often enough when, out of duty to my readers, I have hung on where I should, in the ordinary course of events, have hung up.

On the other hand this particular piece of work has brought me much pleasure during the past ten months; also I have learned to make a shrewd guess at the day's programmes and to decide beforehand whether I am likely to be entertained or otherwise.

Constructive Criticism

The object of a journal (devoted to wireless) keeping a tame music critic about its premises is a perfectly good one. The critic is expected to provide readable matter for those who buy the journal; he is expected at the same time to be constructive and to do something towards keeping up a high standard at Broadcasting House.

It is impossible to say with accuracy whether any critic can lay his hand on his heart and say he *knows* he has been of use. I often wonder if I have.

The only thing I can honestly say I *think* I have done for listeners came to light last Christmas. I did appeal in "Wireless Magazine" for an all-star vaudeville for Boxing Night. There *was* one—for the first time. Also I asked for Bransby Williams as "Scrooge." He appeared—the first time for two Christmases.

It may be coincidence; it may not. At all events, I have attempted to be constructive in *Amateur Wireless* by making suggestions each week in a paragraph called "Programme Pointers." My object here is to give a sort of review of impressions gained by watching the programmes closely during the last ten months. Naturally I have formed definite opinions.

Taking the lighter side first, a mass of names seems to come before me. They are names of well-known comedians and vaudeville people generally. It does not seem necessary, for example, to ask for Leonard Henry, Tommy Handley, Clapham and Dwyer, Mabel Constanduros, Cicely Courtneidge, Flotsam and Jetsam, Elsie and Doris Waters, or Jeanne de Casalis. All one can do is to grumble if they do not appear.

These people are all distinctive; you know their style as well as I do. "Uncle Leonard's" giggle is as well known as Clapham's stuttering; Tommy Handley's form of wit is recognisable and distinct from Gillie Potter's. By the way, has the latter not got over his anger at the vaudeville critics even yet?

Gillie Potter is a first-class comedian whose broadcasts are always popular

The Cockneyism of Miss Constanduros is very different from that of the Sisters Waters, just as there is a distinct difference between Cicely Courtneidge in a flurried mood and Jeanne de Casalis getting excited over some trifle.

The Western Brothers are good at satire in their vaudeville efforts

Microphone Personalities

All these people may be put into categories, but their personalities—and, what is more, the "microphone personalities" they create for our amusement—are quite distinct. You know what you are going to get as soon as you see their names in the programmes.

Floy Penrhyn can use a telephone in vaudeville as well as either of the

BROADCASTERS WHO DO THINGS!—Cont.

Clapham recently bought a Gecophone three-valve set. Here he is with Dwyer, making good use of it before their turn starts

other two, but she uses it very differently.

Then there are the imitators. We can do with more of them because the idea of impersonations contains a single, simple thought; this always makes for good broadcasting.

Farmyard Imitations

I do not know who Imito is, but his farmyard imitations are amazing. On the other hand, he is not the only one; Carr Lynn, Percy Edwards, and Reginald Gardiner are all good at that sort of thing. Incidentally there are only two good ventriloquists.

Closely allied to imitations are the burlesques. Of these we have not nearly enough. I am certain that good burlesque and satire are appreciated as much as any form of humour. Norman Long is good at burlesque. I remember he completely won me by satirising the adenoidal dance-band singers.

I should like to hear Florence McHugh again; she skitted at hyper-modern music very cleverly one night some time ago. I have not heard her since. Ronald Gourley also "burlesqued" Czerny's piano exercises quite cleverly. I appeal for more and more satirical burlesque; it is a powerful vehicle for effect.

Topical songs should find a more ready place in vaudeville. I suppose they, too, come under the heading of satire. I wish we had more of the Western Brothers for that reason.

Our broadcasters in provincial dialect are not too numerous, unfortunately. Will Fyffe, Sandy Rowan, Stainless Stephen, and one or two others seem to be all we have. They are good enough, but we can do with more of the type of Our Bill, who tells a story in dialect. Julian Rose is another type of comedian bearing repetition. He can be very funny.

Darky Comedians

We are not too well stocked with darky comedians. Alexander and Mose, Nosmo King and Partner, and G. H. Elliott are all I can call to mind at the moment. The last-named is an excellent singer.

All these people come to the microphone fairly often and, as I have said, we generally know what to expect of them. Naturally I do not know what the B.B.C. pays these people for their work, but it is obvious that to invite several of them to broadcast in one vaudeville must be rather expensive.

Sandy Rowan faces the microphone—an impression by Lissenden

All the same, I offer a suggestion. If occasionally two or more of them could be invited to broadcast *together* I think there would be a good result. Can you imagine Harry Tate and George Graves in an argument? I can! Think of their individual styles; they would be amusing together.

Do you remember Leonard Henry broadcasting from his bath? He was very funny that night. I wish he would broadcast from it again some night, *especially if by so doing he prevented Gillie Potter from having his*! They would be worth hearing.

One of the best vaudeville artists is Leonard Henry; he needs no introduction

Astra Desmond is a popular singer, who always gives a pleasing performance

Dale Smith has the gift of singing dead in tune, not possessed by everybody

Well known as one of the best "dialect" broadcasters—Stainless Stephen

AN ARTICLE BY WHITAKER-WILSON

I want Jetsam, with Flotsam as accompanist, to give Cicely Courtneidge a singing lesson. It would be great fun to hear her trying to imitate his low notes in "Ali Baba's Camel." If he managed to teach her well, the B.B.C. might turn Gracie Fields over to him. She would lead him a vocal dance!

Claude Hulbert might, for once, take Dwyer's place. I should appreciate a lecture from him with Clapham as commentator. There is no end to the idea. Vaudeville has really become a little stale, despite the amazing talent that has been displayed. It wants new life in it. I imagine the suggestion I have given might possibly do something for vaudeville.

The public is interested in these personalities; a combination of them, here and there, instead of always having them separately, might be worth trying as an experiment.

There are a few singers for whom I want to ask. One is Dale Smith. He has the power to sing dead in tune—a power not possessed by everybody. Also he sings good songs. He has a breeze about him; may it blow into my study more often than it has recently!

A good broadcasting voice is that of Muriel Gale; she is also breezy. Perhaps her name has something to do with that. As a singer of light songs she is most attractive.

I have been hunting through my notes for some minutes in search of a singer whose voice appealed to me as excellent in the comedy sense. I have just found her —Tessa Dean.

Good Duet Singing

While I think of it, there was some splendid duet-singing some time ago between a soprano and a contralto. Their names are Beatrice Beaufort and Janet Christopher. I have not seen them mentioned since an isolated broadcast some months since. They appealed to me because they sang good songs and sang them *dead together*. May they be asked again soon?

I am inclined to ask for more song recitals, so long as the singers are given to understand that an attempt is being made to interest the so-called low-brow in a better type of song.

Candidly, I despise shop ballads. I dislike all badly written songs and want to see something better made really popular. There is only one way to do that: it is to get the best singers to sing a good style of song.

Series of the Best Songs

So long as lieder-singers persist in singing Wolff, Schubert, Brahms, and Strauss in German, so long will they alienate the interest of the average listener.

I am personally very fond of lieder sung in German, but I know quite well that only a small percentage of listeners really enjoys songs sung in foreign languages.

At all events, surely there can be a special series of the best songs sung in English given by Astra Desmond, Dorothy Silk, Enid Cruickshank, Evelyn Scotney, Marion Anderson, Muriel Brunskill, Maggie Teyte, Dora Labbette, and a host of others whose names escape me. Roy Henderson, Norman Allin, Harold Williams, Stuart Robertson, Eric Greene, and Frank Titterton are also types of singer for this particular piece of work.

I suggest that the B.B.C. fixes some time like 5.30 p.m. on Sunday afternoon for a numbered series, just like the evening symphony concerts; such concerts would give the average listener a chance of appreciating good vocal music put before him in an attractive fashion.

There is hardly any necessity to appeal for more chamber music concerts or even symphony concerts. The Promenades will be on in a few days' time. Lovers of serious music are well catered for. I, for one, have little to complain of in this respect.

Cicely Courtneidge is always good, as every listener knows

One of the best "darky" comedians is G. H. Elliott

Dora Labbette is good in English songs

Another excellent singer is Harold Williams

Claude Hulbert should give a lecture with Clapham as commentator!

Norman Allin is excellent as a broadcaster. He also takes part in opera

A very well-known tenor, Frank Titterton is welcome whenever he broadcasts

Evelyn Scotney needs no introduction to lovers of good singing

The Triple-tune Four

A Set with Two Screen-grid Stages :: Designed by the "W.M." Technical Staff

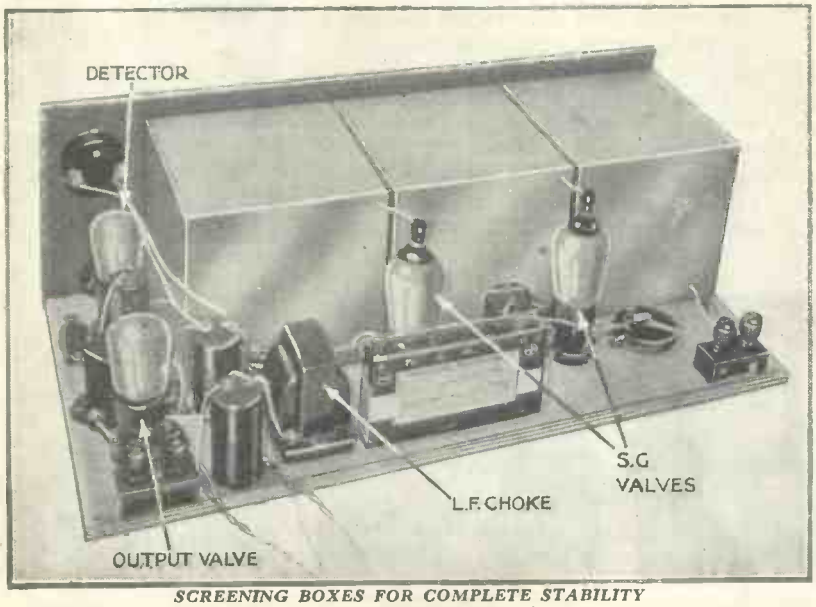
THIS design presents a unique opportunity for the keen amateur to build himself a first-class screen-grid receiver at remarkably low cost. We make no apology for producing a set that to some extent is reminiscent of what was common practice some three years ago.

Correspondence

From correspondence we know that hundreds of "Wireless Magazine" readers will welcome the appearance of an up-to-date circuit that uses what have come to be regarded as "old" components.

We learnt recently that one of the best-known coil makers had a stock of 2,000 sets of six-pin plug-in coils which they proposed to clear out at really remarkable prices. This seemed an opportunity too good to be missed and one of which many constructors would like to take advantage, especially as the coils in question are of undoubted efficiency.

It should be made clear that when the stock of 2,000 sets is exhausted—as it certainly will be in a very short time—no further supplies will be available. Those who intend to build the Triple-tune Four, therefore, after having read this description of it, should order the parts without delay or they will be disappointed.



SCREENING BOXES FOR COMPLETE STABILITY
This photograph shows how the metal screening boxes for the tuning circuits are arranged in the Triple-tune Four to give complete stability in operation

Two special features of the Triple-tune Four are the use of plug-in coils of the six-pin type and separate variable condensers for tuning the three circuits. That is why the set is so cheap to put together. A complete set of coils for the three tuned circuits costs only £1 3s. and many old hands will already have three suitable .0005-microfarad condensers.

No Ganging Trouble

This receiver, of course, has no ganging and there are no preliminary adjustments to give any trouble. On the other hand, the coils have to be changed when it is desired to go from the medium to the long wave-band (and *vice versa*) and there are three separate tuning condensers to adjust.

But, as we have already pointed out, there are hundreds of constructors who do want such a set—we are constantly being asked for one.

Although the actual components used may be regarded by some as "old," the circuit follows the most up-to-date practice, as will be clear from the diagram opposite.

Tapped Aerial Coil

As the aerial coil is tapped there is no need to use a pre-set condenser, thus saving a couple of shillings to start with. The tappings enable the best results to be obtained with any particular length of aerial and should be tried in turn. Of course, what is the best tapping for medium-wave reception may not be best for the long waves.

Both the screen-grid tuning circuits make use of high-frequency transformers. From past experience we know that these are particularly efficient. A special feature of these transformers is the fact that they have removable primaries (a set of four primaries is supplied with each coil—two for the medium waves and two for the long waves). In this way it is possible to get the best compromise between signal strength and selectivity for any particular reception conditions.

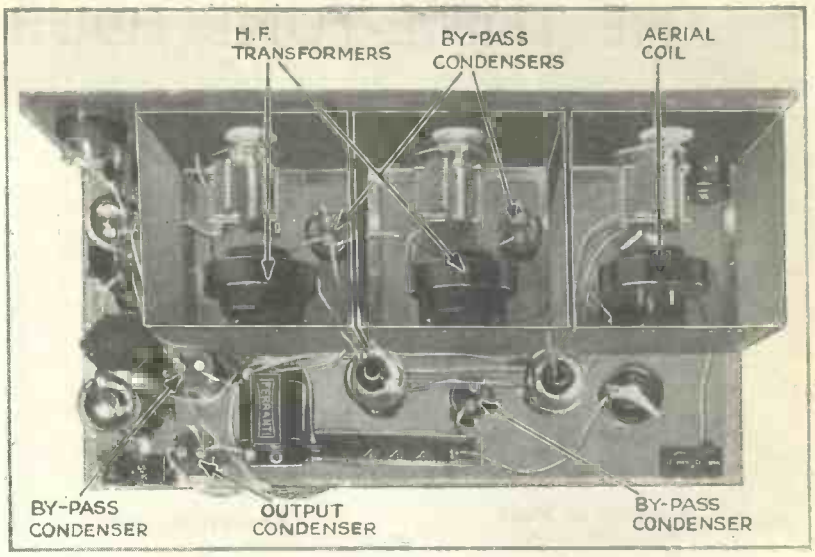
Adjusting Selectivity

When the small primaries are used the set is in its most selective condition; if the large primaries are employed the signal strength is increased, but at the expense of selectivity. It will, therefore, be apparent that the set can be adjusted at will to give the best possible results for local or long-distance reception.

As high-frequency transformers are used in the anode circuits of the two screen-grid valves there is no need for the decoupling precautions that would otherwise be necessary to ensure stability of operation—another saving in expense.

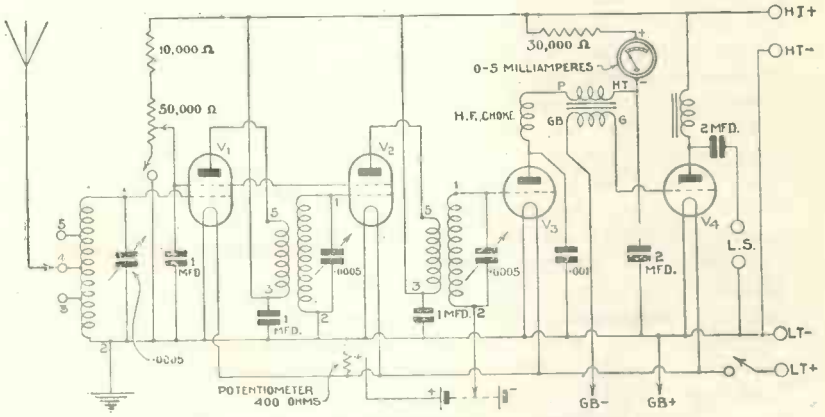
No Reaction Needed

Owing to the efficiency of the two screen-grid stages incorporated in the Triple-tune Four there is no need to rely on reaction to bring up the strength of distant stations and no reaction circuit is included in the design.



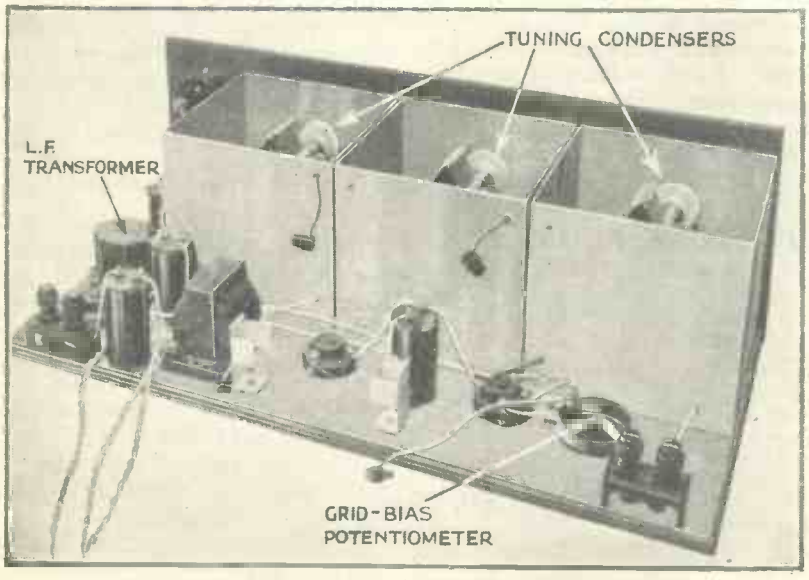
SIMPLE AND STRAIGHTFORWARD LAYOUT

There is nothing complicated about the construction of the Triple-tune Four, as this illustration shows. Note that the baseboard is covered with aluminium foil



UP-TO-THE-MINUTE SCREEN-GRID CIRCUIT

The circuit of the Triple-tune Four follows the latest radio practice. The valve combination is two screen-grid stages, anode-bend detector and a power valve



SEPARATE TUNING COILS AND VARIABLE CONDENSERS

The Triple-tune Four uses three separate tuning coils and three separate tuning condensers. The coils have interchangeable primary windings

This means that the three main tuning dials are the only controls that have to be operated for bringing in stations; the set is therefore no more difficult to operate than one with two tuned stages and a reaction control—a combination that is still very common.

Overall Band-pass Effect

By the way, it is possible with a set having three tuned circuits to adjust them so that a definite band-pass action is obtained. For instance, the aerial circuit can be adjusted dead in tune, the first high-frequency circuit tuned slightly high and the second high-frequency circuit tuned slightly low; the result is an overall band-pass effect that gives fine selectivity and retains sufficient high notes to give perfect quality of reproduction.

In order that the three circuits

THE TRIPLE-TUNE FOUR—Continued

Good Results on Test

TESTS on the Triple-tune Four were made in South London—on Midsummer's Day—using an outdoor aerial 70 ft. long. Most readers are aware that at this time of the year conditions are generally poor, the majority of the foreign stations not coming in until well past ten o'clock at night. However, the log, although rather small, is satisfactory.

Strange at First

After handling so many one- and two-knob sets recently this one naturally appeared rather strange at first, but after half an hour it was possible to find one's feet, as it were, and get down to the business of testing its capabilities under summer conditions.

The medium waveband was tried first, using the coils CAC5 and CSP5 (2) with No. 6 primary coils. Selectivity was adequate for all general purposes and the sensitivity was well up to standard. Almost every station was heard clear of interference. One very noticeable point was the wide wavelength range covered, this extending from below 200 metres to well above 550 metres.

Alternative Primaries

In the box of coils supplied with the set was another set of primaries (No. 4) for the medium waveband. These were tried and were found to give much better selectivity. I imagine that the No. 4 primaries would be the better for the winter months.

On the long waves every station on the log was heard clear of all interference, although it was not possible to receive Zeesen at all. Super-het selectivity is necessary to separate this station from its high-power neighbours, Radio Paris and Daventry. No. 14 primary coils were used for the long-wave tests, with six-pin-coils types CAC20 and CSP20 (2).

Aircraft Signals

Heston A.A. station and Croydon Airport were heard at good signal strength, but I omitted to take note of their dial readings.

The novice should soon master the art of tuning the set. Naturally he will find it rather difficult at first. It will be seen from the list of stations, though, that the dials are almost all in step with one another over both wavebands.

Milliammeter Movement

The maximum tuning point can be seen by noting the movement of the milliammeter needle. As anode-bend rectification is used, the maximum signal strength is obtained when the milliammeter needle is at its highest point.

Readers who intend to use this set with a mains unit will be interested to know that it was tested with an Atlas mains unit, type AK260, which gave perfectly satisfactory results. Quality on a large balanced-armature cone loud-speaker was quite pleasing.

T. F. Henn

LOG OF THE TRIPLE-TUNE FOUR

LONG WAVES	Aerial	H.F.	
Huizen	80	81	81
Radio Paris	74	78	74
Daventry National	63	66	66
Eiffel Tower	58	60	58
Kalundborg	41	43	45

MEDIUM WAVES	Aerial	H.F.	
Vienna	84	88	90
Brussels No. 1	82	84	84
Prague	80	82	81
North Regional	77	80	79
Langenberg	75	78	77
Beromunster	73	74	75
Rome	70	71	72
Sottens	65	67	66
Midland Regional	63	65	65
Toulouse	60	62	61
Lvov	58	60	60
London Regional	53	55	54
Poste Parisien	47	50	49
Bordeaux	42	45	44
North National	41	44	43
Hilversum	39	42	42
Heilsberg	34	39	37
London National	29	35	33
Trieste	25	30	30
Fécamp	18	26	25

can be tuned without difficulty a milliammeter is included in the anode circuit of the detector valve. As the detector is arranged on the anode-band principle the reading of the milliammeter increases when a station is being received.

The greater the increase in the milliammeter reading the greater is the strength of the signal being received. There is thus a *visual* indication of what is happening as the tuning condensers are adjusted.

"Band-Pass" Action

Moreover, by watching the milliammeter it will be possible to see when a "band-pass" effect is being obtained. Supposing that to start with the three condensers are adjusted to give the maximum reading on the milliammeter; one then knows that all three circuits are tuned to the resonant point.

If, now, the second condenser is tuned slightly high and the third condenser is tuned slightly low, the milliammeter reading will be reduced somewhat. But if the first condenser is slowly adjusted around its resonant point it will be seen from the milliammeter that there is a definite "band" in the tuning. Many interesting experiments can be made by the amateur on these lines.

The anode-bend detector is adjusted for the best results by means of the bias applied to the grid. This is roughtly adjusted by varying the tapping on the grid-bias battery and fine adjustments are obtained by setting the 400-ohm potentiometer mounted on the baseboard. Normally, from 1.5 to 4.5 volts bias will be required for this valve.

Volume Control

With such a powerful receiver it is, of course, necessary to have some kind of volume control. In this case volume is controlled by altering the voltage on the screen of the first high-frequency valve. A 50,000-ohm potentiometer is placed in series with a 10,000-ohm fixed resistance and the voltage on the screen of the valve is controlled by varying the setting of the potentiometer, which is mounted on the panel for this purpose.

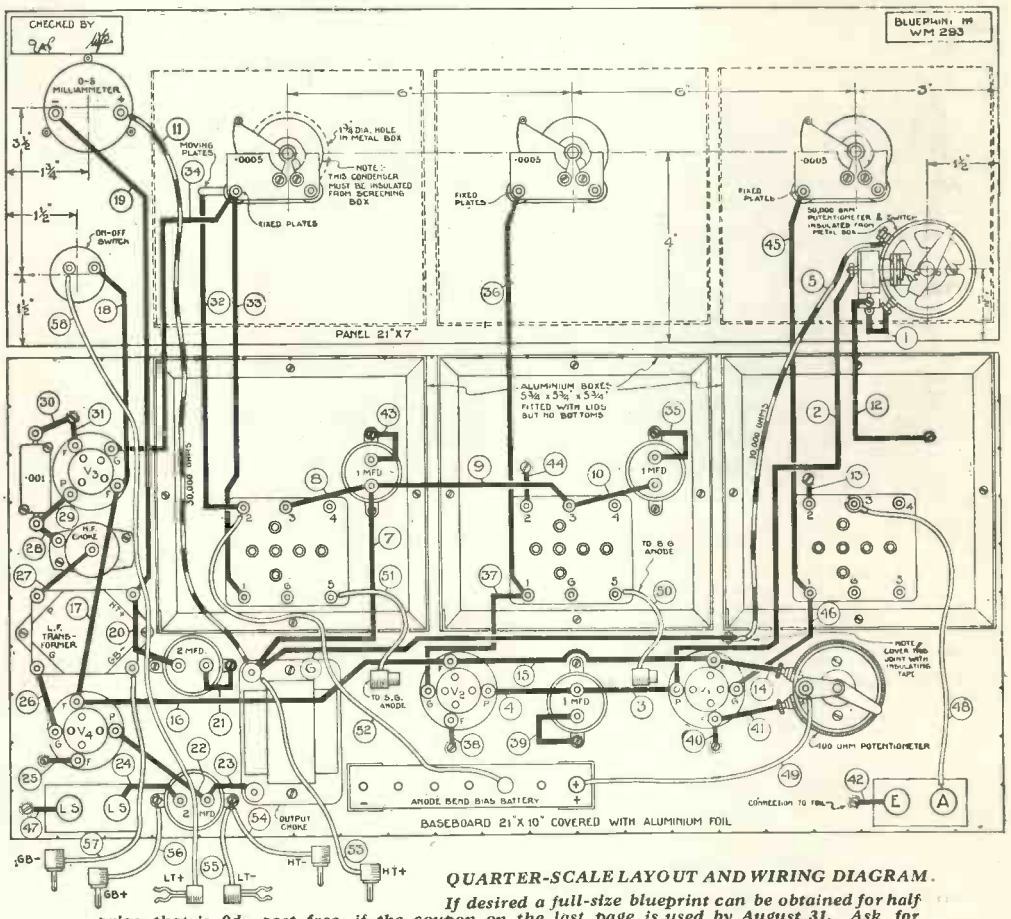
It will be clear from the photographs reproduced in these pages that the layout of the Triple-tune Four is particularly straightforward.

TWO SCREEN-GRID STAGES FOR RANGE

There are comparatively few components and these are all easily accessible. The three tuning circuits are enclosed in three separate screening boxes; for this reason the set is quite stable in operation.

All the essential details for the construction if the set are included in these pages, the quarter-scale layout and wiring diagram alongside being very easy to follow. Those who desire one, however, can obtain a full-size blueprint. This can be had for half price (that is, 9d., post free) if the coupon on the last page of the issue is used by August 31.

Address your application to "Wireless Magazine," Blueprint Department, 58-61 Fetter Lane, London, E.C.4, and ask for No. WM293.



QUARTER-SCALE LAYOUT AND WIRING DIAGRAM.

If desired a full-size blueprint can be obtained for half price, that is 9d., post free, if the coupon on the last page is used by August 31. Ask for No. WM293 when ordering. Make the connections in the numerical order indicated

COMPONENTS NEEDED FOR THE TRIPLE-TUNE FOUR

CHOKE, HIGH-FREQUENCY
1—Peto Scott, 4s. 6d. (or Lewcos, Varley).

CHOKE, LOW-FREQUENCY
1—Ferranti, type B8, 7s. 6d. (or Varley, Tunewell).

COILS
1—Set of Lewcos Super coils and primaries (ref. W4M), £1 3s.

CONDENSERS, FIXED
1—Dubilier .001-microfarad, type 670, 1s. 3d. (or T.C.C.).
3—Dubilier 1-microfarad, type 9,200, 7s. 3d. (or T.C.C., Telsen).
2—Dubilier 2-microfarad, type 9,200, 7s. 6d. (or T.C.C., Telsen).

CONDENSERS, VARIABLE
3—Utility .0005-microfarad type 197, with vernier dial, £1 10s. (or Jackson, Lotus).

EBONITE
1—Becol, 21 in. by 7 in. panel, 6s. 11d. (or Peto Scott).

HOLDERS, COIL
3—Lewcos six-pin, type SPB, 6s.

HOLDERS, VALVE
4—W.B. four-pin, 2s. 8d. (or Lotus, Benjamin).

METAL BOXES
3—Parex screening boxes, 10s. 6d.

METER
1 Bulgin 0-5 milliammeter, type MC3, £1 10s

RESISTANCES, FIXED
1—Magnum 10,000-ohm spaghetti, 1s. (or Varley, Tunewell).
1—Magnum 30,000-ohm spaghetti, 1s. 6d. (or Varley, Tunewell).

RESISTANCES, VARIABLE
1—Bulgin 50,000-ohm combined potentiometer and switch, type VCH, 7s. 6d.
1—Sovereign 400-ohm baseboard-mounting potentiometer 1s. 6d.

SUNDRIES
Sheet of aluminium foil, 21 in. by 10 in.
2—Belling Lee terminal blocks, 1s. 4d. (or Junit).
1—Pair of Bulgin grid-bias battery clips, type No. 1, 6d.
2—Belling-Lee anode connectors, 1s.
Tinned-copper wire for connecting.
Lengths of oiled-cotton sleeving.
Lengths of rubber-covered wire.

PLUGS AND TERMINALS
6—Belling-Lee wander plugs, marked: H.T.+, H.T.—, G.B.+ (2), G.B.— (2), 1s. (or Clix, Eelex).
2—Belling Lee spade terminals, marked: L.T.+, L.T.—, 4d. (or Clix, Eelex).
4—Belling Lee terminals, marked: Aerial, Earth, L.S. (2), type B, 2s. (or Clix, Eelex).

SWITCH
1—Bulgin rotary, on-off type S85, 1s. 9d.

TRANSFORMER, LOW-FREQUENCY
1—Atlas, 5s. 6d.

ACCESSORIES

BATTERIES
1—Pertrix 120-volt high-tension, 15s. 6d. (or Siemens, Lissen).
1—Pertrix 9-volt grid-bias, 1s. 6d. (or Siemens, Lissen).
1—C.A.V. 2-volt accumulator, type 2AG9, 12s. 6d.

CABINET
1—Pickett, in oak, £1 2s. 6d.

LOUD-SPEAKER
1—Blue Spot cabinet cone, type 45R, £2 12s. 6d.

VALVES
2—Cossor 220SG, £1 13s.
1—Cossor 210HL, 7s.
1—Cossor 220PA, 8s. 9d.

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

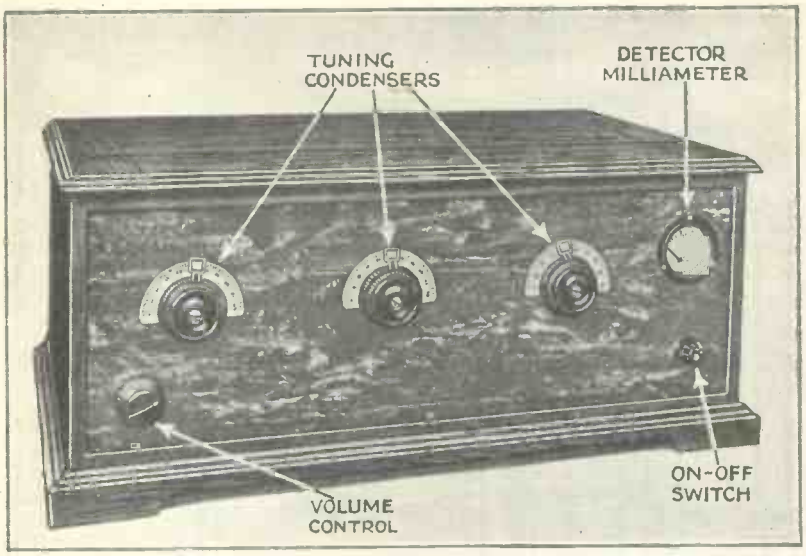
There is little that need be said about the actual construction of the receiver, for everything will be clear from the photographs and layout diagram. Note, however, that a sheet of aluminium foil is placed right over the baseboard and that the screening boxes have lids but no bottoms.

Screening Completed

The screening at the bottom is, of course, completed by the aluminium on the baseboard and special care should be taken to see that a tight screw joint is made.

One point that has not yet been mentioned is the fact that the screen-grid potentiometer has coupled with it a simple type of on-off switch. This is to cut the potentiometer right out of circuit when the set is not being used; if this is not done then there is a constant drain on the high-tension source. When the set

THE TRIPLE-TUNE FOUR—Continued



THREE TUNING CONTROLS—BUT NO REACTION
Although the Triple-tune Four has three tuning controls it is not at all difficult to operate. There is no reaction knob to complicate the adjustment

is switched off the potentiometer knob should therefore be turned right round to the left.

Results on Test

The test report on page 76 may not seem very impressive for a four-valver with two screen-grid stages, but it must be remembered that the test was made in the middle of the summer when reception conditions were at their worst. In the autumn this set will be capable of bringing in scores of stations at good strength from all over Europe.

There is not much more to be said about the set. The method of tuning will be clear from the remarks made in the test report and from what has already been said in this article. Operators should try the alternative primary coils which, by the way, are plugged on the sides of the main coils.

Remember that the small primaries give the best selectivity and that the large primaries give the best signal strength. Those who live a fair distance from the nearest broadcasting station will probably seldom have to use the small primaries, but for those in close proximity to a broadcasting station the small primaries will be invaluable.

Suitable Valves

Any standard types of screen-grid valve will be suitable for the Triple-tune Four. The detector should be of moderately high impedance, say of the order of 20,000 to 25,000 ohms.

The power valve will, of course, have to be chosen with an eye on the limits of the high-tension supply. If a mains unit is used for obtaining high tension then the power valve can be of much lower impedance than would be economical if dry batteries are to be used. This is a point for the individual operator to decide for himself.

Once more we repeat that only about 2,000 sets of coils for the Triple-tune Four are available. When they have been disposed of they will not be repeated.

We are certain that they will be satisfied with the results that can be obtained from this receiver and we anticipate that in a few weeks we shall receive many enthusiastic reports on the performance of the Triple-tune Four.

The B.B.C. Flag

MOST people passing by Broadcasting House in Portland Place notice the B.B.C.'s flag flying from the top of the building. This flag symbolises broadcasting by a very appropriate design.

It may interest listeners to know that the flag is based on the B.B.C.'s coat of arms.

Earth and Ether

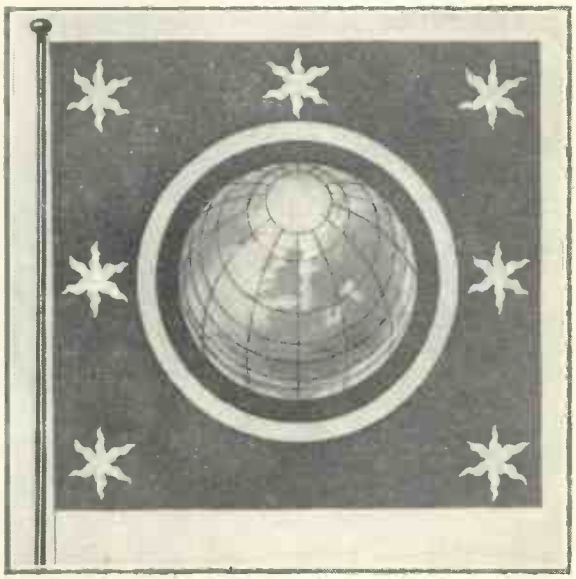
Made by Mr. G. P. Jennings, the flag consists of a terrestrial globe, representing the earth, on an azure field, representing the ether. Around the globe are seven planets.

Pluto, the new planet, is not shown, as this was not recognised as a major planet at the time when the original coat of arms was designed.

Encircling the globe is a golden ring, symbolising transmissions girdling the earth.

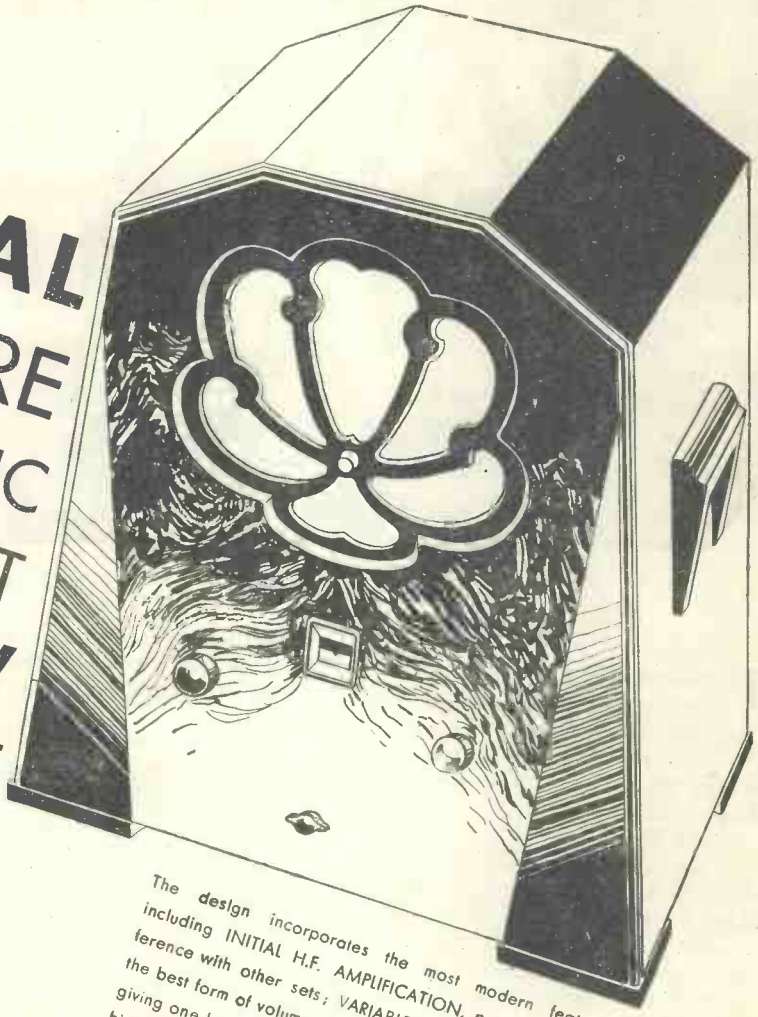
This unique flag is hoisted every morning at 9 a.m. and is lowered at 6 p.m. There is a smaller edition of the flag for use on stormy or very windy days.

The flag flys over what most people would think is the bow of the "ship" called Broadcasting House, but we now think of this end as the stern, because of course the ship's flag always flies above the "Admiral's" quarters. Sir John Reith is just below.



THE B.B.C. FLAG
London readers will be able to see this flag flying over the headquarters of the B.B.C. at Broadcasting House in Portland Place Regent Street

TECHNICAL MEN ARE ENTHUSIASTIC ABOUT THIS NEW SET



Widespread interest has been aroused by the introduction of the FERRANTI 7-Valve Super-Heterodyne. Knowing the high quality of FERRANTI components, technical men looked for an altogether outstanding performance from the new FERRANTI Receiver. The definite opinion of these practical-minded listeners is that the FERRANTI Super-Heterodyne is exactly what is wanted for modern radio conditions—an instrument built to standards of precision in every detail, and able to exploit the full possibilities of every kind of broadcast.

The design incorporates the most modern features, including INITIAL H.F. AMPLIFICATION, preventing Interference with other sets; VARIABLE MU VALVES, providing the best form of volume control; GANGED CONDENSERS, giving one knob tuning; BAND PASS COUPLING, ensuring high selectivity without loss of high notes; MOVING COIL SPEAKER, for high quality reproduction; TONE CONTROL, to provide sharp or mellow tone at will; ILLUMINATED WAVELENGTH SCALE, giving instant station identification; AUTOMATIC MAINS AERIAL DEVICE, enabling the Receiver to be easily moved from room to room and used wherever an A.C. light or power socket is available, and GRAMOPHONE PICK-UP.

FERRANTI

7-VALVE SUPER-HETERODYNE CONSOLETTE

RETAIL PRICE 22 GNS

Or by Deferred Payments -42/- down and 12 monthly payments of 38/6.

FOR ILLUSTRATED LITERATURE, WRITE TO:

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A Radio Fan's Causerie :: Conducted by BM/PRESS

Radiolympia, 1932

IF you have not already done so, make a note in your diary that the Radio Exhibition opens at Olympia on Friday, August 19. It will remain open until Saturday, August 27.

Many people are of the opinion that the exhibition is being held too early this year and that many prospective visitors will be away on holiday. The reason for the early date is to give dealers an opportunity of ordering supplies from the manufacturers some weeks before the autumn buying rush really begins in earnest.

It is hoped in this way that deliveries will be kept up to date and that some of the annoying delays that have occurred in the past will be obviated. If this object is achieved, then the early date will have justified itself.

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T.S.F. in Brittany

Since I last penned these notes I have spent a fortnight at Dinard. There *la télégraphie sans fils*, as the French call wireless, is conspicuous by its almost complete absence. In Dinard itself I did not see more than half a dozen aerials and during after-dinner strolls I heard only two loud-speakers.

In a weekly pictorial, however, I came across an interesting referendum. The paper is called *Vu*; it deals with items of general interest and is not a wireless paper. This referendum is of such interest that I propose to give a complete translation of all the questions asked; so here goes:

If You Own A Set

If you own a set, you are asked to reply to the following questions:

1.—What make is your receiver?

2.—What was the year of manufacture? How many valves has it? Is it worked from batteries or from the mains?

3.—Among the reasons enumerated below, which led you to buy the receiver?

(*a*) Were you recommended by friends? (*b*) Were you recommended by a dealer? (*c*) Did you decide after a demonstration? (*d*) Did you buy as the result of an advertisement? (*e*) For any other reasons?

4.—Are you entirely satisfied with the set?

5.—If not, is it the set that is unsatisfactory or the programmes you hear?

6.—If the set, indicate the reasons. (*a*) Is the number of stations you can receive too limited? (*b*) Have you had difficulty in separating various stations? (*c*) Is the quality all you desire? (*d*) Does the appearance of the set please you? (*e*) Any other reasons?

7.—Do you intend soon to change to another receiver? (*a*) What make will you choose? (*b*) Battery or mains operated?

8.—What other makes of apparatus do you know of?

9.—What kinds of programmes interest you most? Indicate the first three items of your choice from the following: (*a*) classical music; (*b*) light music; (*c*) dance music; (*d*) drama; (*e*) talks; (*f*) news; (*g*) running commentaries; (*h*) variety of programmes.

10.—Have you electricity in the house? (*a*) Direct current? (*b*) Alternating current?

11.—Have you a car? What make?

12.—Have you an electric fire or any other electrical appliances?

13.—Have you a telephone?

Well Planned

These questions are, I think you will agree, very well planned, and if a reasonable number of replies is received they should go a long way towards showing the real reaction of French listeners to existing radio conditions.

The reason for questions 11, 12, and 13 may not be at once apparent to readers of "Wireless Magazine." They are included, I think, because radio in France is comparatively much more expensive than it is over here.

If You Have No Set

Here is the second set of questions, to be answered if you have no set:

1.—Have you ever previously had a receiver?

2.—Why haven't you one now? Indicate three from the following reasons: (*a*) Is the cost too high? (*b*) Is the manipulation too compli-

(*Continued on page* 82)

RADIO MEDLEY—Continued from page 80

cated ? (*c*) Are the results sufficiently clear: isn't the quality of reproduction good enough ? (*d*) Doesn't the appearance of the latest sets please you ? (*e*) Don't the programmes interest you sufficiently ? (*f*) Do you prefer to provide your own music by going to concerts or by means of a gramophone ? (*g*) Any other reasons ?

WOMAN ANNOUNCER FOR BERLIN

Frau Gertrud van Lyseren has been appointed as the first woman announcer in Berlin. No doubt her voice will soon be familiar to British listeners

3.—Have you ever heard a receiver at friends' houses ? How often ?

4.—Have you had a free demonstration in your home ? (*a*) What make was the apparatus ? (*b*) Are you going to buy it ?

5.—If you buy a set: (*a*) What make will you choose ? (*b*) For battery or mains operation ? (*c*) How many valves ?

6.—How much do you intend to spend ?

7.—What other makes do you know of ?

8.—What kind of cabinet do you prefer ? Modern style ? Antique style ?

9.—Do you think the results depend on the number of valves ?

10.—Have you electricity in your house ? (*a*) Direct current ? (*b*) Alternating current ?

11.—Have you a car ? What make ?

12.—Have you an electric fire or any other electrical appliances ?

13.—Have you a telephone ?

There is no question that the items included in this referendum have been well thought out. I hope it will be a bigger success than the recent B.B.C. questionnaire on family conditions. The French wireless questionnaire seems to me to be of greater interest and also of greater practical value than the B. B. C.'s recent effort.

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A Fillip to Television

With the announcement of the early release of a new Baird Televisor and the evening session of television transmissions to be put out by the B.B.C. it seems likely that television in this country will receive a much-needed fillip.

The B.B.C. have now taken over television experiments for themselves and they will do their work quite independently of any commercial interests. Up till now the Baird Company has actually paid the B.B.C. for putting out experimental television transmissions from the company's own studios in Long Acre. I understand that in future the programmes will be arranged entirely by the B.B.C. and that they will be broadcast from studio BB at Broadcasting House.

Transmissions will be made between 11 p.m. and 11.30 p.m. on Mondays, Tuesdays, Wednesdays and Fridays, starting about the time this issue of "Wireless Magazine" is published. Vision will be transmitted from the London National station and speech from Midland Regional.

Those who are not interested in television cannot grumble at these arrangements, for at the time these transmissions are to be made both these stations have normally closed down for the night.

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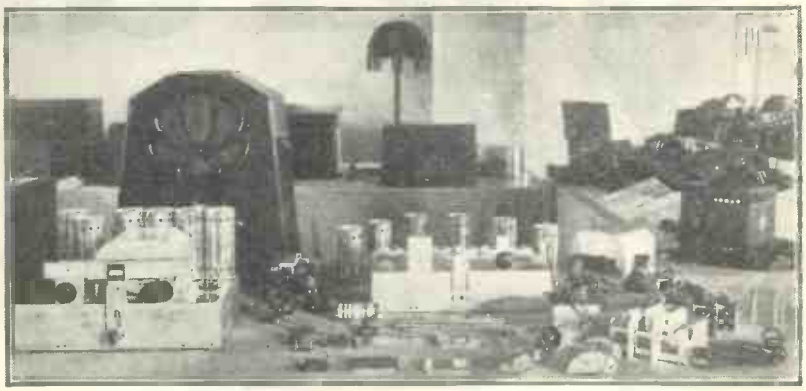
An Electrical Jubilee

Last month I had something to say about the remarkable work of the late Dr. Ferranti. Since then I have had an opportunity of visiting the Jubilee Exhibition held by Ferranti's at Bush House.

There was a fine collection of electrical gear, ranging from power-station apparatus to the finest precision meters for small measurements. Radio people, of course, were most interested in the new seven-valve super-het receiver, which seems certain to be a great success.

I also took the opportunity of having a good look at the Ferranti electric clocks. When I went to the Hollinwood works a few months ago there was no time to make any detailed inspection of the "innards."

(*Continued on page* 84)



FERRANTI'S JUBILEE EXHIBITION

To celebrate their jubilee, Ferranti's recently held an exhibition of their electrical products at Bush House, London. This photograph shows the new seven-valve super-het in various stages of assembly

RADIO MEDLEY—Continued from page 82

There is a particularly neat bearing in these clocks, which you should ask to see if they are on show at the Radio Exhibition, as I suppose they will be.

By the way, there is now a "drum" model without a case for building into a radio cabinet as an integral part of the receiver. This should interest those who have synchronised A.C. mains and who intend to build themselves new sets during the autumn.

CANNIBALS AND THE GRAMOPHONE
Yakouba cannibals in West Africa listening to one of the H.M.V. portable gramophones used in the B.I.P. film, "Timbuctoo." The star, Henry Kendall, is seen in the centre

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Valve Possibilities

Unless I am very much mistaken not many new valves will be announced this autumn. Every manufacturer is now making an enormous range of different types (just have a look at the valve guide in the front of this issue of "Wireless Magazine" !) and there is really no need at present for any more variations.

I will make two exceptions, though. We do need more variable-mu battery valves, and I believe that there is a market for more low-consumption battery pentodes.

Rather than spend money on new types it would be better for valve manufacturers to restrict their ranges and concentrate on a further price reduction. There is much to be said in favour of using four reasonably efficient valves instead of only two super "hotted-up" types.

Off to Falkirk

I heard an amusing experience the other day from a set designer associated with a well-known firm. He was asked to take one of his new designs up to Scotland to try out under the new conditions.

He stayed the night in Glasgow and was called for the next morning by the factor who had asked for the demonstration. They got all the gear into a car and started off. It was not long before the set designer realised that they were going farther than he had thought.

On asking the factor where they were making for he received the reply: "Why, we're going out to Falkirk."

My friend had not bargained on having to demonstrate his set almost under the shadow of the Falkirk aerial, but everything went well. The local transmission was cut right out within five degrees either side of the tuning point. I believe he himself was surprised at such excellent selectivity!

Will Prices Rise?

It seems to me that radio components have touched the bottom as far as price level is concerned. Lower prices mean smaller profits, of course, and a manufacturer told me the other day that although his firm had trebled its turnover during the last season it had not been able to increase its profits.

That seems to be the case with a number of component makers.

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A Loud-speaker Problem

Designers of sets for home constructors will be faced with an additional problem this season. Shall the cabinet have space to accommodate the loud-speaker or not?

The midget type of console cabinet with provision for a self-contained loud-speaker has now come to stay. The difficulty is that so many amateurs already have a good loud-speaker in a case. They obviously do not want to pull it to pieces.

Moreover, most of the cabinets I have seen will only accommodate a small loud-speaker with about a 7-in. diaphragm.

BM/PRESS
London, W.C.1

TRYING OUT A NEW THREE-VALVER
A listener trying out the new Regentone three-valve A.C. set, which was recently favourably reported on by the Set Selection Bureau of "Wireless Magazine"

News From The Set Makers

A Forecast of Things That Will Be Seen at Olympia

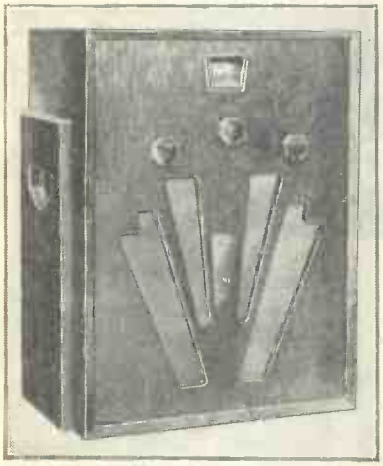
Here are two pages of real news from the leading set manufacturers—a forecast of what will be seen at Olympia when the Radio Exhibition opens on August 19. These notes will not only be of interest to the set buyer; they will interest all radio enthusiasts.

Ferranti Sets the Pace

A SEVEN-VALVE super-het console for 22 guineas—that is the latest Ferranti development. I have been having a preliminary skirmish with this set. It certainly sets the pace. I got Mühlacker clear of London Regional.

More remarkable still, I think, was the entire separation of Sottens from Midland Regional. The Swiss station came in at full blast long before it was dark.

Among the outstanding features



SELF-CONTAINED TWO-VALVER

A new Marconiphone receiver (model 248). This is a two-valve battery set with self-contained loud-speaker

of the set is the loud-speaker tone control. This has the effect of cutting off the high notes, thereby giving that " mellow " tone so many listeners insist upon. Atmospherics being rather bad at the time of the test, I must needs go " mellow " too, with the result that nearly all the continuous crackling background subsided, enabling me to enjoy quite a number of foreign stations.

Ferranti's are now making nearly all the valves used in this new super-het.

Some marvellous tooling has gone into the production of the Ferranti super-het, which the makers seem confident is going to enjoy a huge popularity during the coming season. I know this much—I shall hang on to my sample until it is forcibly dragged away from me !

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Portadyne Is Not Satisfied

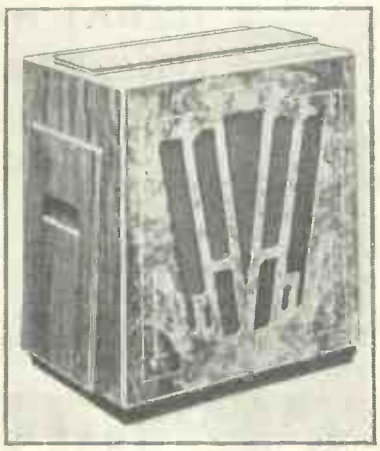
Not satisfied with producing one of the most ingeniously controlled portables of the season, the makers of Portadyne radios have now sent me advance details of a new portable for battery operation with the outstanding feature of a moving-coil loud-speaker. And why not?

It has long been a mystery to me why portables should always be condemned to miserable little cone units, especially in these enlightened days.

The new Portadyne, to be known as the B.M.C., will be available as from July 18. Its price is 16 guineas.

Circuit features include a band-pass low-frequency coupling, pentode output, and reaction combined with the volume control.

Although a moving-coil instrument the total anode-current consumption is said to be only 10 milliamperes, which must in part be attributed to the use of an economy pentode.



LOW-FREQUENCY BAND-PASSING

Low-frequency band-passing is a feature of the Portadyne B.M.C. receiver, which has reaction combined with the volume control

Varley's Programme

Price reductions on existing models and the introduction of super-het models are announced by Varley's, who have let me in on their new season's secrets.

The very popular three-valve Square Peak models for A.C. and D.C. mains are being retained, both being " pepped up " with the latest ideas. These sets will be only 15 guineas for standard supplies, with a guinea extra charge for 25-cycle mains.

A new and really " hot " Square Peak-er will be introduced at 17 guineas. This set will positively bristle with special features. There will be a tapered volume control for local-station reception.

Another feature will be the station

AN OUTSTANDING DESIGN

This is the set everybody has been waiting to see—the Ferranti seven-valve super-het receiver with moving-coil loud-speaker

marking of the tuning scale, which is of the improved type that covers up the markings of the waveband not in use, thus avoiding confusion when logging.

The self-contained moving-coil reproducer can be switched out of circuit if an external model is wanted.

For A.C. supplies only there will be a five-valve super-het console and a five-valve radio gramophone. These will be for use with an external aerial and earth system.

(*Continued on page* 88)

PRAISE

The Regentone switch, with its positive action and heavy contacts, comes through a critical examination with full marks. Good coils are mainly responsible for the undoubted sensitivity of the set.

▪ ▪ ▪

It gives no grounds for complaint on the score of selectivity.

▪ ▪ ▪

Actually, it handles very well indeed, and for the results expected by the average user it is as near as need be quite foolproof. But it responds handsomely to the touch of the user who has taken the trouble to master the niceties of control.

▪ ▪ ▪

The general level of background noises, including hum, is commendably low.

▪ ▪ ▪

All pedal notes can be picked out, which proves that there is no heavy resonance which would tend to obscure a number of them. The reproduction of speech leaves little to be desired, and is pleasant to listen to.

▪ ▪ ▪

When operating the new Regentone set one does not notice the absence of a band-pass filter ; this applies even when using the most sensitive of the alternative methods of aerial connection that are provided by the makers.

▪ ▪ ▪

An almost perfect form of volume control is afforded by regulation of the negative grid-bias applied to the variable-mu valve.

▪ ▪ ▪

Tuning coils of rather greater efficiency—and size—than is fashionable nowadays are fitted.

▪ ▪ ▪

For a two-circuit set, the conclusion is reached that this method of control is highly satisfactory.

REGENTONE

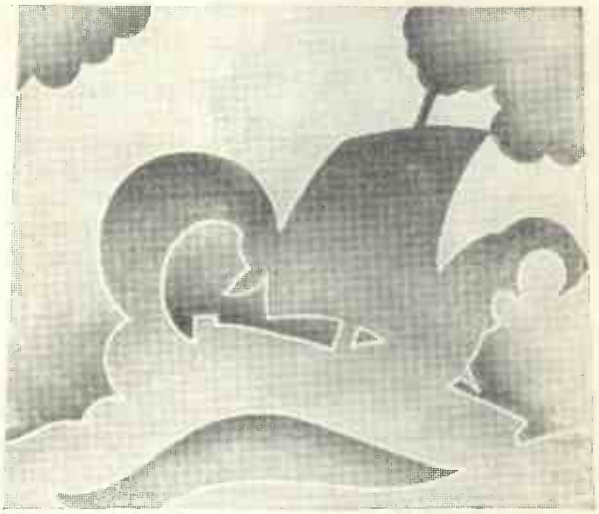
16 GNS.

OR 39/6 DOWN, including B. V. A. valves and royalties. For 200/250v. 40/60 cycles. Three valves. For A. C. Mains. Built-in moving coil speaker. Super-selective. Provision for mains aerial, external aerial and gramophone pick-up.

SPECIAL 25 CYCLE MODEL 14/- EXTRA

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

WIRE-WOUND



RESISTANCES

BI-DUPLEX

POPULAR

POWER

SPAGHETTI

TAG

A good anode resistance must be accurately rated and remain accurate in use. It must be robust, silent in operation and free from overheating or liability to break down. It must have a low self-capacity. *In short, it must be VARLEY, who first introduced wire-wound resistances for radio.*

WRITE FOR SECTION BC OF THE VARLEY CATALOGUE

SPECIFIED IN THE "PERCY HARRIS RADIOGRAM" VARLEY SPAGHETTI AND TAG RESISTANCES

Varley

Props. : Oliver Pell Control Ltd.

Advts. of Oliver Pell Control Ltd., 103 Kingsway, London W.C.2

NEWS FROM THE SET MAKERS—Continued from page 86

AN A.C. FIVE-VALVER
The Philips 630A receiver has a special micrometer tuning dial, with "super-inductance" tuning

Ekco Makes a Start

An early start with new season's sets has been made by the Ekco factory, from which is being turned out in considerable quantities model M23, a three-valve A.C. console that will come in for its share of

STRIKING CABINET DESIGN
Particularly pleasing in appearance is the Philips 830A receiver. This has a new type of permonent-magnet moving-coil loud-speaker

praise in the next issue of "W.M."

Meanwhile I have had a chance to run over the new set's points. The first thing that strikes me is how value-for-money standards are being altered. Here is a three-valver, with self-contained moving-coil loud-speaker, and everything for reception except the aerial and earth—all for 17 guineas.

Even the aerial is not essential, for in addition to the now almost standard fitting of a mains aerial this set is notable for the inclusion of what is termed an internal aerial.

This is a short piece of flex tacked on the inside of the back of the cabinet. It is rather surprising what can be picked up on this little aerial. The locals roar in on it!

In addition to this three-valver there will be several other new Ekco sets, including radio gramophones at distinctly competitive prices.

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Two-valvers Going Strong

I suppose the two-valver is practically confined to this country. That is what comes of producing such high-mu valves! With a modern A.C. detector and a power pentode you can drive a moving coil to perfection, not merely on the locals but from many foreigners.

These generalisations are inspired by the particularly attractive newcomer to the Pye range. I am thinking of model K, which is about the nattiest thing in two's I have yet seen. For 12 guineas you have a set corresponding in the automobile business to the "baby sports."

What do you think of band-passing? It's the thing for selectivity in two-valvers, so the makers have put it in "K." But what about low-frequency band-passing? "K" has that too, with the advantage of a good bass response and a sharp cut-off at 5,000 cycles. The

A MOVING-COIL TWO-VALVER
The mains-energised loud-speaker in this Pye K receiver (a two-valver) gets 1.4 watts from the pentode output valve

claim is that you get crispness without mush.

The moving-coil loud-speaker incorporated in this paragon of two's is mains-energised—and gets 1.4 watts from the power pentode, so the volume must be pretty big. The total power consumption is low, being only 36 watts.

Music Magnet's Attraction

I have always been impressed with the very fine workmanship put into the parts for the Music Magnet kits. In the latest version we have a three-valve battery console, consisting of a new chassis with a screen-grid detector, a new cone loud-speaker with floating cone, and all the batteries.

There's no doubt about it—the table-cabinet set is almost dead among the factory sets. Now the kits seem to be following suit—hence the Osram Thirty-three Music Magnet. We shall hear more of this kit, which certainly sets a new standard in the home-assembly market.

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Philips Sets Made Here

I am told that the new season's range of Philips' sets will soon be on the market at very competitive prices and that they will be entirely made in this country.

Among the forecasted sets are four- and five-valvers for mains working, incorporating the famous "super-inductance" system of tuning for selectivity. Then there are to be two battery sets.

All models will be fitted with the new Philips permanent-magnet moving-coil loud-speaker, with provision for cutting out the self-contained loud-speaker if it is desired to play an external one alone.

From the operating point of view model 630A in the Philips new range—a five-valver for A.C.—is especially interesting for its micrometer tuning dial. More of which anon. *Vanguard.*

IN A BAKELITE CABINET
Ekco still retain their well-known bakelite cabinet. This is a self-contained three-valve model for A.C. mains

One of Noel Eadie's greatest operatic roles is in "Aida," with the aria "Queen of the Night." She is a famous star of the B.N.O.C. and Covent Garden

The MONTH'S RADIO MUSIC

By T. F. HENN

THE thirty-eighth season of Promenade Concerts at the Queen's Hall opens at 8 p.m. on August 6 with, of course, Sir Henry Wood as conductor and Charles Woodhouse as leader of the B.B.C. Orchestra of eighty-nine players. Sir Henry Wood has conducted at every season of these concerts since the first in 1895.

Change in Programmes

There is no need to describe the progress of the "Proms" from 1895 to the present day. Listeners are going to have the opportunity of noting for themselves the big change in the make-up of the programmes that has taken place during the last thirty-seven years.

On August Bank Holiday Sir Henry Wood will conduct an exact replica of the first Queen's Hall "Prom" as it was performed in August, 1895. Congratulations to the B.B.C. on its initiative!

When at Broadcasting House recently I had the opportunity of delving into the treasures of the Music Department and seeing an original set of programmes of the 1895 season. Besides their rather large size and the announcement that one could stand in the promenade or sit in the balcony for a shilling or pay half a crown for the grand circle, the most surprising thing was the material in the programmes.

John Watt is the author of innumerable revues. He recently joined forces with Claude Hulbert and Paul England in the production of "Postman's Knock"

In those days the audience were spared the agony of listening to the wails of our so-called contemporary "music" and, instead, were treated to the type of music which nowadays would be classed as hackneyed. I am convinced that the old music is still appreciated by the bulk of the listening public.

Here is a suggestion to which I recommend that the B.B.C. gives serious thought. We have had our Sunday evening symphony concerts from No. 10 studio during the last few winters and they have been very enjoyable. Why not have a Saturday evening series of concerts with programmes identical to those of the first season of Promenade Concerts?

Besides their novelty and undoubted historical interest, the concerts would have a wide appeal on

(Continued on page 92)

A brilliant pianist known throughout the country, Helen Perkin recently took part in the Mozart programme under Percy Pitt. She played the great Coronation Concerto

Emanuel Starkey is musical director of the Regal Cinema, Marble Arch, from which a musical performance is relayed every week. He directs the Virtuosi Symphony Orchestra

Under the baton of Frank Gomez, the Whitby Municipal Orchestra is heard regularly from London Regional. His selections are always well chosen, as many listeners must be aware

THE MONTH'S RADIO MUSIC

—Continued from page 90

Weekly concerts are broadcast from the Midland studio by the Midland Studio Chorus, which is under the direction of Edgar Morgan, a well-known musician

Judith de Leeuw, a distinguished Continental pianist, recently took part in a Sunday afternoon concert with the Bournville Male Voice Choir

The only singer in the world with a "double" voice who can sing tenor and bass. Sometimes Strath Mackay even produces a third "voice"

account of the old-time nature of the items.

At the time of going to press, the names of the artists taking part in the 1895 "Prom" are not available, but here are the main items you will hear.

Orchestral Items

The concert will open with Auber's overture, "Le Domino Noir," a delightful piece of light orchestral music. Other orchestral items will be the "Bohemian Dance" by Bizet; Delibes' suite, "Le Roi S'Amuse"; a grand selection from *The Gondoliers* by Gilbert and Sullivan; and Schloesser's well-known march, "Les Enfants de la Garde." Among the songs will be Molloy's universal favourite, "Love's Old Sweet Song"; Tosti's "Good-Bye"; "O Ruddier than the Cherry," from Handel's *Alcis and Galatea*; and Newton's "Ailsa Mine."

And now for a few words about the 1932 concerts. The arrangement of devoting different nights to the works of different composers will be continued. Mondays will still be Wagner nights and Fridays will bring huge audiences to the Queen's Hall for the Beethoven concerts. Bach and Brahms will be the attraction for Wednesday evenings; Saturdays will, of course, be the "popular" nights.

A glance at this season's prospectus for Saturday nights and the 1895 Saturday night concert will show the vast difference between the organisers' idea of popular programmes to-day compared with those of thirty years ago.

Tuesday and Thursday nights will share two Tchaikowsky, three Haydn-Mozart and four British programmes. In addition there will be one Schumann, one Schubert, one Mendelssohn and four miscellaneous nights.

On looking through the season's programmes, I feel certain that the concerts are going to be just as good, if not better, than they were last year.

Florence Austral makes her reappearance in the first Wagner concert on August 8 and will sing at two others during the season.

Saxophone solos may sound strange to music lovers, but all who have heard James Donovan will admit his capabilities in this direction

Five "Prom" Debuts

Joseph Hislop, the English tenor, and Egeon Petri, the well-known pianist, are also making their reappearance at the Queen's Hall. Five artists will be making their "Proms" debut. These are Adolph Busch, who will play violin concertos by Bach and Brahms; Jo Vincent, Florence Easton, Ria Ginster, and Maria Basildes, all well-known singers.

Among the very old "Prom" favourites who will be heard are Albert Sammonds playing the Delius and Max Brusch violin concertos; Lamond playing Beethoven's "Emperor Concerto" for piano and orchestra; and Lionel Tertis playing the Elgar viola concerto.

Three famous organists who will be heard during the season are Marcel Dupré, organist of Notre Dame Cathedral, Paris; G. D. Cunningham, and Dr. Thalben Ball. By the way, *every* Promenade Concert will be broadcast.

The B.B.C. has recently announced that an extra two weeks' season of Promenade Concerts will be given from December 31 to January 14 next. These will be conducted by Sir Henry Wood and will be run on the

(*Continued on page* 94)

THE MONTH'S RADIO MUSIC—Continued from page 92

Dorothy Summers is a clever actress who has broadcast repeatedly. Her most recent "appearance" was in "The Dumb and the Blind" from Midland Regional

A famous Canadian conductor now visiting England. Reginald Stewart has already conducted the B.B.C. Orchestra on several occasions. He was born in Edinburgh

One of the earliest of broadcast singers, Helen Alston has taken part in every form of studio concert. During the Children's Hour she gives dainty songs at the piano

hensive lines as the famous summer concerts.

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It was originally intended that Richard Tauber, the great German tenor, should sing in an orchestral concert which is to be broadcast on July 24, but for some reason Tauber cannot appear and his place has been taken by Frank Titterton. This great English tenor is widely known for his gramophone records, especially of songs associated with Tauber.

An interesting story is told by a member of the B.B.C. staff of a dinner he had with Frank Titterton at the Hungaria Restaurant, Piccadilly Circus. The orchestra were playing Lehar's famous song from the *Land Of Smiles*, "You are My Heart's Delight," and Titterton was leaning back in his chair smoking his after-dinner cigar.

Impromptu Song

Unconsciously, he burst into song with the orchestra and the audience were entertained to a magnificent rendering of the song. After the impromptu song was over, Titterton was surrounded by admirers who tried to coax him into singing again.

Titterton will be singing at the forthcoming season of "Proms."

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Recent programmes have shown that the B.B.C. is paying serious attention to the lighter side of its programmes. Vaudeville shows from the new studio have been well up to standard, especially those produced by Gordon McConnell. Listeners will hear another McConnell production on August 6.

No doubt the improvement in vaudeville productions is due, to some extent, to Henry Hall and his band. This combination always seems to be full of enthusiasm and certainly at its best in the vaudeville studio. I am inclined to believe that Henry Hall's band is better suited for variety shows than for straight dance music.

Henry Hall's Ill-luck

Henry Hall was on his way to Broadcasting House recently when, without any warning, his car stopped dead just outside a garage. Examination soon showed that he had run out of petrol. He had his tank filled but unfortunately, when it came to paying, Henry found that he had left all his money at home.

After delicately revealing his identity, and explaining to the garage proprietor that he was in a hurry as he had to broadcast, all he got was: "Sorry, but I don't know him."

So Henry Hall had to leave his gold cigarette case as security against the petrol. Such is fame!

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A certain amount of reshuffling of the fixed features in broadcast programmes is certain during the next couple of months. Do not be surprised if, when you switch on on a Saturday night, expecting to hear Ambrose and his band, you find that, because Ambrose is away on holiday, "Mr. Crooner and His Melodians" are taking his place.

It is not possible to give a complete schedule of the holiday times of the popular favourites, but listeners can rest assured that the B.B.C. will make these alterations as pleasant as possible.

Round the Radio Trade

AN all-British cathode-ray oscillograph has just been produced by A.C.Cossor, Ltd. By means of one of these instruments any wave form or other electrical movement can be transformed into a visible image. Oscillations or mains hum in a radio set, for instance, can be watched on a screen.

◆ ◆ ◆

Harlie Bros. (Edmonton), Ltd., announce a move to a new factory in the Cambridge Arterial Road, a short distance from their old premises. Starting with small components this firm has now progressed to the production of complete talking-picture equipment, pick-ups, electric gramophone motors, loudspeakers, and microphones.

◆ ◆ ◆

One of the gramophone companies, which up till now has not produced any battery-operated instruments, is said to be engaged on the design of a super-het portable receiver. Details of the new set are awaited with interest by everybody.

TESTS OF NEW APPARATUS

R. and A. Loud-speaker :: Benjamin Transfeeda :: Lanchester Loud-speaker

CHALLENGER LOUD-SPEAKER

This is the R. and A. Challenger model. It is supplied complete with an input transformer

R. & A. LOUD-SPEAKER

APPARATUS: Permanent-magnet moving-coil loud-speaker, Challenger model.
PRICE: £1 15s. (with transformer).
MAKERS: Reproducers and Amplifiers, Ltd.

A GOOD permanent-magnet moving-coil loud-speaker which we have tested this month is the R. & A. Challenger. This loud-speaker is built up on a very rigid metal chassis which accommodates at the back the somewhat flat E-shaped permanent magnet.

A 6-in. paper diaphragm is fitted, this being of the type which has the suspension formed as an integral part of it.

A 1-in. moving-coil is fitted; this is of the low-resistance type, and the necessary tapped input transformer is mounted on the metal chassis.

The centering device is of the usual web type.

On test the loud-speaker gave very good results, the response to the upper frequencies being especially good. The sensitivity was good, being, in fact, little less than that of our standard reproducer. This loud-speaker is British made and can be recommended for general use.

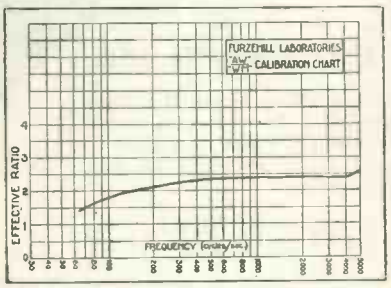
◆ ◆ ◆

BENJAMIN TRANSFEEDA

APPARATUS: Parallel-feed low-frequency transformer, Transfeeda model.
PRICE: 11s. 6d.
MAKERS: Benjamin Electric, Ltd.

AN interesting component which we have recently received for test is the Benjamin Transfeeda. This component is essentially a parallel-fed transformer, the necessary feed resistance and coupling condenser being included in the case.

The feed resistance has a value of 50,000 ohms, tapped at 30,000 ohms from the anode end, thus enabling the unit to be used with the best results when preceded by either



TRANSFORMER RESPONSE CURVE

A curve showing the frequency response of the Benjamin Transfeeda

high- or low-impedance valves. The tapped feed resistance also allows a decoupling scheme to be used if low-frequency instability is experienced, it being only necessary to add a 2-microfarad condenser.

The amplification obtained with the device naturally depends on the valve used. The transformer itself appears to have a step-up of approximately 2.5 : 1, judging from the results obtained on test. The response curve of the device when used following an HL210, with the full 50,000-ohm resistance in circuit, is reproduced herewith. It will be seen to be level in character, both bass and treble being well maintained.

PARALLEL-FEED TRANSFORMER

The new Benjamin Transfeeda, which works on the parallel-feed principle

◆ ◆ ◆

LANCHESTER LOUD-SPEAKER

APPARATUS: Permanent-magnet moving-coil loud-speaker, type B.O.B.
PRICE: £1 (£1 5s. 6d. with transformer).
MAKERS: Lanchester's Laboratories, Ltd.

POSSIBLY the smallest cabinet moving-coil loud-speaker on the market is the Lanchester permanent-magnet, type B.O.B. This loud-speaker employs a large bar-type permanent magnet with a soft-iron yoke. The central polepiece is not fixed to the magnet, but is held in place by the magnetic attraction. It is, however, accurately positioned by means of a collar fitting into a slot in the yoke.

A very small low-resistance moving coil is used, this being only $\frac{5}{16}$ in. in diameter. The diaphragm is shallow and is only 4 in. in diameter.

MIDGET MOVING-COIL

The Lanchester B.O.B. moving-coil loud-speaker measures approximately 7 in. high, 9 in. wide and 3½ in. deep

The centering device is interesting and new to us.

The results on test were excellent for such a small instrument. The sensitivity was quite up to standard and sufficient to enable the loud-speaker to be used with all types of receiver; at the same time input to the order of 800 or 1,000 milliwatts could be handled without any signs of distress.

Queer Police Uses for Wireless

KENNETH ULLYETT tells of some behind-the-scene matters connected with the police force and shows to what a large extent the police are making use of the most up-to-date radio ideas

UP in a little room at Scotland Yard is the radio centre of the Metropolitan Police Force. Here the police try out short-wave sets and portable transmitters for flying-squad use.

Listening Cabinet

At one end of the room is a metal-lined listening cabinet. It has small glass windows at the top, so that the officer on duty is not entirely cut off from the laboratory workers, but he is otherwise electrically and acoustically screened. It is truly a cabinet of police radio thrills!

The sets inside the listening cabinet are metal screened and there is a remote-control relay, so that the Scotland Yard transmitter can be worked from inside the box. In a way, this is the electrical centre of the police wireless activities, but at Scotland Yard there are many other things than ordinary listening.

For quite a long while wireless-picture apparatus of the Fultograph type was installed. The police also have their own cable printers. There is a console cable printer just like those in any London newspaper office, and the events of the world are tapped out on it by the magnetically-operated hammers.

They are, I understand, rebuilding one of the small Marconi transmitters at the "Yard." Formerly this was a medium-wave job, capable of giving speech or telegraphy, but generally the latter, so that the messages, even if overheard, could not be understood.

It had the old type of glass-bulb air-cooled valve and vario-coupler tuning. The new transmitter, I am told by a reliable authority, is like those at the latest aerodromes and can more easily be shifted from one waveband to another.

The radio flying squad when out on its beat constantly changes wavelengths so that there is less chance of eavesdropping. The transmitter at the Yard must be capable of jumping from one waveband to another with equal ease.

I am not at liberty to disclose the police wavelengths, but I can assure you that the Yard experts are contemplating using short-wave gear entirely.

Traffic Control

When the police are engaged on a wireless job which is not of a secret nature they always use short-wavers. When the New Scotland Yard officials took charge of the traffic control on the road leading to Epsom last Derby Day, 100-metre transmitters and receivers were used. This is the kind of gear which I am told is used in the flying-squad cars.

In the traffic-control experiment, the famous Cierva Autogiro plane was fitted up with a 100-metre transmitter. This was not a police job, but was of the type largely used for military purposes on the ground. The Autogiro hovered over the huge crowds on the downs and transmitted instructions as to the best way of handling the traffic.

On the Ground

At a vantage point on the downs was a motor van fitted up with a Marconi AD27A short-waver, using a screen-grid high-frequency stage and a single power valve. A portable transmitter was also carried in the van so that the police on the ground could talk back to the plane.

It makes you think that the day is not far off when every "bobby" will have a short-wave set in his helmet and a microphone instead of a lantern!

Already two tests have been made with midget sets designed to strap on to the belts of police on duty in smash-and-grab areas. These have the old Admiralty-type double-ended valves and a special 60-volt high-tension battery. In one of the small sets a large phone was mounted in the domed part of the helmet.

Even the police find it difficult to get wavelengths for their job. That is one reason why the scheme put forward by a keen Yorkshire police chief has not yet materialised. He wanted every main police station throughout the country to have a short-wave transmitter.

I hear that the American police are to press for more wavelengths at the Madrid Convention, and there may be a joint appeal by the police of all nations.

Queerest Use Yet

The queerest police use for wireless of which I have yet heard, and which New Scotland Yard may try when it becomes completely Americanised, is that which a Berlin doctor is demonstrating to a section of the German police.

He has a little high-frequency oscillator with a pick-up coil which he puts near the heart or the main artery of a suspect. In this way he claims to be able to record the blood pressure and nerve strain.

If the suspect tells the truth, the heterodyne high-frequency oscillator makes the loud-speaker tick rhythmically. If the suspect prevaricates, the oscillator goes all syncopated!

On the Crest of the Waves

RADIO NEWS FROM ALL EUROPE :: By JAY COOTE

AUSTRIA

UOR2, the short-wave experimental transmitter on 49.4 metres, which for test purposes has been relaying the Vienna programmes, has been temporarily closed down.

BELGIUM

Complaints have been lodged by Flemish listeners in regard to the unfavourable channel of 338 metres allotted to Brussels (No. 2); it is pointed out that the French transmissions on 509 metres cover a greater portion of the country. To ensure fair play, Flemish subscribers suggest that the Dutch principle (by which every three months wavelengths are exchanged) should be adopted.

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Radio Schaerbeek (Brussels) has resumed its transmissions on 245.9 metres; at present the broadcasts have been only authorised during the luncheon hour, namely, midday to 2 p.m. B.S.T.

◆ ◆ ◆

Every weekday (Saturdays excepted) between 12.30 and 1.30 p.m. B.S.T. tests on about 280 metres are carried out by an experimental station in the neighbourhood of Brussels. Similar experiments are made on Saturdays between 3 p.m. and 5 p.m., and again on Sunday mornings between 10 a.m. and noon. Announcements are given out in the French and Flemish languages. As a rule the broadcasts are limited to gramophone records, the call being "Ici Bruxelles experimentale S.B.R." (phon.: *ess-bay-air*).

◆ ◆ ◆

During the past few months a number of mushroom broadcasters have cropped up in provincial districts in addition to the already existing Radio Eglise du Christ, Antwerp (209 metres); Radio Châtelineau, Charleroi (215.4 metres); Radio Conférence, Brussels (215 metres). The new arrivals include Franchimont (207 metres); Seraing (210 metres); Radio Wallonia, Villereille-le-Brayeux (230.3 metres); Liége Experimental (242 metres); Counte-Liege (269 metres); and Radio Liberté, Fontaine-l'Evêque (231 metres.) Most of these stations are on the air at low power on every Sunday morning between 10 a.m. and midday, and at various times on week-day evenings.

CZECHO-SLOVAKIA

Since broadcasting was introduced in this country the transmitters have been operated and maintained by a private concern, Radio Journal (Prague), to which a monopoly was originally granted by the State. In view of political dissension, however, request has been made to the authorities to take over the whole system, and the matter is being considered by the Czech Government.

DENMARK

With a view to the maintenance of the Danish National Symphony Orchestra, for which it has been difficult to secure a regular income, a proposal has been made to levy a tax on all radio receivers, gramophone instruments, and records. Artists and musicians in Denmark have energetically protested against the public concerts given by the broadcasting authorities in view of the reduced prices charged for seats.

FRANCE

A short news bulletin in the English language is broadcast from Radio Toulouse every weekday between midnight and 12.30 a.m., and on Sundays between 10.45 and 11.15 p.m. B.S.T. Although the new Radio Toulouse high-power transmitter is ready to work, permission to use it has not yet been granted by the State authorities.

◆ ◆ ◆

Tourists to Normandy during the summer holidays are reminded that a visit may be made to the Radio Normandie (Fécamp) transmitter and studios on any Tuesday or Friday between 2.30 and 5 p.m. B.S.T.

◆ ◆ ◆

Lille PTT was promised a high-power transmitter two years ago and work was started on the buildings to house the station. Lack of funds, however, only permitted a partial erection of the steel aerial masts; a "full stop" resulted, and all the site now shows to subscribers is a small collection of rusty girders!

◆ ◆ ◆

Have you noticed how conscientiously Poste Parisien (Paris) closes down every evening to the strains of "La Marseillaise," and have you also observed how regularly the engineers switch off before the French national anthem is completed; in fact, even in the middle of a bar?

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Radio Vitus (Paris), in view of its association with the Pathé film company, has adopted as an opening signal the crowing of the cockerel so familiar to all movie fans.

◆ ◆ ◆

Television transmissions by the Baird process are now carried out at fixed periods from Paris. Ecole Supérieure (Paris PTT), on 447.1 metres, is responsible for the vision part of the entertainment, the accompanying speech and music being sent through Radio Vitus (308 metres). The schedule is as follows: Mondays (4-4.45 p.m.); Tuesdays (5-5.45 p.m.); Fridays (4.45-5.30 p.m.).

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Apparently the results achieved by the new Radio Paris transmitter have not proved up to expectations; its broadcasts do not adequately cover the French provinces, although they are well heard in most districts of the British Isles. Steps are to be taken to increase the radiated energy, with a view to obtaining a minimum of 120 kilowatts in the near future.

◆ ◆ ◆

It is doubtful whether Grenoble PTT will remain on 569 metres, as the channel used is considered unfavourable for local listeners.

GERMANY

Two channels are now regularly used by the Zeesen short-wave transmitter, namely, DJB, 19.737

(*Continued on page* 102)

EQUIVALENT TO A HALL-MARK

If the PARMEKO Transformer or Choke costs a little more than others you could name—make the grand gesture! It's worth far more than the little extra to get PARMEKO performance. Remember—PARMEKA, both in workmanship and materials, is the *Best—Regardless.*

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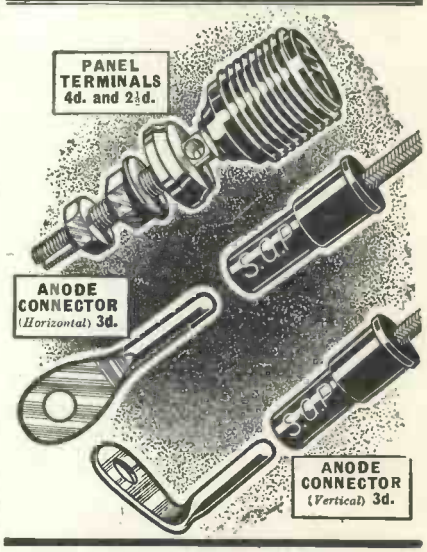

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When replying to advertisements, please mention "Wireless Magazine"

ON THE CREST OF THE WAVES— Continued from page 100

metres (15,200 kilocycles), and DJA, 31.381 metres (9,560 kilocycles). The former station works from 14.00 B.S.T., or earlier, until 18.00; the latter from 18.00 to the end of the programme. The power of the broadcasts is 8 kilowatts (aerial).

◆ ◆ ◆

"Elbe Weser Radio" is the call put out by a German coastal radio-telephony station, DAC, working on 160 metres (1,875 kilocycles), through which ships of all nationalities in the Baltic and North Sea may obtain expert medical advice from the Cuxhaven naval hospital.

◆ ◆ ◆

For some time past the Breslau studio has published in its daily programmes the names of the announcers acting as compères for all radio entertainments. Listeners in Germany now ask that all stations should adopt the same principle.

◆ ◆ ◆

In order to cut down expenses, Berlin, Königsberg, Leipzig, and Breslau have agreed to carry out a regular interchange of programmes, thus relaying entertainments for the common benefit from their respective studios, according to a rota, on different days of the week. In the same way, Munich, Cologne, Frankfurt-am-Main, and Stuttgart, each in turn, will also provide broadcasts for all transmitters in the association. It is expected that the development of this scheme in Germany will lead eventually to the formation of three separate groups comprising all studios, namely, Berlin, Breslau, Heilsberg, and Leipzig; Cologne, Frankfurt and Stuttgart; and Hamburg and its relays.

◆ ◆ ◆

By arrangement with the National Broadcasting Company of America, the Berlin station hopes to secure relays, *via* San Francisco, of concerts broadcast from Tokio (Japan).

HUNGARY

With a view to the subsequent relay of a performance from the Royal Opera House at Budapest, excerpts from Puccini's *Turandot*, as played at that theatre, were transmitted by land-line to London. As the broadcast was of an experimental nature, it was not given to B.B.C. listeners. Arrangements have now been made between the Hungarian broadcasting company and our home organisation for a special relay at an early date.

◆ ◆ ◆

Stuhlweissenburg is the site of the new Hungarian short-wave telegraphy and telephony transmitter which is to be used for the relay of the Budapest programmes. It operates on seven different channels between 17.51 and 55.56 metres, with a power of 8 kilowatts. For transmissions to the United States of America 21.92 metres has been adopted for work during daylight hours and 43.83 metres for night broadcasts.

◆ ◆ ◆

The high-power station under construction at Csepel, near the capital, will possess distinctive features, inasmuch as the aerial is actually a pylon 322 metres high. The transmitter, when completed, will be capable of radiating 120 kilowatts and is destined to put the Budapest programmes within the reach of listeners all over Europe.

ITALY

A recent law suggested by Mussolini compels the Fascist association of hotel keepers to pay a special tax to the EIAR (Italian broadcasting corporation). The rate, which is established on a sliding scale, varies between 150 and 1,000 lire per annum, according to the population of the district in which the inn or hotel is situated.

◆ ◆ ◆

2RO Rome, which for a few weeks was working on 42.8 metres, has now resumed its transmissions on 25.4 metres. Its official wavelength is 48.2 metres.

LATVIA

Broadcasts by the Riga station on 198 metres have proved so great a success that the plant is to be reconstructed to increase its power to 50 kilowatts. Simultaneously, two further relays at Goldingen and Modohn will be installed to take the capital programmes. They will operate in the higher section of the broadcasting band.

LUXEMBURG (Grand Duchy)

Nothing definite is yet known regarding the date on which this super-power station is likely to be brought into operation. According to reports in the German technical press the original 200-kilowatt transmitter constructed in France failed to pass the tests and was refused by the shareholders. It is stated that a 20-kilowatt plant has been ordered from another French firm.

NORTH AFRICA

With the financial assistance of local wireless clubs and the co-operation of the French Posts and Telegraphs, it is hoped to install a broadcasting station in the neighbourhood of Tunis to take over the "skeleton" programmes transmitted by the military station at La Kasbah.

POLAND

The Polish ambassador at Moscow has protested against the anti-Polish propaganda broadcast by the Minsk station which, particularly in the Wilno district, has greatly interfered with the reception of the Warsaw programmes. As the Soviet Government retorted that it has no jurisdiction over wireless entertainments, Poland threatens to erect in the vicinity of Wilno a morse transmitter to jam the Minsk broadcasts.

PORTUGAL

CT1AA, Lisbon, which has been heard testing regularly during the past few weeks on 31.25 metres, appears to have definitely adopted this wavelength for its weekly transmissions. As an interval signal, the studio uses a cuckoo call somewhat similar to that you may have picked up from Ljubljana.

ROUMANIA

To replace the monotonous ticking of a metronome, the Bucharest studio is endeavouring to find a more musical interval signal. Several mechanical devices on the lines of the musical box have been tried and the engineers hope shortly to bring to the ears of listeners a distinctive signal embodying a short melody based on an old Roumanian folk song.

RUSSIA

The 100-kilowatt Moscow-Stalin transmitter on 424.3 metres has temporarily suspended its broadcasts; although but recently constructed, it is to be entirely overhauled with a view to boosting its energy to 300 kilowatts. The Moscow-Stchelkovo station, which

(*Continued on page* 104)

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All these 1s. each, post free

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New Economy Two (D, Trans)	WM265
Family Two (D, Trans)	WM278
Economy A.C. Two (D, Trans)	WM286
Screen-grid Two (SG, Trans)	WM289
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
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The Room-to-Room 2 (D, Trans)	AW298
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Gramo-radio D.C. Three (SG, D, Trans)	WM196
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Five-point Three (SG, D, Trans)	WM212
Falcon Three (AC Set)	WM217
New Brookman's Three (SG, D, Trans)	WM218
Five-point Short-waver (D, 2 Trans)	WM223
Regional Three (SG, D, Trans)	WM236
Band-pass Inceptordyne (SG, D, Pen.)	WM244
Ether Marshal (SG, D, Trans)	WM247
Meridian Short-waver (D, RC, Trans)	WM255
Five-Advantage Three (D, RC, Trans)	WM257
Everybody's Radiogram (SG, D, Trans)	WM258
Double Band-pass Three (SG, D, Trans)	WM259
Everybody's Radiogram (with Automatic Grid Bias)	WM262
New Economy Three (SG, D, Trans)	WM263
New Plug-in-Coil Three (D, 2 Trans)	WM270
Transportable Three (SG, D, Trans)	WM271
Multi-Mag Three (D, 2 Trans)	WM288
★Percy Harris A.C. Radiogram (D, RC, Trans)	WM294
Square-peak Three (SG, D, Trans)	AW293
Universal Short-wave Three (SG, D, Trans)	AW301
Olympian Three (SG, D, Trans)	AW306
Tonality Three (D, RC, Trans)	AW321
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Baby Three (D, RC, Trans)	AW324
World Wide Short-wave Three (D, RC, Trans)	AW332
New Favourite Three (D, RC, Trans)	AW334
Home Lover's All-electric Three (SG, D, Trans)	AW335
P.W.H. Mascot (D, RC, Trans)	AW337
Home Lover's Battery Three (SG, D Pen)	AW341
New Regional Three (D, RC, Trans)	AW349

FOUR-VALVE SETS

All these 1s. 6d. each, post free

Five-point Four (SG, D, RC, Trans)	WM216
Ether Rover (SG, D, RC, Trans)	WM266
Quadradyne (2SG, D, Trans)	WM273
Double Band-pass Four (SG, D, RC, Trans)	WM274
Economy Radio Gramophone (SG, D, RC, Trans)	WM276
A.C. Quadradyne (2 SG, D, Pen)	WM279
Ideal A.C. Home Super (Super-het)	WM290
★The Gold Coaster (AC Short-wave)	WM292
★Triple-tune Four (2SG, D, Trans)	WM293
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
Four-star Four (SG, D, RC, Trans)	AW318
The 50/- Four (SG, D, RC, Trans)	AW331

FIVE-VALVE SETS

All these 1s. 6d. each, post free

Regional D.C.5 (SG, D, LF, Push-pull)	WM252
Ideal Home Super (Super-het)	WM280
Easytune 60 (Super-het)	WM284
James Quality Five (2SG, D, RC, Trans)	AW227
Britain's Super (Super-het)	AW311
A.C. Britain's Super (Super-het)	AW322
Mains section (1/-)	AW322A
James Short-wave Super-het	AW328
Simple Super (Super-het)	AW340

SIX-VALVE SETS

All these 1s. 6d. each, post free

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
1932 A.C. Super 60 (Super-het)	WM272

SEVEN-VALVE SET

1s. 6d., post free

Super Senior (Super-het)	WM256

PORTABLE SETS

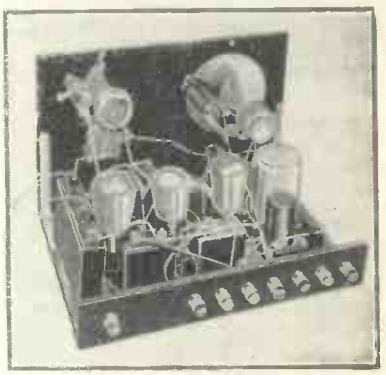
Super 60 Portable (Super-het)	WM238	1/6
Home and Garden Three (D, RC, Trans)	WM246	1/-
Town and Country Four (SG, D, RC, Trans)	WM282	1/6
Everybody's Portable (Super-het)	WM291	1/6
Sunshine Three (SG : HF, SG : D, Trans)	AW235	1/-

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-P-A (Public Address)	WM275
A-P-A Radio Unit (SG, D)	WM281
Economy Gramophone Amplifier	WM277
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

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



A FINE STRAIGHT THREE

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MISCELLANEOUS

"W.M." Standard A.C. Unit	WM214	1/-
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Plug-in Adaptor	WM267	1/-
Super-het Adaptor	WM268	1/-
A Simple Mains Unit	WM283	1/-
Short-wave Director (wavemeter)	WM285	6d.
Voltage Regulator	WM287	1/-
Choke Output Unit	AW240	1/-
Simple Tester Unit	AW246	-/6
"A.W." Improved Linen-diaphragm Speaker	AW248	1/-
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D.C. H.T. Unit	AW312	1/-
Output Unit for Pentode Sets	AW316	1/-
"A.W." Short-wave Adaptor	AW317	1/-
Short-wave Plug-in Adaptor	AW326	-/6
Super-het Short-wave Adaptor	AW329	-/6
"A.W." Short-wave Adaptor	AW339	1/-
Mascot Mains Unit	AW350	1/-

Each blueprint shows the position of each component and every wire and makes construction a simple matter. Copies of "Wireless Magazine" and of "Amateur Wireless" containing descriptions of 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.

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

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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.

ON THE CREST OF THE WAVES

(*Continued from page* 102)

has acted as local relay of the Trades' Union's studio, has been adapted for television transmissions.

SPAIN

The Barcelona studio has inaugurated an item in its broadcasts which enjoys considerable popularity. Every Wednesday and Friday, between midnight and 12.30 a.m., Spanish licence holders are permitted to broadcast short personal messages and greetings to relatives on board ships at sea.

◆ ◆ ◆

The new plan for the reorganisation of the Spanish broadcasting system shows that the government has in view for Madrid a 120-kilowatt station to work on a wavelength between 1,334 and 1,396 metres, one 20-kilowatter to operate on the channel originally allotted to Madrid (EAJ7), and, in addition, a 10-kilowatt short-wave transmitter to relay the capital programmes. Barcelona, Valencia, Seville, and Corunna will each work with 20 kilowatts.

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