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Wireless Magazine

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DECEMBER 1932

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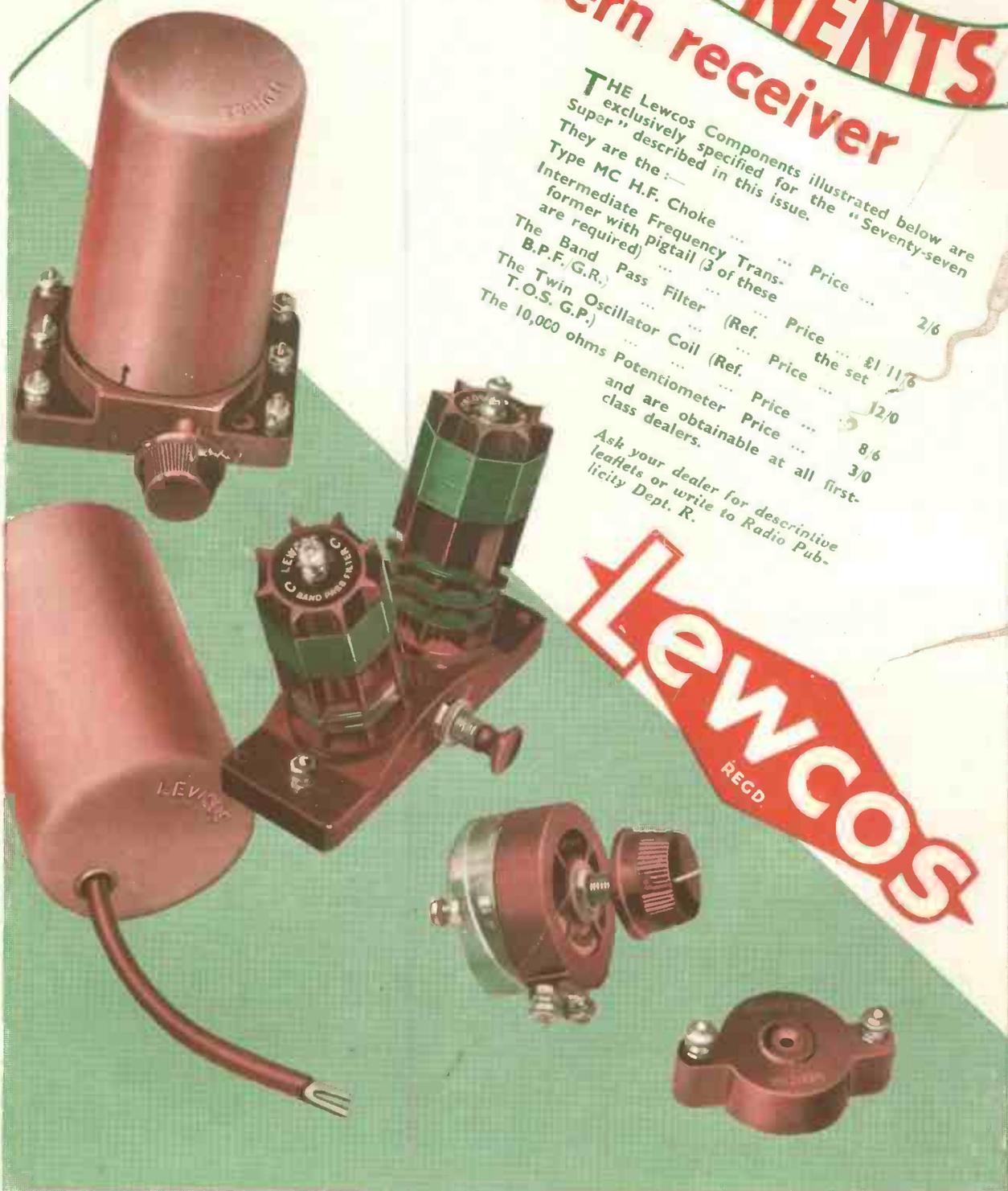
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Economy Screen-grid Three

Radio "Juggles" for Christmastide

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Introducing Our Christmas Number

OUR Christmas Number, ladies and gentlemen, and I hope you like it! Our cover is an experiment, and it may, or may not, please you, but the up-to-date note is indicative of our contents.

Our Buyers' Guide to Sets for 1933 is a special sixteen-page supplement, giving details of more than 300 sets made by nearly seventy manufacturers and illustrated by forty photographs. This feature is of great value to the reader who wants to buy a new set for himself and of particular utility to the constructor to whom non-technical friends so frequently go for advice when in doubt as to which set they should buy.

In connection with this Buyers' Guide, I am making a special offer of a free copy of a very useful little book. Will you turn to Page Nine of the supplement and see for yourselves exactly what I am offering?

Henry is recently married. Apparently the one thing his friends forgot to give him was a wireless set, but somebody must have presented him with a cheque for five guineas because, when he ran into George of the "W.M." Technical Staff the other day, he asked how he could start radio on the proceeds of his cheque!

George discusses the idea with our staff and when he meets Henry a week later he is able to give him details of a simple set, complete with valves, batteries and loud-speaker, which can be assembled well within the five guineas available. If the idea interests you, turn to page 664. The set there described is great value for money. Readers all over the country will be building it during the coming month.

Dr. E. H. Chapman deals with a very favourite subject this month, "Rejuvenating An Old Set." He knows, as we all know, that many readers have three-year- or four-year-old sets that are still giving good

service, but which would be all the better if they could be brought up to date, especially if they could be made more selective.

Our biggest technical feature of the month is our Seventy-seven Super, which is a real super-het for the connoisseur, presented to our readers only after months of experimental work on the part of the WIRELESS MAGAZINE Technical Staff. The Seventy-seven Super—which being interpreted means the seventy-station seven-valve super-heterodyne receiver—is just the proposition to appeal to thousands of keen constructors.

It uses a really large power valve; it is a complete radio gramophone; and it is wholly run from A.C. mains—a wonderful set for the reader who wants an absolutely up-to-date receiver of the most selective type.

You will remember that I referred in my notes two months ago to the Whitaker-Wilson play, "Sir Christopher Wren." In his article, "The Story of A Radio Play," Whitaker-Wilson discloses some secrets about the production of that play.

You will remember, too, that I offered one guinea for the best criticism. Frankly I am disappointed in the result. I had hoped that readers would have taken an opportunity of letting a critic see himself as others see him, but the criticisms received have been of the highly appreciative order and not a single one has "blistered" my Whitaker! I am sorry now that I did not compete myself! I am sending one guinea to Mr. J. D. Stuart Martin, of Kevocklea, Lasswade, Midlothian.

We introduce a further Christmas touch in Kenneth Ulyett's "Radio 'Juggles.'" There is profound mystery in radio and "juggles" exploits it to the bewilderment of the average Christmas party.

A Happy Christmas to You! B. E. J.

BUYERS' GUIDE TO SETS FOR 1933

(Supplement after page 584)

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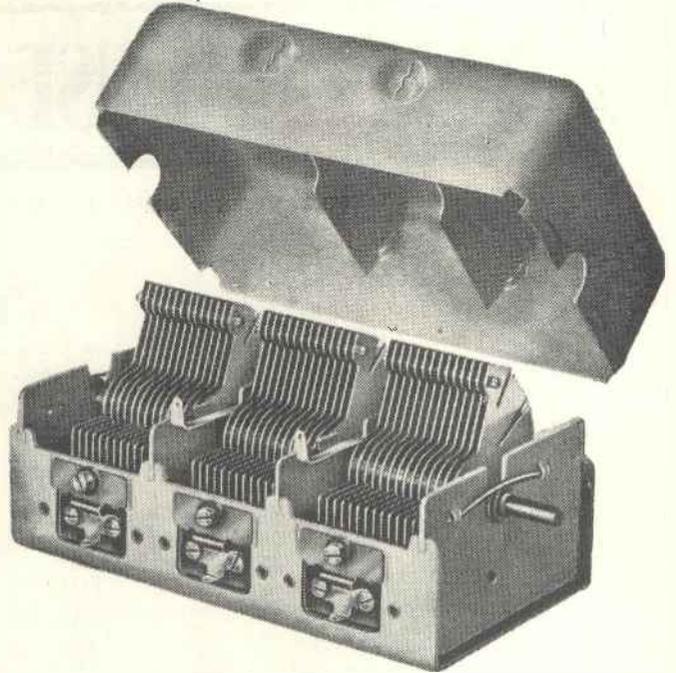


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VALVES TO USE IN YOUR SET

Characteristics of All the Most Important British Types

Make	Type	Impedance	Amplification Factor	Mutual Conductance	Anode Current at 120 volts	Make	Type	Impedance	Amplification Factor	Mutual Conductance	Anode Current at 120 volts	Make	Type	Impedance	Amplification Factor	Mutual Conductance	Anode Current at 120 volts
2-volt Three-electrode Valves						2-volt Variable-mu Valves						6-volt Three-electrode Valves					
Mazda	H210	59,000	47	.8	.5	Lissen	SG2V	350,000	—	1.7	—	Mazda	H607	90,000	40	.45	1.0
Lissen	H210	50,000	35	.7	1.0	Mazda	S215VM	350,000	700	2.0	—	Mazda	H610	66,000	40	.6	1.0
Cossor	210RC	50,000	40	.8	.5	Mazda	S215B	334,000	700	2.1	—	Lissen	H610	60,000	40	.66	1.0
Osram	H210	50,000	35	0.7	1.0	Cossor	220VSG	110,000	—	1.6	—	Marconi	H610	60,000	40	.66	.35
Six-Sixty	210RC	45,400	50	1.1	1.0	Osram	VS2	—	—	1.25	—	Osram	H610	60,000	40	.66	.35
Lissen	H2	45,000	50	1.1	2.0	Marconi	VS2	—	—	1.25	—	Six-Sixty	6075RC	58,000	42	.7	.5
Mazda	H2	45,000	50	1.1	1.8	Six-Sixty	215VSG	—	—	—	—	Cossor	610RC	50,000	40	.8	.75
Mullard	PM1A	41,600	50	1.2	.75	2-volt Pentode Valves						Mullard	PM5B	49,000	40	.85	.5
Marconi	H2	35,000	35	1.0	1.0	Lissen	PT225	71,000	100	1.4	7.0	Marconi	HL610	30,000	30	1.0	1.0
Osram	H2	35,000	35	1.0	1.0	Six-Sixty	230PP	64,000	80	1.25	10.0	Osram	HL610	30,000	30	1.0	1.0
Six-Sixty	210HF	25,000	19	.75	1.0	Marconi	PT240	55,000	90	1.65	9.0	Lissen	HL610	21,000	25	1.2	2.5
Osram	HL210	23,000	20	.87	1.5	Lissen	PT240	28,000	64	2.3	12.5	Cossor	610HF	20,000	20	1.0	1.75
Marconi	HL210	23,000	20	.87	1.5	Cossor	220PT	—	—	2.5	—	Mazda	HL610	20,000	22	1.1	1.8
Mullard	PM1HF	22,500	18	.8	1.0	Osram	220HPT	—	—	2.5	—	Mullard	PM5D	20,000	26	1.3	1.0
Cossor	210HL	22,000	24	1.1	1.75	Marconi	PT2	—	—	2.5	5.0	Six-Sixty	607HF	15,200	17	1.1	2.0
Lissen	HL2	22,000	35	1.8	3.0	Mazda	220APen.	—	—	2.5	—	Mullard	PM5X	14,700	17.5	1.2	1.6
Mazda	HL2	21,000	32	1.5	3.6	Mazda	Pen.220	—	—	2.5	—	610D	9,250	18.5	2.0	2.0	
Lissen	HL210	20,000	20	1.0	2.2	Mullard	PM22A	—	—	2.3	4.0	Mullard	PM6D	9,000	18	2.0	2.0
Mullard	PM1HL	20,000	28	1.4	1.2	Mullard	PM22	—	—	1.3	12.0	Lissen	L610	8,000	16	2.0	2.0
Six-Sixty	210HL	20,000	26	1.3	1.0	Osram	PT2	—	—	2.5	5.0	Cossor	610LF	7,500	15	2.0	3.4
Mazda	HL210	18,500	26	1.4	3.0	Six-Sixty	220Pen.	—	—	2.5	—	Marconi	L610	7,500	15	2.0	3.0
Marconi	HL2	18,000	27	1.5	1.0	4-volt Three-electrode Valves						Osram	L610	7,500	15	2.0	3.0
Osram	HL2	18,000	27	1.5	1.0	Marconi	H410	60,000	40	.66	.5	Mullard	PM6	3,550	8	2.25	7.0
Cossor	210HF	15,800	24	1.5	2.2	Osram	H410	60,000	40	.66	.35	Cossor	610P	3,500	8	2.28	8.0
Cossor	210Det	13,000	15	1.15	2.5	Osram	H410	60,000	40	.66	1.0	Marconi	P610	3,500	8	2.28	6.0
Six-Sixty	210LF	12,500	10.6	.85	2.5	Six-Sixty	4075RC	58,000	37	.64	.55	Osram	P610	3,400	8	2.28	6.0
Mullard	PM1LF	12,000	11	.9	2.6	Mullard	PM3A	55,000	38	.66	.3	Six-Sixty	610P	3,400	7.8	2.3	8.0
Osram	L210	12,000	11	.92	2.0	Cossor	410RC	50,000	40	.8	.6	Lissen	P610	3,200	8	2.5	6.0
Marconi	L210	12,000	11	.92	2.0	Lissen	HL410	21,000	25	1.2	2.5	Cossor	625P	2,500	7	2.8	13.0
Mullard	PM2DX	12,000	18	1.5	2.0	Osram	HL410	20,800	25	1.2	1.25	Lissen	P625	2,500	7.5	3.0	8.0
Six-Sixty	210D	10,000	18	1.6	2.0	Marconi	HL410	20,800	25	1.2	1.25	Marconi	P625	2,400	6	2.5	11.0
Cossor	210LF	10,000	14	1.4	3.0	Cossor	410HF	20,000	22	1.1	1.0	Osram	P625	2,400	6	2.5	11.0
Lissen	L210	10,000	12	1.2	3.0	Lissen	HL410	20,800	25	1.2	1.25	Cossor	610XP	2,000	5	2.5	15.0
Mazda	L2	10,000	20	2.0	3.0	Osram	HL410	20,800	25	1.2	1.25	Mullard	PM256	1,850	6	3.25	8.0
Marconi	P215	5,000	7	1.4	6.0	Cossor	410HF	20,000	22	1.1	1.0	Six-Sixty	625SP	1,780	5.8	3.25	8.0
Osram	P215	5,000	7	1.4	6.0	Marconi	410LF	12,500	13.5	1.1	3.0	Marconi	P625A	1,600	3.7	2.3	20.0
Six-Sixty	220P	4,800	7.2	1.5	5.0	Osram	410LF	10,000	17	1.7	2.5	Osram	P625A	1,600	3.7	2.3	16.0
Mullard	PM2	4,400	7.5	1.7	5.0	Six-Sixty	4075HF	12,500	13.5	1.1	3.0	Lissen	P625A	1,500	4.5	3.0	12.0
Lissen	P220	4,000	7	1.75	5.0	Lissen	L410	8,500	15	1.8	3.5	Six-Sixty	625SPA	1,500	3.9	2.6	20.0
Cossor	220P	4,000	9	2.25	6.0	Marconi	L410	8,500	15	1.77	3.0	Mullard	PM256A	1,400	3.6	2.6	20.0
Cossor	215P	4,000	9	2.25	5.0	Osram	L410	8,500	15	1.77	3.0	Mazda	P650	1,300	3.5	2.7	30.0
Cossor	220Pa	4,000	16	4.0	5.5	Mullard	PM4DX	7,500	15	2.0	2.0	6-volt Screen-grid Valves					
Marconi	LP2	3,900	15	3.85	6.0	Six-Sixty	410D	7,250	14.5	2.0	4.0	Six-Sixty	SS6075SG	210,000	190	.9	—
Osram	LP2	3,900	15	3.85	6.0	Marconi	P410	5,000	7.5	1.5	6.0	Cossor	610SG	200,000	200	1.0	—
Mazda	P220	3,700	12.5	3.4	11.0	Osram	P410	5,000	7.5	1.5	6.0	Mullard	PM16	200,000	200	1.0	—
Six-Sixty	220PA	3,700	13	3.5	6.0	Six-Sixty	410P	4,100	7.8	1.9	7.5	Osram	S610	200,000	210	1.05	4.0
Mullard	PM2A	3,600	12.5	3.5	6.5	Cossor	410P	4,000	8	2.0	8.0	Marconi	S610	200,000	210	1.05	4.0
Lissen	LP2	3,500	12.0	3.5	9.0	Mullard	PM4	4,000	8	2.0	7.5	6-volt Pentode Valves					
Marconi	P240	2,500	4	1.6	12.0	Lissen	P410	4,000	8	2.0	7.0	Marconi	PT625	43,000	80	1.85	10.0
Marconi	P2	2,150	7.5	3.5	12.0	Marconi	P425	2,300	4.5	1.95	14.0	Osram	PT625	43,000	80	1.85	10.0
Osram	P2	2,150	7.5	3.5	10.0	Mullard	PM254	2,150	6.5	3.0	9.0	Six-Sixty	SS617PP	28,500	54	1.9	15.0
Six-Sixty	220SP	2,060	7	3.4	13.5	Six-Sixty	420SP	2,150	6.5	3.0	10.0	Lissen	PT625	24,000	60	2.5	14.0
Mullard	PM202	2,000	7	3.5	14.0	Marconi	P415	2,080	5.0	2.4	14.0	Cossor	615PT	—	—	2.0	17.0
Mazda	P240	1,900	7	3.7	18.0	Osram	P415	2,080	5	2.4	14.0	Mullard	PM26	—	—	2.0	15.0
Mullard	PM252	1,900	7	3.7	14.0	Cossor	425XP	2,000	7	3.5	13.0	A.C. Three-electrode Valves					
Six-Sixty	240SP	1,900	6.6	3.5	14.0	Mazda	P425	1,950	3.5	1.8	26.0	Six-Sixty	4DX.AC	36,000	7.5	2.1	3.0
Mazda	P220A	1,850	6.5	3.5	13.0	Lissen	P425	1,500	4.5	3.0	28.0	Mullard	904V	34,000	75	2.2	1.8
Lissen	P220A	1,700	6	3.5	12.0	Cossor	415XP	1,500	4.5	3.0	15.0	Cossor	41MRC	19,500	50	2.6	2.7
Lissen	PX24P	1,500	4.5	3.0	12.0	Osram	PX25	1,265	9.5	7.5	—	Cossor	41MH	18,000	72	4.0	2.0
Cossor	230XP	1,500	4.5	3.0	15.0	Cossor	4XP	1,200	4.8	4.0	18.0	Osram	41MHF	15,400	41	2.8	3.0
Lissen	P240A	1,000	5.0	5.0	20.0	Marconi	PX4	830	5	6.0	35.0	Six-Sixty	4GP.AC	12,000	36	3.0	4.0
2-volt Double-grid Valves						4-volt Screen-grid Valves						Mullard	354V	12,000	36	3.0	4.0
Marconi	DC2	3,750	4.5	1.2	—	Cossor	410SG	800,000	800	1.0	—	Lissen	AC/HL	11,700	35	3.0	6.0
Osram	DC2	3,750	4.5	1.2	—	Lissen	SG410	200,000	180	.9	—	Mazda	AC/HL	11,700	35	3.0	5.0
Cossor	210DG	3,400	2.7	.8	—	Mullard	PM14	230,000	200	.87	—	Cossor	41MHL	11,500	52	4.5	4.0
Mullard	PM1DG	—	—	.8	—	Six-Sixty	4075SG	220,000	190	.87	3.0	Mazda	AC2HL	11,500	75	6.5	4.5
Six-Sixty	210DG	—	—	.8	—	Osram	S410	200,000	180	.9	3.5	Marconi	MH4	11,100	40	3.6	4.75
2-volt Screen-grid Valves						4-volt Pentode Valves						Osram	MH4	11,100	40	3.6	4.75
Lissen	SG215	900,000	1,000	1.1	—	Marconi	PT425	50,000	100	2.0	8.0	Osram	MH4	11,100	40	3.6	4.75
Mazda	S215A	727,000	800	1.1	—	Osram	PT425	50,000	100	2.0	8.0	Micromesh	HLA1	10,000	80	8.08	6.0
Mazda	215SG	455,000	500	1.1	—	Marconi	PT4	50,000	110	2.2	—	Marconi	MHLA	8,000	20	2.5	10.0
Six-Sixty	218SG	357,000	500	1.4	—	Osram	PT4	42,000	120	2.							

RESEARCH

What difference has two years made to radio reception? What are you missing by using old valves? Mullard research will tell you that. It has given you the finest range of 2-volt valves on the market, valves that give you performance you never dreamed of two years ago: it has discovered a non-vibrating filament and conquered microphony in the P.M.1HL: it has produced the P.M.22A—a low-consumption pentode for portables. Now it is looking ahead to experiment and improve to give you still better radio in the future.

P.M.12A Screened Grid.
P.M.2A Power Valve.
P.M.22 Pentode.

P.M.1HL non-microphonic Detector
P.M.202 Super Power Valve.
P.M.22A Low-consumption Pentode



Mullard

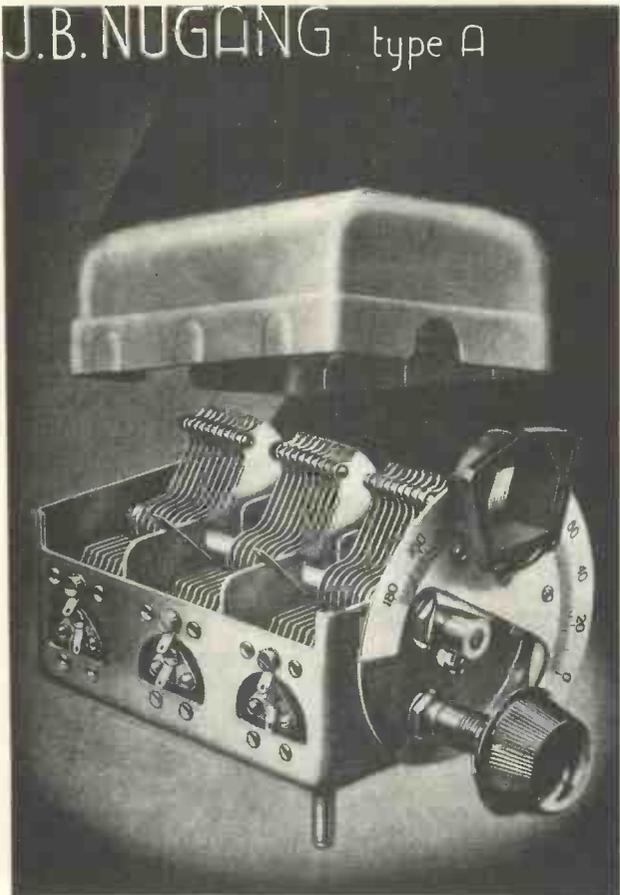
THE MASTER VALVE

ASK T.S.D.—Whenever you want advice about your set or your valves—ask T.S.D.—Mullard Technical Service Department—always at your service. You're under no obligation whatever. We help ourselves by helping you. When writing, whether your problem is big or small, give every detail. Ask T.S.D.

Advt. The Mullard Wireless Service Co., Ltd., Mullard House, Charing Cross Road, London, W.C.2

Arks

You will get prompt replies by mentioning "Wireless Magazine"



A RIGID CHASSIS THAT IS ALL ONE PIECE

Matched to within 1/2 of 1 per cent + half a mmfd.

● so strong that there can never be the slightest distortion in use. NUGANG TYPE "A" is similar to the standard Nugang Model but with the addition of a powerful Disc Drive. Easily fitted—only round holes to cut in receiver panel.

Trimmers to each stage operated by external starwheels. Vanes wide spaced and of heavy gauge. Special rotor bearings ensure permanent accuracy and give remarkably free movement. Capacity, .0005 mfd.



NUGANG TYPE "A"
Complete with Disc Drive.

Fully screened.		Semi-screened (without lid).
18/6	2-gang	16/6
27/-	3-gang	24/6
34/6	4-gang	31/6

PRECISION INSTRUMENTS

Advertisement of Jackson Brothers, 72, St. Thomas' Street, London, S.E.1.
Telephone: Hop 1929.

JUST ATTACH UNIVOLT TO YOUR RADIO SET



INSTANTLY CONVERT IT TO A RADIOGRAM

without Cabinet or Mounting.

FULLY GUARANTEED TWO YEARS

Absolutely Self-contained. No Radio Interference. Silent and Uniform running. No Overheating. Simple Voltage adjustment. Minimum Current consumption. Solid Walnut Grained Bakelite Case. Speed Control (70-90 r.p.m.). Invisible Rubber Insulated Feet. On-Off Switch. Flex and Plug-in Adaptor. Univolt Super Pick-up perfect Tracking. Swivel Head Weight Adjustable Arm. Sensitivity and frequency response hitherto never attained. Square Law Volume Control. Automatic Start and Stop. Terminal to connect to Radio.

Univolt is needed in every home where there is Radio. Connected in an instant, it reproduces electrically all recorded music through your Radio with full clear beautiful volume... giving the performance of an expensive Radio-Gramophone at the least possible cost. Equipped with a controllable speed motor and the super-sensitive Univolt Pick-up. The case itself is made of solid walnut grained bakelite, effectively harmonising in any home. Univolt is only £2 high to top of turn-table.

STANDARD MODEL for A.C. Mains of Standard Voltages, as described and equipped with a patented super pick-up with swivel head and weight adjustment, square law volume control and automatic start and stop. **CASH PRICE £5 : 15 : 6** or 11 monthly payments of

12/-

UNIVERSAL MODEL for A.C. & D.C. mains. **13/6**
Cash price £6 : 10 : 6 or 11 monthly payments of
Obtainable from most Radio Dealers. In cases of difficulty send direct giving name & address of local Dealer.

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Manufacturers and Patentees **UNIVOLT ELECTRIC LIMITED**,
Balfour House, 119/125 Finsbury Pavement, London, E.C.2.
National 0620.

MAINS RADIO AND SAFETY M.K. Fuse Plugs



For real protection of Mains Radio, it is necessary to fit an M.K. Fuse Plug for connecting to the Mains Supply.

The flexible is then adequately safeguarded against damage (due to external short circuit) by the small cartridge fuses, fitted in the connecting Fuse Plug. Ask your dealer to show you this new M.K. safety device which safeguards your Mains Radio and the connecting flexible.

Recommended Fuses : M.K. 1 amp. for Radio
M.K. 2 amp. for Radio-Grams

See the TRADE MARK

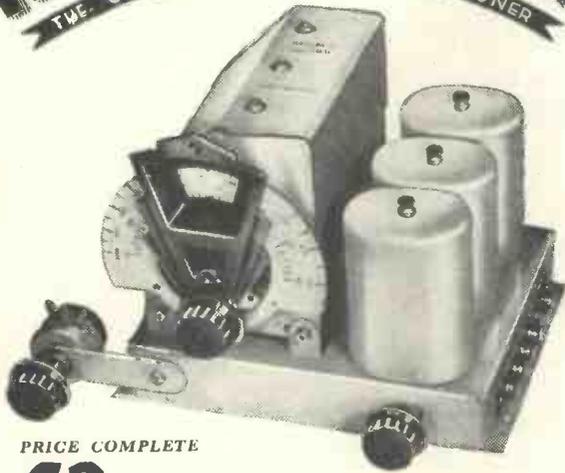


"M.K." ELECTRIC LTD., WAKEFIELD STREET, EDMONTON, N.18
Telephone : Tottenham 3056 (4 lines) Telegrams : "Multicon, Totlane, London."

Speedy replies result from mentioning "Wireless Magazine"

RADIOPAK

TRADE MARK
THE ONLY COMPLETE BAND-PASS TUNER



PRICE COMPLETE

£3

THE famous British Radiophone **RADIOPAK**, on account of its tremendous success in the "CALIBRATOR" will be specified in an A.C. receiver—particulars to be published in the January issue of "Wireless Magazine."

The band-pass "Radiopak" simplifies set construction as well as it simplifies selectivity. No development in modern component design is so important as this to the amateur constructor. Revolutionary in conception and design, neat, compact, and robust, above all the "Radiopak" is efficient.

Consisting of screened coils, ganged condenser with drive, combined volume control, and on-off power switch, mounted neatly on a metal chassis, the "Radiopak" needs only the addition of valves, low-frequency circuit, loud-speaker, and batteries or mains unit to form a complete receiver.

Because the coils and condenser are matched with the highest possible degree of accuracy before leaving our factory, all ganging difficulty is eliminated, and each unit is supplied with a tuning scale calibrated in wavelengths.

Standard Type 535.A. Fitted with 10,000 ohms potentiometer ... **£3 0 0**
 Type 535 A/50,000, for use with reaction, fitted with 50,000 ohms potentiometer and extra knob for reaction condenser **£3 0 6**

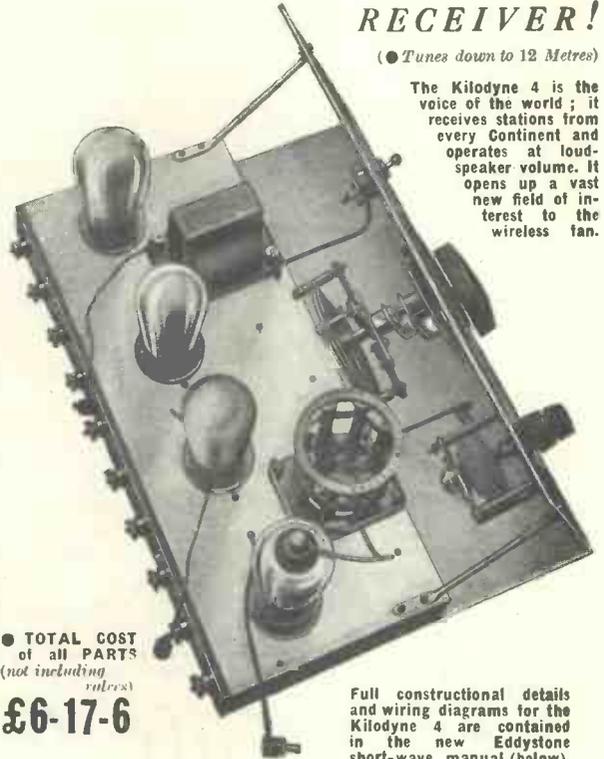
THE BRITISH RADIOPHONE LTD.
 Aldwych House, Aldwych W.C.2
 Telephone: Holborn 6744

BRING IN THE WORLD

ON THIS ALL-WAVE RECEIVER!

(Tunes down to 12 Metres)

The Kilodyne 4 is the voice of the world; it receives stations from every Continent and operates at loud-speaker volume. It opens up a vast new field of interest to the wireless fan.



● TOTAL COST of all PARTS (not including valves)

£6-17-6

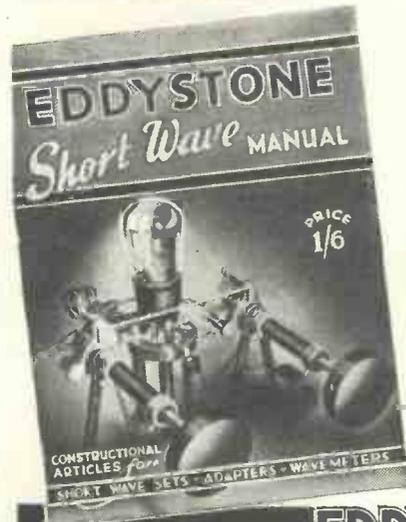
Full constructional details and wiring diagrams for the Kilodyne 4 are contained in the new Eddystone short-wave manual (below).

The Kilodyne 4 tunes down to 12 metres and is adaptable up to 2,000 metres, incorporates S.G. H.F. amplification, absolutely no hand capacity, perfectly smooth reaction, one-dial tuning, has been designed by short-wave specialists and praised by leading short-wave critics. It is supplied complete ready for any home constructor to assemble easily, or the individual components are obtainable separately.

● FULL CONSTRUCTIONAL DETAILS ARE GIVEN IN THIS MANUAL.

Invaluable to S.W. enthusiasts.

THE KILODYNE 4



● "The Eddystone Short-wave Manual" includes fully illustrated constructional articles for building 2-, 3-, and 4-valve short-wave receivers, a 1-valve super-het. S.W. converter, a 1-valve S.W. adapter, a dynatron and heterodyne wavemeter, and a 7-metre ultra S.W. converter. List and cost of parts given in detail for each set. Articles on short waves, short wave tuning, S.W. condensers, trouble locating, etc.

PRICE 1/6 (Post free)

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 WEBB'S RADIO STORES,
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EDDYSTONE

Advertisers like to know you "saw it in the 'Wireless Magazine'"

VALVES TO USE IN YOUR SET — Continued from p. 556

Make	Type	Impedance	Amplification Factor	Mutual Conductance	Anode Current at 200 volts	Make	Type	Impedance	Amplification Factor	Mutual Conductance	Anode Current at 200 volts	Make	Type	Impedance	Amplification Factor	Mutual Conductance	Anode Current at 200 volts	
A.C. Three-electrode Values—Continued						Cossor	MSG/HA	209,000	780	2.0	2.1	Filament Current .25 Ampere	Marconi	DH	10,800	40	3.7	6.0
Mullard	104V	3,000	12	4.0	17.0	Cossor	MSGLA	200,000	750	3.75	5.2		Osram	DH	10,800	40	3.7	6.0
Mullard	AC104	2,850	10	3.5	11.0	Six-Sixty	4YSGAC	—	900	3.5	—		Marconi	DL	2,660	12	4.5	25.0
Six-Sixty	SS4PAC	3,170	12	3.8	11.0	A.C. Variable-mu Valves						Osram	DL	2,660	12	4.5	25.0	
Osram	ML4	2,860	12	4.2	25.0	Lissen	AC/SGV	300,000	—	—	—	Filament Current .5 Ampere	Mazda	DC/HL	13,000	35	2.7	3.0
Marconi	ML4	2,860	12	4.2	25.0	Cossor	MVSG	200,000	—	2.5	7.8		Mazda	DC/P	2,220	10	4.5	15.0
Lissen	AC/P	2,800	10	3.6	20.0	Marconi	VMS4	—	—	2.4	—		D.C. Screen-grid Valves					
Mazda	AC/P	2,650	10	3.75	13.0	Mazda	AC/SG,VM	—	—	3.0	6.0	Filament Current .1 Ampere						
Cossor	4IMP	2,500	18.7	7.5	24.0	Mazda	AC/SI,VM	—	—	14.0	5.8	Mazda	DC2SG	—	11,200	12.0	4.5	
Mullard	AC064	2,000	6	3.0	20.0	Mullard	MM4V	—	—	—	10.0	Filament Current .25 Ampere						
Cossor	41MXP	1,500	11.2	7.5	40.0	Osram	VMS4	—	—	2.4	—	Osram	DS	550,000	500	1.1	2.5	
Mazda	AC/P1	1,450	5.4	3.7	2.0	Mullard	VM4V	—	—	—	8.2	Marconi	DS	540,000	500	1.1	2.5	
Six-Sixty	HV4/1	1,450	6.3	3.0	18.0	A.C. Pentode Valves						Osram	DSB	350,000	1,120	3.2	3.5	
Marconi	PX25	1,265	9.5	7.5	—	Marconi	PT4	42,000	120	2.85	32.0	Marconi	DSB	350,000	1,120	3.2	3.5	
Osram	PX25	1,265	9.5	7.5	—	Osram	PT4	42,000	10	2.85	32.0	Marconi	DSB	350,000	1,120	3.2	3.5	
Mullard	O54V	1,250	5	4.0	30.0	Marconi	MPT4	33,000	100	3.0	32.0	Filament Current .5 Ampere						
Mullard	AC044	1,150	4	3.5	30.0	Osram	MPT4	33,000	100	3.0	32.0	Mazda	DSCG	—	1,000	2.75	4.0	
Micromesh	PA1	1,050	12.6	12.0	35.0	Cossor	MS Pen. A	—	—	4.0	9.0	Marconi	VDS	—	—	2.4	—	
A.C. Double-grid Valves						Cossor	MP Pen.	—	—	4.0	0.0	Osram	VDS	—	—	2.4	—	
Cossor	41MDG	40,000	10	.25	—	Mazda	AC/Pen.	—	—	2.5	30.0	Filament Current .2 Ampere						
A.C. Screen-grid Valves						Six-Sixty	SS4P-en AC	—	—	3.0	—	Mazda	DC/2Pen.	—	—	12.5	3.0	
Six-Sixty	4SGAC	1,000,000	1,000	1.0	1.5	Mullard	AC/PT	—	—	3.0	—	Filament Current .25 Ampere						
Mullard	S4V	909,000	1,000	1.1	2.5	Lissen	Pen 4V	—	—	2.6	28.0	Marconi	DPT	30,000	90	3.0	40.0	
Mazda	AC/SG	630,000	1,700	3.0	4.0	Cossor	PT4I	—	—	3.0	30.0	Osram	DPT	30,000	90	3.0	40.0	
Mazda	ACS2	600,000	3,000	5.0	4.0	Mullard	PT41B	—	—	2.25	30.0	D.C. Pentode Valves						
Marconi	MS4	500,000	550	1.1	2.5	Mullard	PM24A	—	—	2.0	20.0	Filament Current .2 Ampere						
Osram	MS4	500,000	550	1.1	2.5	Mullard	PM24B	—	—	2.1	30.0	Mazda	DC/2Pen.	—	—	12.5	3.0	
Six-Sixty	4XSGAC	485,000	1,600	3.3	—	Mullard	PM24C	—	—	3.0	30.0	Filament Current .5 Ampere						
Mullard	S4VA	—	1,000	2.0	4.5	Mullard	PM24M	—	—	3.0	30.0	Marconi	DPT	30,000	90	3.0	40.0	
Cossor	41MSG	400,000	1,000	2.5	3.0	D.C. Three-electrode Valves						Osram	DPT	30,000	90	3.0	40.0	
Marconi	MS4B	350,000	1,120	3.2	3.5	Filament Current .1 Ampere						Mazda	DC3HL	11,700	35	3.0	5.0	
Osram	MS4B	350,000	1,120	3.2	3.5	Mazda	DC2P	2,650	10	3.75	15.0	Filament Current .5 Ampere						
Lissen	AC/SG	340,000	1,100	3.25	8.0	Filament Current .5 Ampere						Mazda	DC/2Pen.	—	—	13.5	3.0	
Six-Sixty	SS4MIMAC	300,000	900	3.0	—	Filament Current .5 Ampere												
Mullard	S4VB	257,000	750	2.5	9.5													

Free Gift Coupon

See Special Offer on Page Nine of Set Buyers' Supplement

A Free Copy of "The How and Why of Radio" Presented to Every Reader Who Buys Any New Set Mentioned in the Supplement

BUYER'S NAME AND ADDRESS

DEALER'S NAME and FULL ADDRESS

Make and Type of Receiver :

Date Purchased :

When You Have Bought Your New Set Send to "Set Selection Bureau," WIRELESS MAGAZINE, 58/61 Fetter Lane, London, E.C.4, and We Will Send You a Copy of "The How and Why of Radio" by return.

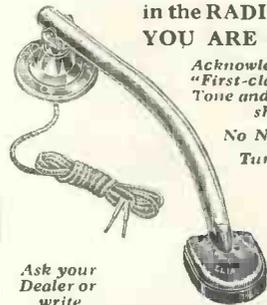
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FIT A



RELIANCE

PICK-UP AND CARRIER in the RADIO-GRAM YOU ARE MAKING



Acknowledged to be "First-class" in value, Tone and Workmanship

No Needle Screw Turnover Head

Arm Incorporates a Rest

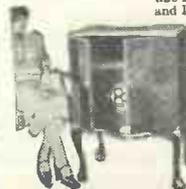
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Famous makers' Offer! £5 Radio Gram CABINET for 65/- 7 DAYS' FREE TRIAL

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You save 35/1. A few only at makers' prices. Rich Brown Oak "Master Grand" (as made for Radio Press) carriage paid. A fine Bargain. PHOTOGRAPHS and LISTS FREE. All Models from 35/- to £15



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Patent 8123 improved acoustics yields mellow, rich, full volume that your speaker is really capable of. Makers to: (Radio-Press, E.B.G., 3,000 clients)

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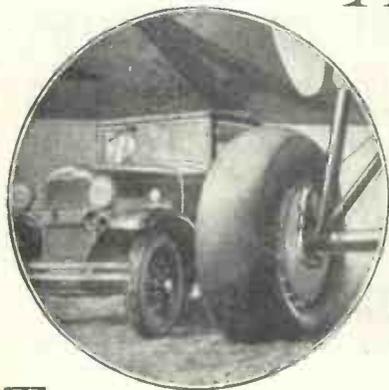


IMPERIAL AIRWAYS

trust to



MARCONI VALVES



This is "HELENA," the largest and probably the safest air liner in the world (note the height of its wheels compared with that of a car). From the moment of taking off the pilots are in constant communication with their air ports. Flags track their movement on control room maps at Croydon, Le Bouget and Brussels; they are told what weather to expect en route, and when visibility is bad this 2,200 h.p. monster is even directed by wireless. Its wireless gear *must* be reliable—so much depends on it—that is why "HELENA," like other Imperial Air-

ways machines, and like the air traffic of almost every nation, trusts to Marconi valves. *When lives depend on a valve they choose Marconi.*

THERE IS A MARCONI VALVE FOR EVERY PURPOSE

Ask your local dealer, or write direct to The Marconiphone Co., 210/212, Tottenham Court Road, London, W.1, for the Marconi valve folder which gives curves, facts and figures for all types.

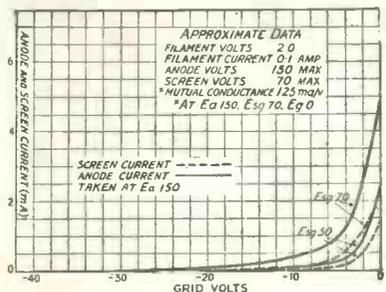
THIS IS THE TWO VOLT RANGE

VS.2.	Variable-Mu Screen Grid	16/6
S.22.	Screen Grid (Single stages)	16/6
S.21.	Screen Grid (Multi stages)	16/6
H.2.	High Magnification	7/-
HL.2.	Medium Magnification	7/-
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P.2.	Super Power	12/-
PT.2.	Pentode	17/6
DG.2.	Double Grid	20/-

VS.2. A NEW 2-volt VARIABLE-Mu

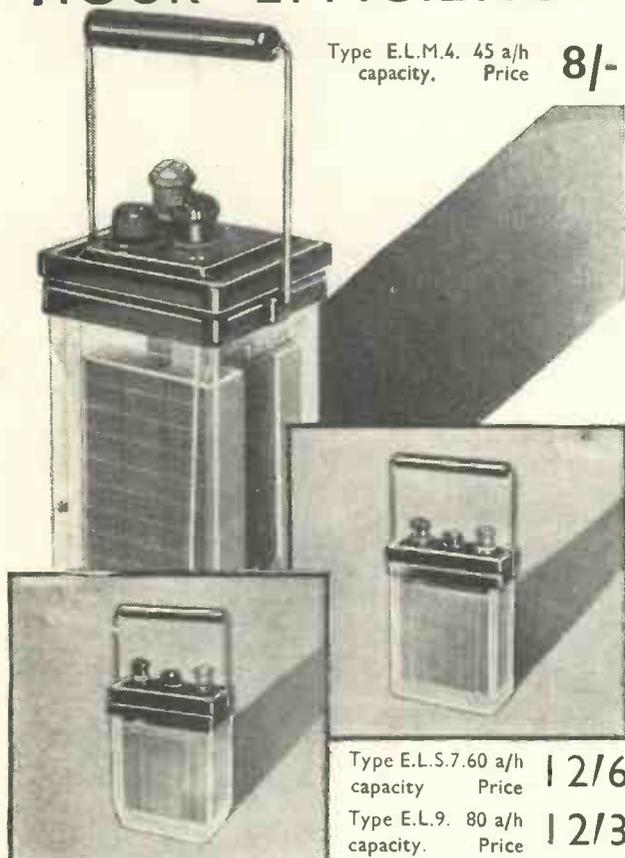
VS.2 is the latest Marconi development, providing the user of a battery-operated receiver with the enhanced selectivity, purer tone and perfect control of volume which only a Variable-Mu Valve can give. It is comparable in range and sensitivity to its famous A.C. counterpart, the VMS.4, and offers definitely improved performance to almost every user of a 2-volt S.G. Receiver.

Price 16/6



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to give **LONGER LIFE**
and **HIGHER AMPERE-
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Type E.L.M.4. 45 a/h capacity. Price **8/-**

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The new Edison Swan "balanced capacity" Accumulator is an entirely new development. The special design of the positive and negative plates, which ensures exact electrical "balance," allows this Accumulator to charge more rapidly, discharge more slowly, and hold its charge longer than ordinary types. Twenty-five years of experience lie behind the production of Edison Swan Accumulators, while every possible mechanical refinement has been incorporated—British-made containers of clear glass, moulded ebonite lids, screwed vents, non-corrodible and non-interchangeable connectors, and a metal carrier which fits neatly round the container.

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EXTRA LIFE

ACCUMULATORS



THE EDISON SWAN ELECTRIC CO., LTD.,
155 CHARING CROSS RD., LONDON, W.C.2

B.193

Has your Loud Speaker a poor response?

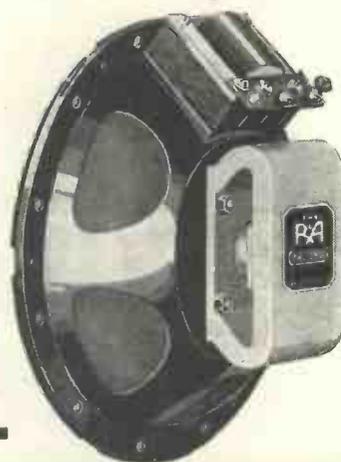
CAN it reproduce the deep notes of the organ and the jingle of keys? If not, you are losing an important section of the musical frequencies, without which balance and fidelity are impossible.

Read the following extract from the *Wireless World* Test Report on the "Challenger" Permanent Magnet Moving-coil Reproducer:—
"Wireless World," June 1, 1932, states:—

"The performance of this unit is such that it merits discussion from an absolute standpoint and without regard to the very reasonable price asked. Overall sensitivity slightly better than average... reproduction of bass below 100 cycles quite definitely above average... as a result of the well-maintained output down to 50 cycles a full-bodied bass is obtained without 'boom.' Reproduction of speech is natural and unforced, and the balance in music is exceptionally good."

Adequate bass is important, that is why you need a "Challenger."

**INCLUDING
3-RATIO
FERRANTI
TRANSFORMER** **35/-**



The R&A "CHALLENGER"

REPRODUCERS & AMPLIFIERS LTD.

WOLVERHAMPTON



Multitone ensures good quality - it is specially needed in highly selective sets and radiograms

By changing the setting of a Potentiometer, the response-curve of the Multitone Transformer is progressively altered from a falling, through a level, to a rising characteristic. When the response is level the transformer ratio is 4:1. True Two-way Tone Control is immediately at your disposal on any set. In use all that is necessary is to turn the Potentiometer until the desired overall response is obtained.

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Our booklet on Tone-Control will be sent post free on receipt of a post card.

Specified without alternative in the "SEVENTY-SEVEN SUPER"

MULTITONE

TONE CONTROL L.F. TRANSFORMER



17/6

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95-98, WHITE LION STREET, LONDON, N.1. · NORTH 5063

M.C. 28

Mention of the "Wireless Magazine" will ensure prompt attention

RAISE THE VEIL OF DISTANCE



Settle yourself in your most comfortable armchair and light your pipe. For to-night "Aida" is being broadcast from Warsaw and your good wife has arranged for a home demonstration of the new LOTUS LONG RANGE 4, the most amazing of modern All Mains Receivers.

Set the dial to 1411 . . . there it is . . . faintly at first, becoming clearer and clearer as you turn the volume control . . . until you are caught up in the glory of Verdi's great masterpiece . . . and you sit back enthralled, following every word and every note, picturing in your mind's eye each successive scene . . .

The last notes of the finale die away, and the tremendous burst of applause is interrupted by the announcer's voice . . . once more you are back in your own room, in your own chair. And yet another critical listener has raised the Veil of Distance—has tasted the delights of perfect trouble-free Radio.

If YOU have not yet heard this amazing LONG RANGE 4, your nearest dealer will gladly arrange a demonstration, preferably in your own home . . . FREE, without obligation.

Some of the features of this wonder Set include: Two Variable-Mu Valves—Screened Grid Detector—Magnavox Moving Coil Speaker—Westinghouse Metal Rectifier—Mains Aerial—Provision for external aerial—Variable Tone Control—and an Inlaid Walnut Cabinet of outstanding design.



A.C. or D.C. **39'3**
20 GNS. **39'3**
or 33/9 down and eleven
monthly payments of **SECURES**

LOTUS

Long Range 4

POST COUPON NOW

FOR DETAILS!

To LOTUS RADIO, LTD., LIVERPOOL.
Please send full details of LOTUS GUARANTEED
SETS AND COMPONENTS and/or arrange a demon-
stration in my own home. (Strike out if not required.)
Name
Address

1d. stamp only (over 10d. 9d. called).
For a copy of Booklet, "Choosing
a Wireless Set", enclose
3d. in stamps.
W.M. 12-32

There is news in the "Wireless Magazine" advertisements

GUIDE TO THE WORLD'S BROADCASTERS

Specially Compiled for "Wireless Magazine" by JAY COOTE

Amended Details.

Metres : 25.4 **ROME (2RO)** **Kilocycles :**
Power : 9 kw. **Prato Smeraldo, Italy** **11,810**

Distance from London : Approximately 890 miles.
Standard Time : Central European (Greenwich Mean Time PLUS 1 hour).
Announcer : Woman.
Call : (Phon.) "Eh-Yah Rah-dee-owe Roma (ay Nar-polly)."
Opening Signal : Carillon (gramophone record).
Interval Signal : Short melody played in three different keys.
 Relays programmes from Rome (Santa Palomba), Naples, Milan, Florence, etc.
 Closes down with the words : "Ente Italiano Audizioni radiofoniche, Radio Roma; Signori, Buona Notte," followed by Italian Royal Anthem and Fascist hymn.
 Also tests on 48.2 metres (6,220 kilocycles).

Metres : 41.1 **BUDAPEST (HAF4C)** **Kilocycles :**
Power : **65 watts** **Hungary** **7,296**

Distance from London : Approximately 902 miles.
Standard Time : Central European (Greenwich Mean Time PLUS 1 hour).
Announcer : Man.
Call : In Magyar and German, when latter: "Hier Radio Club der Ungarischen Technischen Hochschule Muegyetem, Budapest."
Times of Transmission : G.M.T. 23.00-24.00 (almost daily); 10.20-11.00 (occasionally).

Metres : 49.22 **BOWMANVILLE (VE9GW)** **Kilo-**
Power : **2 kw.** **Ontario, Canada** **cycles :**
6,095

Distance from London : Approximately 3,400 miles.
Standard Time : Greenwich Mean Time LESS 5 hours.
Announcer : Man.
Call : "This is VE9GW, Bowmanville, of the Trans-Canada Broadcasting Company, calling you."
 Relays programmes from CKGW-CPRY, Toronto, and from other Canadian studios.
Times of Transmission : G.M.T. 22.00-04.00 (week-days); 17.30-01.00 (Sundays).
 Also tests on 25.4 metres (11,810 kilocycles).

Metres : 49.67 **MIAMI BEACH (W4XB)** **Kilocycles :**
Florida, U.S.A. **6,040**

Distance from London : Approximately 4,400 miles.
Standard Time : Greenwich Mean Time LESS 6 hours.
Announcer : Man.
Call : "This is WIOD, Miami Beach, calling you," or, alternatively, the N.B.C. call when programmes are relayed (see under).
Interval Signal : When relaying N.B.C. programmes : 3 notes.
Standard Transmissions : Daily relays of programmes from WIOD, Miami Beach (230.6 metres), and also entertainments from WEAJ, New York, WJZ, Boundbrook (N.J.), and the National Broadcasting Company of America (Blue Net).

Metres : 250 **RADIO SCHAERBEEK** **Kilocycles :**
Power : **.3 kw.** **Brussels, Belgium** **1,200**

Distance from London : Approximately 218 miles.
Standard Time : Greenwich Mean Time (Belgium adopts B.S.T.).
Announcer : Man.
Call : "Allo, allo, (phon.) Ee-see radio Skar-bake ah Brew-sale," and in Flemish (phon.) : "Here Skar-beek, Brussel."
Daily Transmissions : G.M.T., 12.00, orchestral and vocal concert; 13.50, news; sporting notes, etc. No evening broadcast. Closes down with the usual French greetings (see Brussels No. 1), followed by "La Brabançonne" (Belgian National Anthem).

Metres : 413 **DUBLIN** **Kilocycles :**
Power : 1 kw.* **Irish Free State** **725**

Distance from London : Approximately 289 miles.
Standard Time : Greenwich Mean Time.
Announcer : Man.
Call : "Se Seo Staisiun foirleatha, Baile Ath Cliath" (This is the Dublin broadcasting station); in addition : "Agus radio Corcaighe," if relayed from Cork.
 All announcements are made in English and Gaelic.
Opening Signal : Tuning note. No interval signal.
Standard Daily Transmissions : G.M.T., 13.30, time, weather, news, gramophone records; 18.00, concert, children's corner; 19.00, gramophone records; news, Gaelic talk; 20.00, main evening entertainment; 22.30, news and weather.
Relay : Cork, 224.4 metres (1,337 kilocycles), 1 kilowatt.
 * A super-power transmitter will shortly be brought into operation.

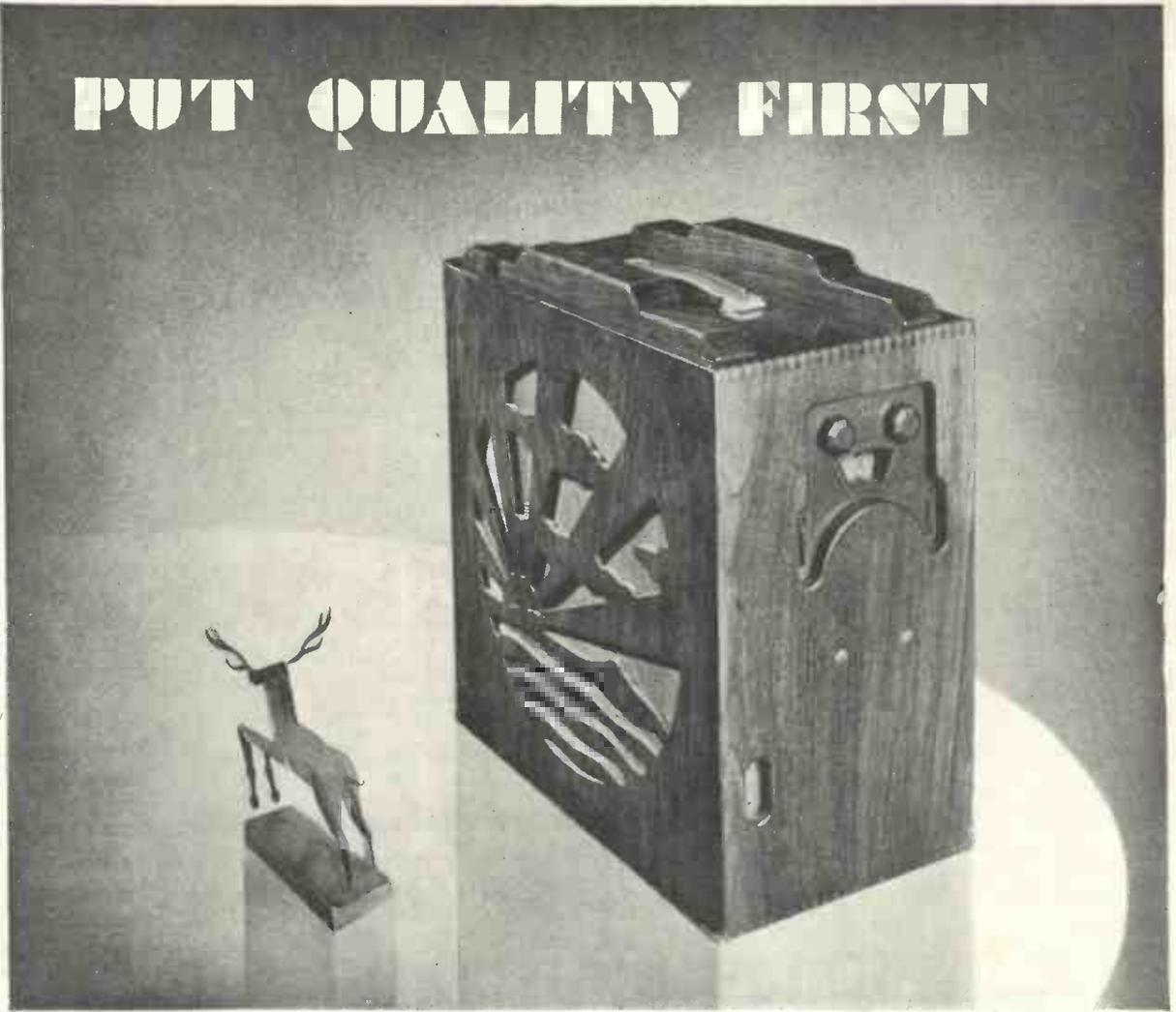
Metres : 937.5 **KHARKOV** **Kilocycles :**
Power : 20 kw. **U.S.S.R.** **320**

Distance from London : Approximately 1,580 miles.
Standard Time : Greenwich Mean Time PLUS 3 hours.
Announcers : Man and woman.
Call : (Phon.) "Govoret Kharkovska rah-dee-owe-movna Stant-see-ya"; between items : "Radio Kharkovska."
Interval Signal : Gong.
Times of Transmission : G.M.T., 04.45, relays Moscow (physical exercises); 06.15, early morning concert, then continuous broadcast throughout day until 19.15, main evening entertainment; 20.55, relay of time signal from Kremlin (Moscow); 21.15, relays Moscow or Leningrad programme; 22.00, news, weather, etc.
 Concludes with the playing of "L'Internationale."

Metres : 252 **BARCELONA (EAJ15)** **Kilocycles :**
Power : **1 kw.** **Spain** **1,193**

Distance from London : Approximately 718 miles.
Standard Time : Greenwich Mean Time (Spain does not adopt B.S.T.)
Announcer : Man.
Call : "Aqui Estacion Barcelona-Asociacion" (phon.) "Ay-ah-rhota Keensay (EAJ 15)"
Daily Transmissions : G.M.T. 18.00, gramophone records; news, weather; 22.00, main evening entertainment.
 Closes down with Republican Anthem, and the words, "Buenas Noches, hasta mañana" (till to-morrow).

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GIVE years of happiness this Christmas; to yourself, your family or your friends. Give radio . . . the perfect radio . . . Pye Radio. Pye receivers are famous as the very best which can be built; they have quality, imparted by imagination in design, craftsmanship in manufacture, beauty in presentation. There is a Pye receiver for every modern radio need. The set illustrated is the Pye "Q" Battery Portable. It is completely self contained, needing no aerial, no earth or electric mains. It costs only 14 gns. or 26/6 first payment. A corresponding all-electric portable is the Pye "MM", costing 17 gns. or 32/- first payment. Ask your local Pye Service Agent (there's one in every town) to demonstrate the Pye Receiver of your choice. It entails no obligation.

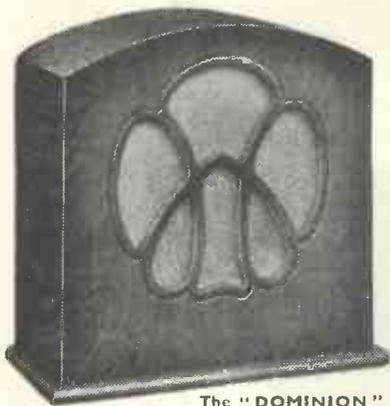


PYE RADIO LTD., SALES ORGANIZATION, AFRICA HOUSE, KINGSWAY, LONDON, W.C.2

E.W.G.

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4.W.M

THE CAMCO "DOMINION"
 A loud-speaker cabinet which for small units is difficult to improve upon. Its design and appearance is specially pleasing, will accommodate 12-in. cones or chassis and units. Finished in oak 12/6.



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The ideal cabinet for converting your set into a modern radio-gram, unequalled for design and finish. Includes motor board, shelf, baffle board, and automatic stay. Includes room for batteries or eliminators. In shaded walnut. Price 75/- complete.

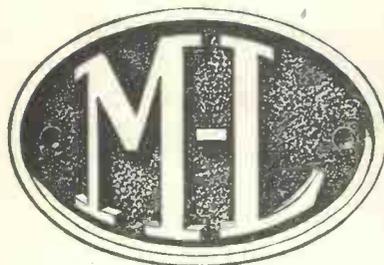


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Decidedly modern in appearance, the Camco "Grosvenor" is handsomely finished in selected walnut veneer. Will accommodate all mains or battery-driven sets with speaker and includes shelf and baffle board. Price 80/-



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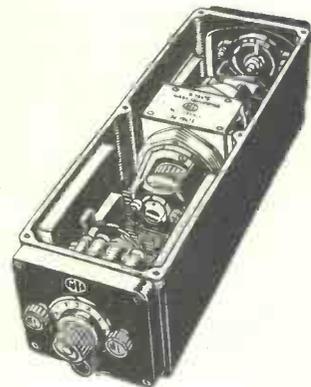
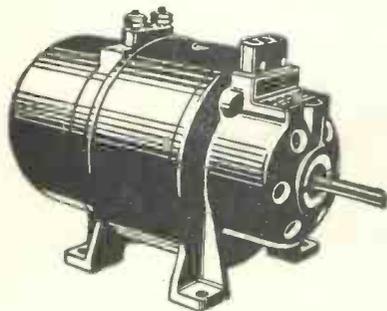
Models for every requirement. D.C. to A.C. Types for operating A.C. Receivers and Radio-Gramophones from D.C. supplies. Electrically and mechanically silent in operation; supplied with anti-interference unit and sound-proof cover. Input: 12 to 220v. D.C. Output: Up to 200 watts at 230v. 50c. D.C. to D.C. Types for supplying H.T. Current to large Public Address Amplifiers, etc. Input: 12 to 220v. D.C. Output: 300v. to 1,000v., etc.

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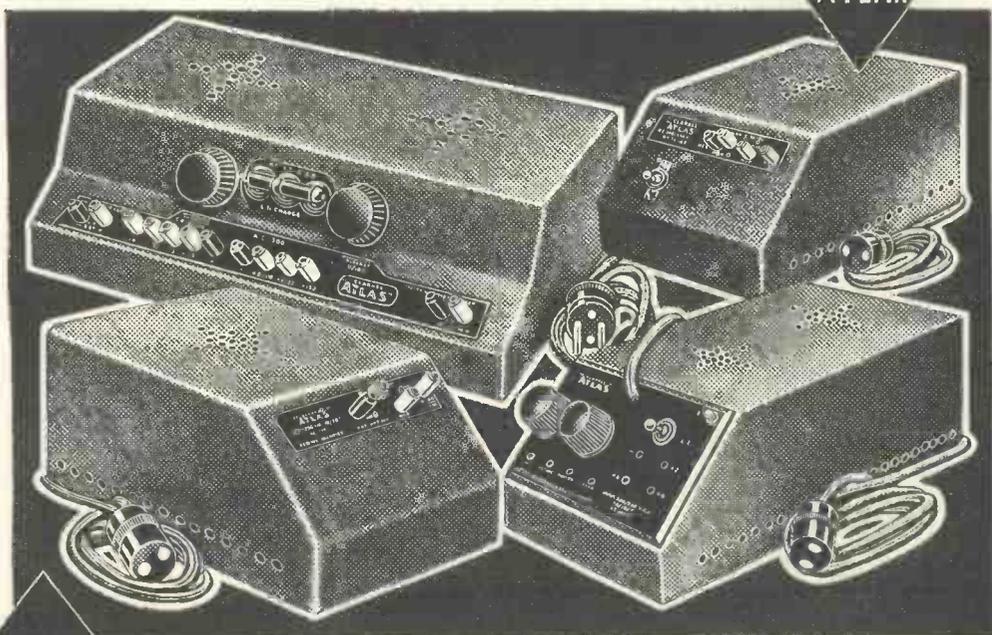
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A YEAR

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COST YOU 50/- A YEAR...**

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FOR LESS THAN 2/- A YEAR**

2/-
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MODELS
FOR
EVERY
SET
for

10/-
DOWN
AND BALANCE
IN EASY
MONTHLY
PAYMENTS

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George Street, Patricroft, Manchester
Please send FREE copy of Folder No. 68,
fully describing "ATLAS" Mains Units
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Name

Address

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38, Oswald Street.

WORLD'S BROADCAST WAVELENGTHS



Wave-length	Name of Station	Dial Readings	Country	Wave-length	Name of Station	Dial Readings	Country
7	Berlin		Germany	30.57	Buenos Aires LQE		Argentina
9.8	Coltano IAG		Italy	30.77	Rocky Point WEL.WNC		United States
9.96	Golfe Aranci		Sardinia	30.9	Rugby GCA		Great Britain
13.97	Daventry (Empire) GSH		Great Britain	30.93	Buenos Aires LQA		Argentina
14.12	Rocky Point (N.J.) WQJ		United States	31.14	Pragins HBC		Switzerland
14.18	Buenos Aires LSL		Argentina	31.25	Lisbon CT1AA		Portugal
14.28	Podebrady, OKI		Czecho-Slovakia	31.297	Daventry (Empire) (GSC		Great Britain
14.47	Buenos Aires LSY		Argentina		Philadelphia		United States
14.60	Malabar PMB		Java	31.28	Sydney VK2ME		New South Wales
14.72	Rugby GAA		Great Britain	31.31	Melbourne VK3ME		Victoria
15.14	Ocean Township (N.J.) WKN		United States	31.35	Radio Nations HBL		Switzerland
15.198	Aranjuez EAO		Spain		Springfield W1XAZ		United States
15.20	Ruyssedele ORA		Belgium	31.38	Poznan SR1		Poland
15.48	Prangins HBL		Switzerland	31.38	Zeezen DJA		Germany
	Sydney VK2ME		Australia	31.48	Schenectady W2XAF		United States
15.5	Ste Assise FTM		France	31.51	Skamlebaek OXY		Denmark
	Kootwijk PCP		Holland	31.55	Melbourne VK3ME		Victoria
15.576	Rio de Janeiro PPU		Brazil	31.58	Rio de Janeiro PRBA		Brazil
15.61	Lawrenceville (N.J.) WKF		United States	31.545	Daventry (Empire) GSB		Great Britain
15.625	Ruyssedele (Bruges) OVG		Belgium	31.68	Rocky Point (N.Y.) WEJ		United States
15.63	Cairo SUY		Egypt	31.86	Bandoeng PLV		Java
15.86	Rocky Point (N.J.) WQE		United States	32.26	Rabat		Morocco
15.93	Bandoeng PLE		Java	33.25	Rugby GBS		Great Britain
16.10	Rugby GBU		Great Britain	33.59	Rocky Point (N.J.)		United States
16.19	Coltano IAC		Italy	34.66	Drummondville VE9AP		Canada
16.26	Bogota HKD		Columbia	34.68	Long Island W2XV		United States
16.3	Kootwijk PCK		Holland	35.05	Deal Beach (N.Y.) WOO		United States
16.36	Lawrenceville (N.J.) WLA		United States	35.55	Rio de Janeiro PRDA		Argentina
16.54	Rugby GBW		Great Britain	36	Norddeich		Germany
16.56	Bandoeng PMC		Java	36.92	Bandoeng PLW		Java
16.57	Chicago (Ill.) W9XAA		United States	37.0	San Paolo PY2SP		Brazil
16.72	Rocky Point (N.J.) WQB		United States	37.50	Tokio JKBB		Japan
16.81	Malabar PLF		Java	38.47	Kemikawoa-Cho-Chiba-Ken		Japan
16.85	Kootwijk PCV		Holland	38.476	Radio Nations HBP		Switzerland
16.878	Boundbrook W3XAL		United States	38.56	Rio de Janeiro PPB		Brazil
16.88	Daventry (Empire) GSB		Great Britain	38.65	Kootwijk PDM		Holland
18.44	Lawrenceville WLO-WLK		United States	39.74	Calgary (Alb.) CKS		Canada
18.56	Rugby GBX		Great Britain	39.98	Tscheng-Ju XGD		China
18.75	New Brunswick (N.J.) WKQ		United States	40.3	Radio Nations HBQ		Switzerland
19.36	Kemikawoa (Tokio) J1AA		Japan	40.4	Warsaw SP1AX		Poland
19.56	Schenectady W2XAD		United States	40.54	New York WEN		United States
19.68	Pontoise FYA		France	41.6	Las Palmas EAR58		Canary Isles
19.737	Saxenburg W8XK		United States	41.7	Singapore VSIAB		Sts. Settlements
19.737	Zeezen DJB		Germany	43.11	Rocky Point (N.J.) WEO		United States
19.815	Daventry (Empire) GSF		Great Britain	43.75	Paris (Vitus) F8LH		France
19.84	Rome (Vatican) HVJ		Italy	43.86	Stuhlweissenburg		Hungary
19.9	Heredia T14NRH		Costa Rica	44.51	Rocky Point (N.Y.) WEJ		United States
19.95	Moscow		U.S.S.R.	44.9	Nauen DGK		Germany
20.0	Drummondville CGA		Canada	45	Constantine FM8KR		Tunis
20.23	Rocky Point (N.J.) WKU		United States	45.11	Coltano IAC		Italy
20.49	Deal (N.J.) WND		United States	45.38	Moscow REN		U.S.S.R.
20.5	Chapultepec XDA		Mexico	45.5	Bucharest		Roumania
20.56	Lawrenceville WMN		United States	46.67	London (Ont.) VE9BY		Canada
21.44	Rugby GBA		Great Britain	46.69	Boundbrook W3XL		United States
21.53	Rocky Point (N.J.) WIK		United States	46.73	Minsk RW62		U.S.S.R.
21.83	Drummondville CGA		Canada	46.8	Moscow		U.S.S.R.
21.92	Stuhlweissenburg HAT		Hungary	48	Casablanca CN8MC		Morocco
22.26	Rocky Point (N.Y.) WAJ		United States	48.05	Barranquilla HKD		Colombia
22.42	Nauen DGJ		Germany	48.35	Bogota HKC		Colombia
22.58	Drummondville CGA		Canada	48.5	Brussels ON4FB		Belgium
23.28	Radio Maroc (Rabat)		Morocco	48.86	Saxenburg (Pa.) W8XK		United States
23.7	Drummondville VE9AP		Canada	48.95	Maracaibo YV11BMO		Venezuela
23.858	Rabat		Morocco	49.0	Bombay VUB		Br. India
24.9	Kootwijk PDV		Holland	49.10	Calcutta VUC		Br. India
25.20	Pontoise FYA		France	49.18	Boundbrook W3XAL		United States
25.27	East Pittsburgh (Pa) W8XK		United States	49.2	Johannesburg ZTJ		Sth Africa
25.284	Daventry (Empire) GSE		Great Britain	49.22	Bowmanville VE9GW		Canada
25.34	Chicago (Ill.) W9XAA		United States	49.34	Chicago W9XAA		United States
25.4	Bowmanville VE9GW		Canada	49.4	Vienna UOR2		Austria
25.465	Rome 2RO		Italy	49.43	Vancouver VE9CS		British Columbia
25.5	Saigon (Chi-Hoa)		Indo-China	49.5	Nairobi VQ7LO		Kenya Colony
25.53	Chapultepec XDA		Mexico	49.5	Philadelphia W3XAU		United States
25.532	Chelmsford GSD		Great Britain	49.586	Navana CMC1		Cuba
25.532	Daventry (Empire) GSD		Great Britain	49.59	Daventry (Empire) GSA		Great Britain
25.6	Pontoise FYA		France	49.67	Halifax VE9GX		Nova Scotia
25.7	Winnipeg VE9JR		Canada	49.83	Miami Beach W4XB		United States
26.83	Rio de Janeiro PPO/PSN		Brazil	49.96	Chicago W9XF		United States
27.1	S.Y. Elettra 1BDX		—	50	Drummondville VE9DR		Canada
27.3	Funchal CT3AQ		Madeira	50	Bucharest		Roumania
27.55	Brussels ORB		Belgium	50.1	Moscow RV59		U.S.S.R.
28.28	Wellington ZLW		New Zealand	50.26	Eindhoven		Holland
28.5	Rugby GBP		Great Britain	50.26	Rome (Vatican) HVJ		Italy
28.98	Rocky Point (N.J.) WEA		United States	51.22	Chapultepec XDA		Mexico
29.16	Sydney VK2ME		New South Wales	52.7	Tananarive FIUI		Madagascar
29.84	Buenos Aires LSX		Argentina Repub.	54.52	New York W2XBH		United States
30	Königswusterhausen DIQ		Germany	55.56	Stuhlweissenburg HAT		Hungary
30.4	Abul Zabal (Cairo) SUV		Egypt	58	Prague OK1MPT		Czechoslovakia
30.43	Madrid EAQ		Spain	58.3	Bandoeng PMY		Java
				60.3	Rugby GBC G6RX		Great Britain
				62.5	Long Island (N.J.) W2XV		United States
				62.56	London (Ont.) VE9BY		Canada

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Complete receiver as illustrated above, in handsomely finished cabinet with five Cossor A. C. Mains Valves, Types M.V.S.G. (2 Metallised) 41 M.H. (Metallised), 41 M.X.P. and Rectifier 442 B.U. and built-in Cossor Utah Moving Coil Loud Speaker.
Pick-Up Plug and Jack.
PRICE £17.17
Hire Purchase Terms: 60/- deposit and 12 monthly payments of 28/-.
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W.M. 12/32

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Even with local stations in full blast, Continental programmes pour in, bright, loud, and clear-cut. "Performance Outstandingly Good," says "Wireless World." "Tonal Response Brilliant"—"Music Seller." "Practically Every Station of Note Receivable"—"Wireless Trader." "Station Finding Extremely Easy."—"Broadcaster."

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33½ gns.

With the Garrard Automatic Control,

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TABLE MODEL RECEIVER

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ALL-BRITISH

PERMANENT

STURDY

QUIET

MOISTURE-PROOF

NOTE THE LOW PRICE FOR THE KIT OF 18 RESISTORS USED IN THIS SET

POST 15/9 FREE

B.A.T. BEST AFTER TEST

FIXED RESISTORS

1-Watt - 10½d.

2-Watts - 1/9

3-Watts - 2/9

5-Watts - 4/0

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Their entirely new process of manufacture ensures that "B.A.T." Resistors are noiseless in operation, permanent in resistance value, and give really perfect voltage regulation. They are sturdily constructed and are definitely proof against surface flaking and the troubles it can cause. Perfect electrical connections are assured, the stout wire leads being heavily soldered to the resistor ends.

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There are no finer Resistors made than "B.A.T.," a fact substantiated by their widespread use by the leading British Radio Manufacturers.

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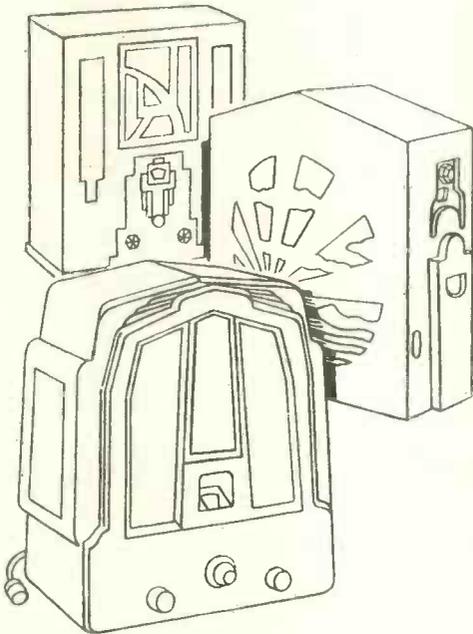
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T.C.C.

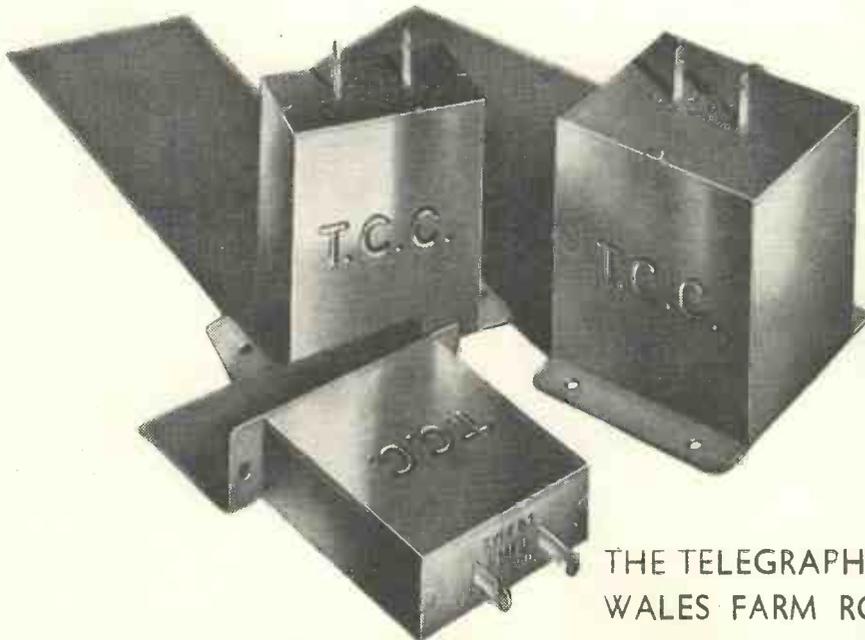
ALL-BRITISH
CONDENSERS

SEE THEM IN ALL THE BEST SETS



ALL the most successful and outstanding receivers of to-day have one thing in common—they use T.C.C. Condensers. This is not a coincidence—it means that the designer in each case has been critical in his choice of components—he has insisted on only the best—and T.C.C. are the unanimous choice of designer and set-maker alike.

Bear this in mind when selecting *your* set—remember that if the set contains T.C.C. Condensers you can be sure that reliability and efficiency have been the first consideration.



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THE TELEGRAPH CONDENSER Co., Ltd.,
WALES FARM ROAD., N. ACTON, W.3.

BROADCAST WAVELENGTHS

Continued from
page 568

Wave-length	Name of Station	Dial Readings	Country	Wave-length	Name of Station	Dial Readings	Country
63.12	Deal Beach (N.J.) WOO ...		United States	363.3	Algiers		North Africa
67.11	Bagdad YID		Iraq	365.3	Frederikstaad		Norway
67.65	Doerberitz DFK		Germany	365.5	Bergen		Norway
70.17	Rocky Point (N.J.) WIR ...		United States	366.1	Seville		Spain
70.2	Khabarovsk RV15		U.S.S.R.		Helsinki		Finland
76.0	Paris 8PCR		France	368.1	Bolzano		Italy
79.5	Salisbury ZEA		South Africa		Kharkov		U.S.S.R.
81.45	Utrecht		Holland	370.4	Radio LL, Paris		France
88.3	Rugby G6RX		Great Britain	372	Hamburg		Germany
92.31	Doerberitz		Germany	376.4	Scottish Regional		Great Britain
198.5	Riga		Latvia	378	Moscow Regional		U.S.S.R.
206	Antwerp		Belgium	380.7	Lvov		Poland
207.3	Franchimont		Belgium	385	Radio Toulouse		France
210	Magyazovar		Hungary	385	Stalino		U.S.S.R.
210.1	Liège		Belgium	388.5	Archangel		U.S.S.R.
211.3	Newcastle		Great Britain	389.6	Frankfurt		Germany
214.2	Warsaw (No. 2)		Poland	394	Bucharest		Roumania
214.3	Aberdeen		Great Britain	398.9	Midland Regional		Great Britain
215.6	Brussels (Conference)		Belgium	403	Söttens		Switzerland
217	Königsberg		Germany	408	Katowice		Poland
218	Salzburg		Austria	411	Madrid (EAJ5)		Spain
219.6	Binche		Belgium	413	Athlone		Irish Free State
220	Béziers		France	416	Dublin		Irish Free State
224	Cork		Irish Free State	419	Radio Maroc		North Africa
225.2	Fécamp		France	423.4	Berlin		Germany
227.4	Flensburg		Germany	423.4	Madrid (Esplaña)		Spain
231.1	Radio Wallonia		Belgium	424.3	Madrid EAJ7		Spain
230.6	Malmö		Sweden	429.8	Belgrade		Yugoslavia
232.2	Kiel		Germany	435.4	Stockholm		Sweden
233.4	Lodz		Poland	441.2	Rome		Italy
235.5	Kristianssand		Norway	447.1	Paris PTT		France
236.3	Bordeaux-Sud-Ouest		France	449.4	Odessa		U.S.S.R.
237.2	Nîmes		France	453.2	Danzig		Danzig
239	Nürnberg		Germany	453.2	Klagenfurt		Austria
240.6	Stavanger		Norway	456.6	Porsgrund		Norway
241.3	Liège Experimental		Belgium	456.6	San Sebastian		Spain
242	Belfast		Ireland	459.4	Beromuenster		Switzerland
244.1	Basle		Switzerland	465.8	Tartu		Estonia
245.9	Radio Schaerbeek		Belgium	465.8	Lyons PTT		France
	Linz		Austria	472.4	Langenberg		Germany
	Berne		Switzerland	476	Sebastopol		U.S.S.R.
247.7	Trieste		Italy	480	North Regional		Great Britain
249.6	Prague (No. 2)		Czechoslovakia	488.6	Prague		Czechoslovakia
249.8	Juan-les-Pins		France	495.9	Trondheim		Norway
252.9	Barcelona EAJ 15		Spain	500.8	Florence		Italy
253.1	Barcelona EAJ 15		Germany	502.4	Nini Novgorod		U.S.S.R.
255	Toulouse PTT		France	508.5	Astrakhan		U.S.S.R.
256.7	Hörby		Sweden	509	Brussels No. 1		Belgium
259.3	Frankfurt		Germany	518	Vienna		Austria
261.6	London National		Great Britain	525.4	Riga		Latvia
263.8	Moravska Ostrava		Czechoslovakia	527	Palermo		Italy
265.4	Lille		France	533	Munich		Germany
266.8	Valencia		Spain	542	Sundsvall		Sweden
267.9	Bremen		Germany	550	Budapest		Hungary
269.4	Bari		Italy	559.7	Kaiserslautern		Germany
270.9	Rennes		France	564	Augsberg		Germany
271.9	Cointe-Liege		Belgium	564.9	Wilno		Poland
273.6	Turin		Italy	571.2	Hanover		Germany
276.5	Heilsberg		Germany	571.2	Freiburg		Germany
279.3	Bratislava		Czechoslovakia	569.3	Grenoble		France
281	Copenhagen		Denmark	574.7	Ljubjana		Yugoslavia
282.2	Lisbon CTIAA		Portugal	675	Ouza		U.S.S.R.
	Berlin		Germany	720	Moscow PTT		U.S.S.R.
283.6	Magdeburg		Germany	748	Ostersund		Sweden
	Stettin		Germany	760	Ceneva		Switzerland
286	Montpellier		France	824.2	Sverdlovsk		U.S.S.R.
286.3	Radio Lyons		France	849	Rostov (Don)		U.S.S.R.
	Bournemouth		Great Britain	882	Saratov		U.S.S.R.
288.5	Scottish National		Great Britain	937.5	Kharkov		U.S.S.R.
	Plymouth		Great Britain	967.7	Alma Ata		U.S.S.R.
	Swansea		Great Britain	1,000	Moscow (Trades Union)		U.S.S.R.
291	Viipuri		Finland	1,035	Kiev		U.S.S.R.
293	Tampere		Finland	1,048.2	Tiflis		U.S.S.R.
293.7	Kosice		Czechoslovakia	1,071.4	Scheveningen-Haven		Holland
296.1	Limoges PTT		France	1,083	Oslo		Norway
298.8	Hilversum		Holland	1,106	Minsk		U.S.S.R.
301.5	Tallinn		Estonia	1,116	Moscow (Popoff)		U.S.S.R.
304.9	North National		Great Britain	1,153.8	Kalundborg		Denmark
306.8	Bordeaux PTT		France	1,171.5	Taschkent		U.S.S.R.
307.1	Zagreb		Yugoslavia	1,200	Reykjavik		Iceland
309.9	Falun		Sweden	1,229.5	Istanbul		Turkey
311.1	Cardiff		Great Britain	1,258	Boden		Switzerland
312.8	Radio Vitus		France	1,260	Vienna (tests)		Austria
315	Genoa		Italy	1,275	Novosibirsk		U.S.S.R.
318.8	Cracow		Poland	1,304	Luxemburg		Luxemburg
	Marseilles		France	1,348	Moscow		U.S.S.R.
	Naples		Italy	1,380	Motala		Sweden
319.7	Sofia		Bulgaria	1,411.8	Novosibirsh		U.S.S.R.
321.9	Dresden		Germany	1,445.7	Warsaw		Poland
325	Göteborg		Sweden	1,481	Paris (Eiffel Tower)		France
328.2	Breslau		Germany	1,538	Moscow (Komintern)		U.S.S.R.
331.4	Poste Parisien		France	1,554.4	Ankara		Turkey
335	Milan		Italy	1,600	Daventry National		Great Britain
338.2	Poznan		Poland	1,635	Irkutsk		U.S.S.R.
342.1	Brno		Czechoslovakia	1,725	Königswusterhausen		Germany
345.2	Strasbourg		France	1,796	Radio Paris		France
348.8	Barcelona EAJ1		Spain	1,875	Lahti		Finland
351	Leningrad		U.S.S.R.	1,935	Huizen		Holland
352.1	Graz		Austria	2,525	Kaunas		Lithuania
355.8	London Regional		Great Britain	2,650	Königswusterhausen		Germany
360.5	Mühlacker		Germany	2,900	Eiffel Tower		France
					Königswusterhausen		Germany

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OSRAM 2-VOLT VALVES WITH THE WEMBLEY FILAMENT

The filament with the highest electron emission efficiency of any Battery valve filament in the world.

A CHOICE OF HIGH EFFICIENCY SCREEN GRID VALVES

OSRAM S.22

The high slope Screen Grid valve for extremely sensitive reception and increased range in screened coil sets.

Slope 1.75 m.a./v.
Impedance 200,000 ohms.

Price 16/6

OSRAM S.21

The sensitive, non-microphonic Screen Grid valve for stable and efficient H.F. Amplification in any screen grid set, and for Detection.

Slope 1.1 m.a./v.
Impedance 200,000 ohms.

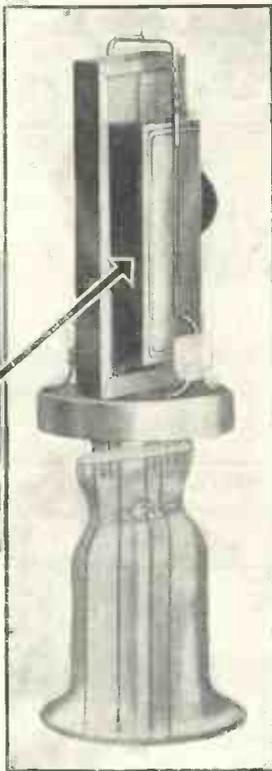
Price 16/6

OSRAM VS.2

The new Variable mu Battery Screen Grid valve which requires only a 9-volt grid bias battery for effective and distortionless volume control.

Max. Slope 1.25 m.a./v.

Price 16/6



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CLOSE MESH SCREEN AND PLATE ANODE FOR LOW CAPACITY AND HIGH EFFECTIVE AMPLIFICATION.

RIGID
Construction for
Reliable Control.

For full technical information
WRITE for OSRAM Wireless Guide
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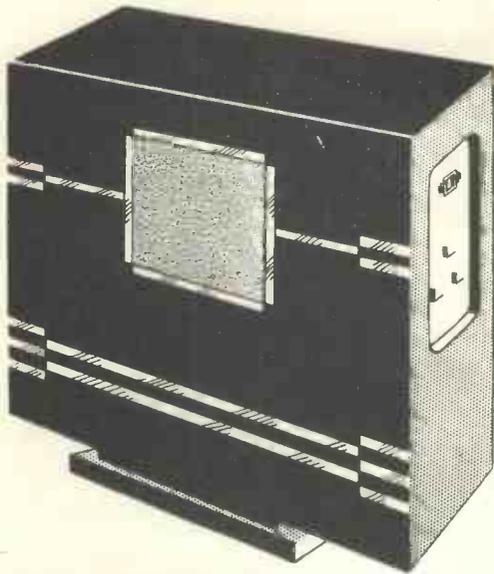
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2 VOLT BATTERY
Valves

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MODERN
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Philomel is just the set for MRS. LISTENER. The neat, modernistic cabinet, the simple controls, closely grouped for easy tuning—have an irresistible appeal for the ladies; especially when combined with such complete portability as in Philomel.

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Square topped tuning gives a high degree of selectivity and enables the utmost advantage to be taken of the amazing sensitivity.

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"Wireless Magazine"
"SEVENTY-SEVEN SUPER"
this handsome

OSBORN CABINET



MODEL No. 234. Beautiful Queen Anne style. Radio-Gramophone Cabinet. 3 ft. 3 in. high by 2 ft. 6 in. wide by 1 ft. 6 in. deep. Takes panel, 19 in. by 12 in., or smaller. Ample room for any type of gramophone motor and largest H.T. and L.T. batteries made. Storage for 35 Records each side of set. If you desire larger panel space, this Cabinet takes panel 27 in. long by omitting Records Storage.

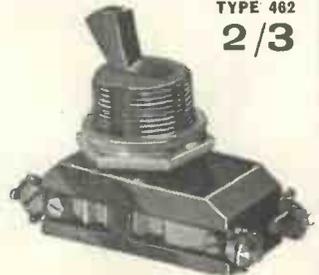
PRICES
Machined ready to assemble, Oak, £3 10s.; Mahogany, £3 15s.; Walnut, £4 10s. Assembled Ready to Polish, Oak, £4 10s.; Mahogany, £4 15s.; Walnut, £5 10s. Assembled and Polished, Oak, £5 10s.; Mahogany, £6 5s.; Walnut, £7 5s.

All Models Carriage Paid.
OSBORN SUPER ACOUSTIC BAFFLE BOARD. Presents 90 per cent. of speaker worry. Guaranteed no vibration even when attached to powerful Moving-coil. Any size hole cut FREE. 18 by 18, 3s.; 24 by 24, 5s.; 30 by 30, 8s.; 36 by 36, 11s. 3d. Carriage paid U.K. Send for Free Sample!

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Write for Free Catalogue of Latest Models, Post Free.

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ON-OFF SWITCH
for the
SEVENTY SEVEN SUPER



TYPE 462
2/3

GEO. BECKER, LTD., Ampere Works, Wembley, Middx. Telephone: Wembley 3737. (M.C.S.)

Simpson's Electric Turntable

"goes by itself"



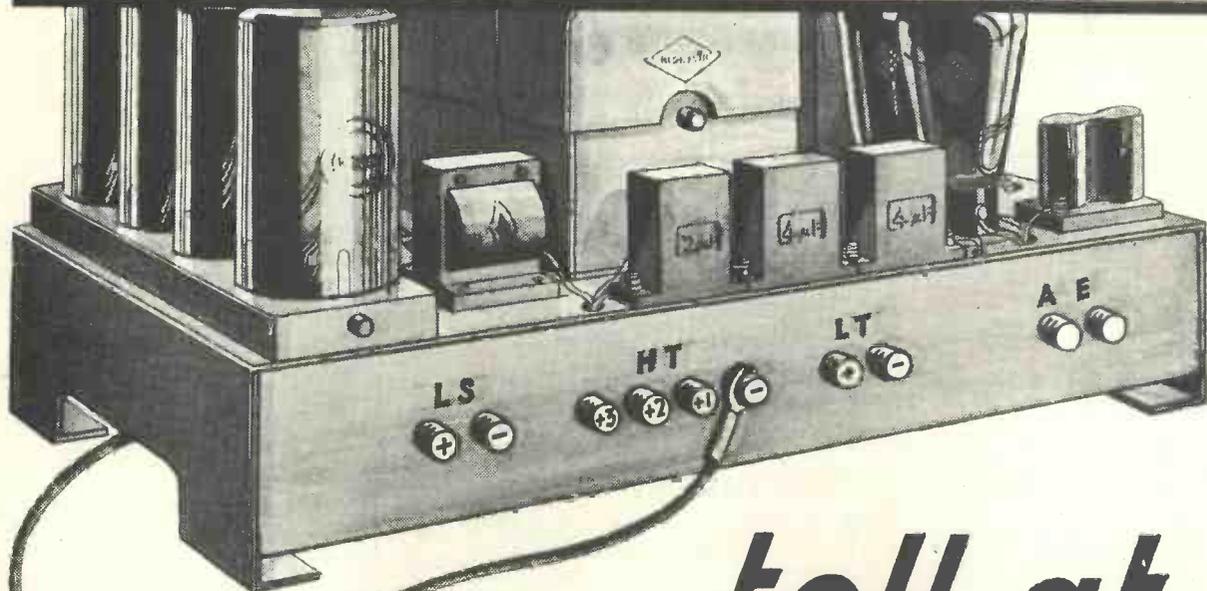
The most remarkable gramophone invention of the age—a gramophone turntable that "goes by itself." In a few minutes you can convert an ordinary gramophone into an automatic electric one. It takes little longer, following the simple instructions supplied, to convert your present Radio Set into a Super Radio-gram. The total cost is **39/6** only. It lasts a lifetime with no additional cost. Ask your Dealer for illustrated leaflet and demonstration.

1. Only 2½ in. deep.
2. Sizes 10 in. and 12 in.
3. 50 Cycles, 100/150 and 200/250 volts A.C.
4. Fits any Gramophone.
5. Costs less than 1d. per week.
6. Correct speed of 78 revs. per minute.
7. Nothing to go wrong.
8. Anyone can fit it.

SIMPSON'S ELECTRICALS LTD., GRANGE ROAD - LEYTON - E.10.

Speedy replies result from mentioning "Wireless Magazine"

WHAT'S THE TROUBLE?



*.. tell at
a glance!*

When trouble occurs—go over your set with an “All-in-One” Radiometer and quickly trace the true source of any fault.

Wherever it may be—circuit, valves, batteries, transformer, or other components—an “All-in-One” Radiometer gets to the root of the matter and registers it at once.

There is no other instrument like it—it is as essential to the radio user as a stethoscope is to the doctor. Ask to see it demonstrated at your radio dealer's or electrician's.

If any difficulty, send P.O. to
PIFCO, LTD., High St., MANCHESTER

Standard Model
“All-in-One” Radiometer
for Battery Sets only, as
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12/6

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Receivers and Mains
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RADIOMETER

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MORE THAN AN ECHO OF EKCO

MR. COLE'S latest book is certainly more than an echo of Ekco. It is a very material, bulky, and informative 28-page booklet. It is more than an echo—it is a veritable counterblast to those who decry mains operation.

It covers everything from the new Ekco all-electric radiograms to consolettes and ordinary mains units for power supply. If you contemplate using the mains in any shape or fashion; if you want a new high-tension unit or a five-valve mains-driven super-het; if you want practically anything of a mains-energised nature, you will find it in this book.

It is a proper art production and you should take advantage of this opportunity of getting a copy free and post free. **291**

THE BOOK OF THE RECTATONE

WHEN you come to think of it, tone control has been one of the biggest improvements in radio this year. It has made an immense difference to the pleasure of foreign-station reception and it has enabled good tone to be obtained from indifferent receivers.

And yet there are still folk who don't know how easy it is to control the tone. To these ignoramuses (pardon the Latin), I must introduce

"The Book of the Rectatone," which tells you just how, why, when, where, and in what fashion you can change the tone of your set.

The Rectatone, of course, is the extremely useful tone-control transformer introduced by Varley a few months ago. The book tells you so much about tone control that I have no need to do any trumpet blowing myself. **292**

FROM GADGETS TO COILS

I MUST say I am all in favour of these compact little catalogues which make for easy reference to a very wide range of parts. Take the new Wearite book, for example, copies of which you can get free through my catalogue service.

It starts off with the latest super-het coils, delves into Binowave and dual-range coils, encircles rheostats and volume controls, winds a tortuous path through a wide range of resistances and high-frequency chokes, jumps lightly over a number of smaller parts like switches and valve holders, and makes a playful bagatelle with a miscellany of earth tubes, coil formers, switch knobs, and whatnots.

The information on all these parts is compressed into a tidy 16-page catalogue, so that you have the "low-down" on a number of components in a handy and easily referenced fashion. The catalogue is well worth getting. **293**

G.E.C. GENERALITIES

THE new G.E.C. folder will interest you, I am sure. No matter whether you want to tackle technical details of the new Gecophone all-mains sets, or whether you want to consider buying a humble loud-speaker chassis, you will find in the Gecophone folder all the "dope" you need.

Pride of place, of course, is given to the Viking and Gala models, which are fitted with an automatic station index, but I feel that in view of super-het popularity the new Gecophone A.C.-operated super-het is going to be a favourite also.

It has band-pass tuning and variable-mu valves in the intermediate-frequency stages, also band-pass coupling. For the really keen man there is the all-wave super-het which goes down to 13 metres. This is the sort of outfit guaranteed to appeal to our friends in the Dominions. **294**

MAKING THE MOST OF THE MAINS

THE new Heayberd catalogue really does tell you how to make the most of the mains supply. It is, strictly speaking, not a catalogue at all in the accepted sense of the word, as it is really a book of handy circuits, specifications, and all manner of details of mains units for every set job.

Heayberd specialise in kits for the home construction of mains units and the circuits relate to these simple-to-build units which can be made up with Heayberd kits for high-tension supply, for low-tension charging, trickle charging, and so on.

The booklet gives details of fault tracking in mains apparatus and also describes some handy mains parts which you can use in your own units. Altogether a very handy publication for the mains user. **295**

THIS AUTOMATIC TUNING BUSINESS

ZETAVOX started the idea of automatic tuning. Press the button—there's your station! The automatic device on the new Zetavox receivers is set for the nine stations best received. That only takes a few minutes and then all that any member of the family has to do is to push the appropriate button to hear any particular station.

It is a novel idea and if you want to see just how it works and to what styles of receiver it is fitted, then write through my free catalogue service for the Zetavox booklet. Zetavox also have an automatic volume control in the super-hets. **296**

THE NEWS RADIO & RECORDS



HIS MASTER'S VOICE

INCREASED VOGUE OF THE "TWO IN ONE" INSTRUMENT

Wireless and Gramophone Combined

Every day more homes are being won over to the radio-gramophone. Many have wanted wireless, and yet been reluctant to do without the same quality of reproduction for records. In the radio-gramophone they have both, it is the best thing of all for modern records, because it gives electrical reproduction of electrical recording.

Never before has it been possible to get the best out of your records. With this instrument a choice is offered of the world's finest broadcast programmes or a concert of one's own choosing. All at a price very little higher than that of an ordinary wireless set. One switch controls long and medium wave wireless, and the gramophone too.

Famous Tenor delays homeward dash to U.S.A. to make these records

RICHARD CROOKS' FIRST ENGLISH RECORDING



Richard Crooks

On his way back from Switzerland to the United States, Richard Crooks, the New York Metropolitan Opera Star, was prevailed upon by "His Master's Voice" to rearrange his time-table especially in order to make

his first recording in England. Had he not been able to fit in this visit, music lovers in England would have been deprived of some of the finest vocal records ever made. Even then, there was only time to make one master record of each, instead of the usual three. *Gipsy Moon—Just to linger in your arms.* Richard Crooks DA1283, 4/-
Tell me to-night (Film "Tell me to-night")—Only my Song. Richard Crooks DA1284, 4/-

AMAZING BOY PRODIGY

Plays Elgar Concerto, conducted by the composer himself!

Recently at the "His Master's Voice" great recording studios at St. John's Wood, there was witnessed a wonderful collaboration of youth and age. The occasion was the recording of the Elgar Violin Concerto, played by Yehudi Menuhin and conducted by the composer himself. This rendering is now released and undoubtedly offers yet another masterpiece for the collector of immortal music in recorded form.



Yehudi Menuhin
(Photo Alban. Paris)

Concerto in B Minor, Op. 61. Yehudi Menuhin and the London Symphony Orchestra, conducted by Sir Edward Elgar.

DB1751-6, 6/- each. Album No. 164.
(Prices do not apply in Irish Free State.)



Ready to play, records or radio

"TRUE TO LIFE" TONAL QUALITY

One of the most deservedly popular radio-gramophones to-day—one which has, in fact, created a vogue of its own—is the "His Master's Voice" Transportable Radiogram, priced at 25 guineas, or by Hire Purchase. It is a four-valve (including rectifier) wireless set, capable of giving a great variety of programmes, with a tonal quality absolutely 'true to life' on radio and records. To help in the attaining of such a high standard of performance, only the finest valves would do—hence the use of Marconi Valves.

Noel Coward Himself — in "Words and Music"

Only Noel Coward, playwright and composer, can deal so frequently and freely with sentiment without once becoming "sentimental"; and only Noel Coward, actor and singer, can "put over" his own delicious and piquant numbers with all their delicate shades of wistful sentiment and gentle irony. He has never done a more brilliant piece of satire than "Mad Dogs and Englishmen."

Let's say goodbye—Mad Dogs and Englishmen. Noel Coward B4269, 2/6

The Party's over now—Something to do with Spring. Noel Coward. B4270, 2/6

"Words and Music" Medley. Raie da Costa. B4268, 2/6

"Words and Music" Selection. New Mayfair Orchestra C2463, 4/-
Mad about the boy—The Younger Generation. Ray Noble and His New Mayfair Orchestra B6238, 2/6



Noel Coward
(Photo Dorothy Wilking)

First Records of New B.B.C. Symphony Orchestra



Adrian Boult (Photo 'Sasha,' London) of fact, a beauty of tone and a realism, which will prove to be something entirely new in the experience of gramophone enthusiasts.

Symphony No. 8 in F Major, Op. 93 (Beethoven) DB1764-6, 6/- each
Funeral March—(Chopin, arr. Elgar.) DB1722, 6/-
The new B.B.C. Symphony Orchestra, conducted by Adrian Boult.

The Gramophone Co., Ltd., London, W.1.

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MAKE EVERY SET A SHORT-WAVE SET!



MAGNUM SHORT-WAVE ADAPTOR

Never mind if your present set, or the receiver in the set buyers' guide you are thinking of buying, does not reach the short waves. The latest Magnum Short-Wave Adaptor will convert it immediately into an amazingly efficient short-wave set. Suitable for both A.C. Mains and Battery Sets. Price, including coil 40/80 metres, cord and plug, 39/6. Extra Coil, if required, 18/40 metres, 3/-.

MODEL T.—For sets using British valves.
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 NOTE.—They are not suitable for sets where a S.G. valve is used as detector.
 Send at once for full particulars with a list of short-wave stations and Free Trial Offer.

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These high-quality instruments are now available as Radio-gramophones and Radio Receivers. A fully descriptive Brochure is now ready and free on application.

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made by Craftsmen for Particular People

THIS HANDSOME NEW OSBORN "BUREAUGRAM" CABINET



Registered Design No. 734677 (17th January, 1928)

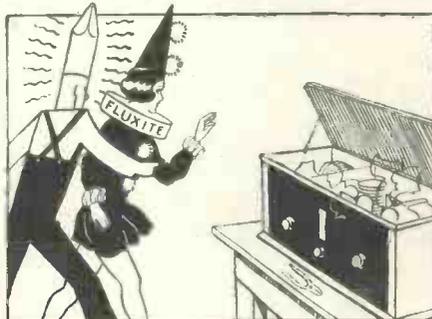
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 THE REGENT WORKS, ARLINGTON STREET, LONDON, N.1. Telephone Clerkenwell 5095. And at 21 Essex Road, Islington, N.1 (2 minutes from Essex Road Tube Station). Telephone Clerkenwell 5634.

A handsome Radio-Gramophone Cabinet. 3 ft. high, 2 ft. wide, 1 ft 5 in. deep. Accommodation for a set, 14 in. by 7 in. by 12 in. deep, also a gramophone motor and pick-up and storage for 50 gramophone records. Should you not require accommodation for set, space may be used for storage of 100 records. This Cabinet is ideal for use with any table model that you wish to convert into a Radiogram. Walnut models can be specially finished to match any "Eye," "Ultra," or similar sets.

PRICES MACHINED READY TO ASSEMBLE
 Oak £2 10s.; Mahogany, £2 15s.; Walnut, £3 5s.
 ASSEMBLED READY TO POLISH
 Oak, £3 5s.; Mahogany, £3 10s.; Walnut, £4.
 ASSEMBLED AND POLISHED
 Oak, £4; Mahogany, £4 5s.; Walnut, £4 15s.
 All models carriage paid.

Osborn Super Acoustic Baffle Board prevents 90 per cent. speaker worry. Any size hole cut FREE. Guaranteed no vibration, even when attached to powerful moving coil. 18 in. by 18 in., 3/-; 24 in. by 24 in., 5/-; 30 in. by 30 in., 8/-; 36 in. by 36 in., 11/3. Carriage Paid U.K. Send for Free Sample.



"We're Fluxite and Solder, The reliable pair, Famous for Soldering—Known everywhere!"

Wherever there's Wireless—There you'll find US. We SOLDER ALL CONNECTIONS Without any fuss!"

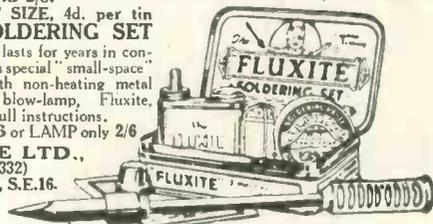
See that Fluxite and Solder are always by you—in the house, garage, workshop—anywhere where simple, speedy, soldering is needed. They cost so little, but will make scores of everyday articles last years longer! For Pots, Pans, Silver, and Brassware; RADIO; odd jobs in the garage—there's always something useful for Fluxite and Solder to do.

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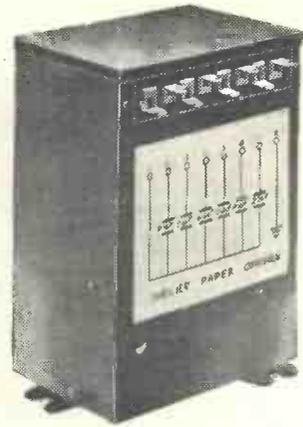
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IT SIMPLIFIES ALL SOLDERING

There is news in "Wireless Magazine" advertisements

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SET
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Type 670 Moulded Mica Condensers—tested 500 volts—are suitable for 250 volts D.C. workings.

CAPACITY.

.0001'.0003	1/- each	.0005/.002	1/3 each
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Have you noticed that all the leading manufacturers use Dubilier Condensers in their sets—the reason is not far to seek for reliability and consistent performance are the keynotes of these components.

No other condensers have proved so conclusively their unquestionable supremacy, they are manufactured and tested under the most exacting conditions which assures their absolute dependability.

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What is the backing for PHILCO claims?

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Super heterodyne circuit. Bandpass input filter (mixed type), giving 10 k/c peak separation. Bandpass intermediate frequency circuits (125 k/c). Special H.F. variable- μ pentode. Seven tuned circuits with single-knob control.

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Anode-bend second detector (Philco screen-grid type). Resistance-capacity coupled to Philco output pentode capable of 3-watt undistorted output. Special tone-filter in anode circuit of second detector. Improved Philco energised moving-coil speaker. Mains hum "entirely negligible and could not be heard even when no programme was coming through,"—(*Wireless and Gramophone Trader*.)

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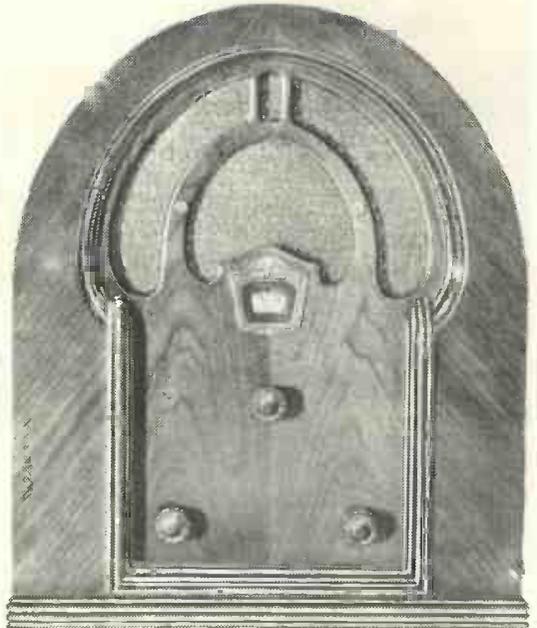
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16 ^{GNS}

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For A.C. or D.C. mains—the Baby Grand

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Use a Philco Super het as your standard set—it is the only set at anywhere near the price that is selective and powerful enough to get every station that is gettable.

And a Complete Range of Receivers and Radiograms from 14 guineas to 65 guineas.

PHILCO

BALANCED SUPER HETS

RADIO "JUGGLES"



FOR CHRISTMASTIDE

Get a crowd to sit around a table and place them with their hands on the table top, fingers touching to form a continuous chain

I'M an awful duffer at party games of the "animal, vegetable and mineral" variety, or in any of those social amusements which necessitate brainfag. Maybe its because I enjoy myself so thoroughly that, on the spur of the moment, I can never remember the names of all flowers beginning with "D," or the number of gadgets brought in on a tray.

I never was good at mental arithmetic and I certainly do not shine in mental observation during the festivities of Christmas parties.

Brightening Your Christmas Party

Having rid myself of this horrible confession, I feel freer to suggest a few good ideas by which you can brighten your Christmas parties with the aid of radio.

Last year I celebrated the twenty-fifth in a house where everybody believed in spiritualism. We had a party game in which the ghosts of great aunts were summoned to do a bit of table rapping, and reedy voices were heard making prophetic utterances in the darkness.

Everybody was most frightfully impressed until a gigantic leg pull was revealed and a loud-speaker hidden underneath the table showed that the spirits were distinctly earthbound, even if the voices sounded ethereal!

It was such a good hoax that I decided henceforth not to vent my inferiority complex again in the form of guessing competitions or party mental arithmetic. The use of a simple radio hoax calls for no concentration and produces far more mirth.

Whether You Are Guest or Host

Just what you do in the way of invoking the aid of radio in party games depends on whether you are guest or host.

People look most ridiculous at party times when they realise they have been spoofed and if you practice too much of this sort of thing on a host you are fairly sure not to get another of those dainty gilt-edged R.S.V.P. cards, whereas if you are throwing a party you can safely put your guests in their places by trying a few radio tricks on them!

This spirit business, for instance; you can either make it serious or a skit. If we were still living in Victorian times you could make it the subject of a pleasant family lecture on the possibilities of high-frequency conductivity of the human body . . . but no, on second thoughts no, not at Christmas time!

If you want to make a few spoof spooks, get a crowd to sit around a table (it must be a round table for spirits never rap on a square one!) and place them with their

Radio can be put to many amusing uses at Christmastide and in this article KENNETH ULLYETT explains a few of the tricks that can be worked without a great deal of trouble or preparation. The ingenious constructor will be able to evolve other tricks on his own account. Although it is so universal, radio is still full of mystery for the average man and woman—a factor that makes for the success of any radio "juggle" you like to try on them!

RADIO "JUGGLES" FOR CHRISTMAS—Cont.

hands on the table top, fingers touching to form a continuous chain.

Let the leader explain in as serious a voice as he can muster (after nuts and wine) that the voices of the spirits will be heard through the wireless set's loud-speaker if everybody sits close and does not break the finger chain.

Good Effect If Worked Properly

If you work this trick properly the effect is rather good. Everybody sits tight while the lights go out and, provided that the table group sit with their fingers touching, the loud-speaker utters guttural sounds which, especially at Christmas time, it is feasible to imagine to be spirit voices.

One of the party is bound to get curious and see what happens when he (or more generally she) breaks the finger chain.

The ghost voices stop at once!

Feeling very guilty, the breaker of the chain makes contact again and up come the spirit voices as before.

Difficult? Not on your life, not to the radio expert of the family! He (the guilty lad) sits in the chain with his hand making contact with a short bit of wire running to the aerial terminal of the set, the ordinary aerial being disconnected. He has previously tuned-in a foreign station.

With any luck the station will still be receivable while there is a goodly chain of people making an aerial capacity, but it will fade out if the human aerial wire is broken.

Good Spook

It makes quite a good spoof spook trick. I am afraid it isn't easy to arrange for tambourines to bang and phosphorescent trumpets to jump up and down—but you can't do *everything* with the wireless!

If you want to make the spook trick appear more genuine you can put a loud-speaker under the table or hide it in a lampshade. You can wire it up to a microphone and dry battery (or to a pair of headphones or loud-speaker used as a microphone) in another room.

You can get a confederate to make appropriate ghost-like remarks in reply to the questions put by the folk around the table.

It's a good trick—but you will probably become *most* unpopular and find, on retiring, that other spirits have put hairbrushes in your bed or sewn up your pyjamas!

A Thought-reading "Juggle"

There is a good thought-reading "juggle" you can try. It is only a spoof, of course; I have never yet seen genuine thought-reading done at a Christmas party. The spoofing in this case is done with the loud-speaker. I am afraid that conscientious people will call it sneaking.

What happens is just this. The thought-reader of the party, who by repute is credited with supernatural powers of observation, goes out of the room to go in a trance, mutter incantations, foam at the mouth or something of that kind—you know the kind of thing.

Meanwhile, the audience in the room decide on an object which the thought-reader has to locate, or they select a card from a pack, which is afterwards shuffled. Back comes the supernatural one, duly in his trance, and after much mystic performance asks to be blindfolded.

Without a word being said, he picks up the chosen object or card. Everybody gasps with amazement and there is really no need why you should give the secret away—unless somebody happens to trip over that guilty-looking piece of flex which runs from the wireless set out to the room where the supernatural one went to work himself into a trance!

If somebody does tread on that wire, the horrid truth will out. Everybody will then know that long before the supernatural one suggested foaming at the mouth the loud-speaker was disconnected from the set and hooked up to the pick-up terminals of the set.

Listening-in

Closer examination shows that the set has its output

terminals connected through the flex to a pair of headphones or another loud-speaker in the next room. Thus is the supernatural one uncloaked, for while the audience was deciding whether they wanted diamonds or clubs, the supernatural one was listening-in to the conversation!

A nasty, sneaking sort of game; but it doesn't need any mental effort and so you may like it better than "animal, mineral or vegetable."

If the extension wires are discovered, you can make a good number of other uses for them. There are literally dozens of guessing games which radio enters into, and the extension wires and microphone in the next room are handy.



THE THOUGHT-READER

Back comes the supernatural one, duly in his trance, and after much mystic performance asks to be blindfolded

WIRELESS WILL KEEP THE PARTY GOING!

One of the best radio games is play-producing. It gives the party a chance to get one back on the B.B.C.—not a very charitable thought for Christmas, but one which keeps guests cheerful!

Get all the members of your party with self-claimed artistic talent to try their hand at imitating the noises in radio plays. Get each one in turn to act before the microphone in the next room—the main body of the party acting as judges.

“Effects” You Can Tackle

Coconut shells banged together for horses’ hoofs, a large brush rubbed to imitate the sound of waves breaking up on the shores, knives jangled to sound like a fierce battle—these are only a few of the “effects” you can tackle. You can make a competition out of this game—the best “effects” creator winning on points, as it were!

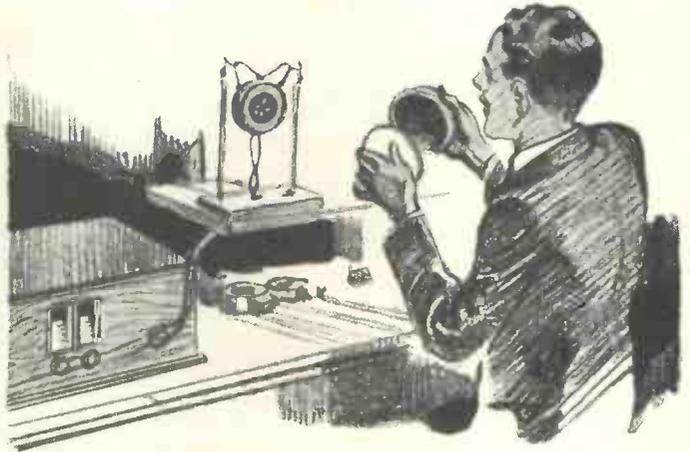
If you have radiogram equipment, you can extend the idea to full programme producing. Switch in gramophone records where necessary, and superimpose your “effects.” All you need is a potentiometer fader control between the microphone and the gramophone pick-up.

A Wireless Guessing Game

One of the many guessing games you can play with a wireless set (and one which doesn’t mean disconnecting any of the wires) is to switch it rapidly on and off for word-forming. Get the company to make rapid pencil notes of the snatches of words and phrases caught before the low-tension switch is flicked off.

Small prizes can be given for the best sentences made up from these phrases. Alternatively, you can put paper over the tuning-dial readings, and prizes can be given for station-spotting.

Let the competitors tune-in before the on-off switch is touched. Prizes can be given for the best attempts to tune-in any special station, or the most distant station.



A CHANCE FOR RADIO PLAYWRIGHTS!

Get all the members of your party with self-claimed artistic talent to try their hand at imitating the noises in radio plays . . . coconut shells banged together for horses’ hoofs

A thoroughly cruel trick, which is nevertheless great fun to play on somebody else, is penny fishing. The ignorami of the party are introduced one by one to a bucket of water with a penny at the bottom of it.

There is a fat prize for the bold fisher who succeeds in hooking the penny by the simple expedient of plunging a hand and bare arm into the water.

Not Only A Trick—But A Kick

It would be easy if the game not only had a trick, but a kick in it. The fisher has to hold a piece of wire in his disengaged hand, or, if you want to make the trick still more crafty, he can be given a “helping hand” by a confederate who presses a piece of wire into the palm of the fisher’s hand.

Therein lies the trick, and the kick. As the fisher touches the water he completes the output circuit of a high-tension battery or of a small medical coil and gets the shock he deserves for his lack of temerity.

The weak ones may flinch, but some horny-skinned individual is sure to succeed in grabbing the penny. He can keep it! It will have been fairly won!

Don’t Let Them Tinker

You will be a wise set owner if you keep off Christmas games which give all your guests a chance to tinker with the set. It never pays, because there is nothing worse than finding on Boxing Day morning that some coon muddled the wires in the height of his hilarity and has totally lost all the emission of the valves; hence no more radio at Christmas, until the radio shops open after the holiday—a long time to wait.

There are all kinds of games you can play with a radio set which gives the merry-makers a chance to tinker with the knobs; it’s great fun for the tinkerers, but it works out rather expensively in reaction condensers and wave-change switches!



FISHING FOR PENNIES IN THE ELECTRIC BUCKET

A thoroughly cruel trick, which is nevertheless great fun to play on somebody else, is penny fishing. The ignorami of the party are introduced one by one to a bucket of water with a penny at the bottom of it

Anode Bend or Leaky Grid ?

GRID rectification, more particularly the type known as power-grid rectification, has become extremely popular within the last few years owing to the fact that, with the proper choice of condenser and leak, and with a reasonably strong signal, the rectification is practically linear.

Obeying A Square Law

The anode-bend rectifier, on the other hand, obeys a square law, so that the low-frequency output is proportional to the square of the input, which introduces distortion.

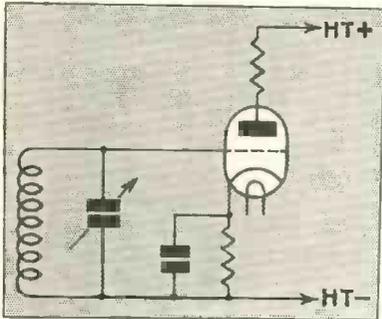


Fig. 1.—Typical circuit for an anode-bend system for A.C. working

On a strong signal it is possible to sweep right over the curved portion of the characteristic and obtain more or less linear rectification for the top portion of the wave, but this is not entirely satisfactory, requiring besides other things that the bias shall be adjusted differently for weak and strong signals.

For Better Quality

Consequently, despite the increased losses which result from the use of grid rectification, this method has been employed in the interests of better quality. With A.C. working, however, it is now possible to obtain linear rectification with the anode-bend system, and the method is gaining favour for that reason.

A typical circuit is shown in Fig. 1, from which it will be seen that the necessary bias is obtained by inserting a resistance in the cathode lead so that the anode current develops a voltage sufficient for the purpose.

The actual value of voltage required is 2 to 3 volts in the ordinary course of events, but since the anode current with no signal is very small, probably in the neighbourhood of .1 milliampere, this resistance has to be 20,000 to 30,000 ohms.

With such an arrangement, therefore, the valve is working practically at the bottom of the curved portion of the characteristic shown in Fig. 2. When a signal arrives a positive voltage causes the anode current to increase, while a negative voltage causes very little decrease owing to the fact that the current is already nearly zero. The result is an increase in the average anode current.

Ordinarily, with a constant bias, the increase in current is proportional to the square of the applied voltage, as already explained, but with the circuit shown the increased anode current flows through the biasing resistance and increases the bias.

Consequently the effective increase in anode current is not as great as it would otherwise be.

This has only a slight effect on weak signals, but becomes increasingly operative as the signal strength increases, with the result that the change in anode current tends to be almost directly proportional to the applied voltage.

By suitable choice of anode resistance and the other constants in the circuit, exact linearity can be obtained and the rectifier operates in a distortionless manner.

The anode-bend rectifier has a further advantage that it is not liable to sudden failure to rectify if the signal is too strong. The grid rectifier, on the other hand, will not handle more than a certain limited signal strength. Beyond this point the rectification falls off very rapidly, and this gives rise to double-hump tuning.

J. H. R.

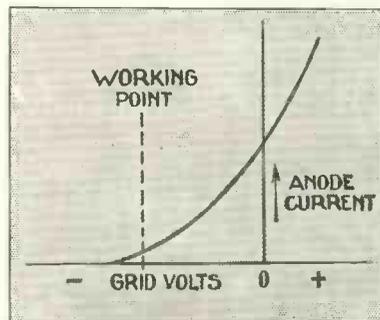


Fig. 2.—Typical characteristic valve curve, showing position for anode-bend working

The Pentode As Detector

THE disadvantages of the ordinary three-electrode detector used as a grid rectifier are well known. Briefly they are a liability to overload fairly easily and the introduction of losses into the tuning circuit just preceding the valve.

In consequence of this the circuit cannot develop its full power nor be as selective as it would be by itself.

Use of Screen-grids

For this reason the screen-grid valve is often used in place of the ordinary triode. For battery sets, however, this has several disadvantages, and the use of the pentode in place of the screen-grid is worth serious consideration.

As an anode-bend detector the screen-grid is not suitable in battery sets, and as a grid detector it overloads much too rapidly.

The pentode, on the other hand, used as a grid detector, will give as good signal-handling characteristics as the ordinary triode, and yet it will give very much more low-frequency output.

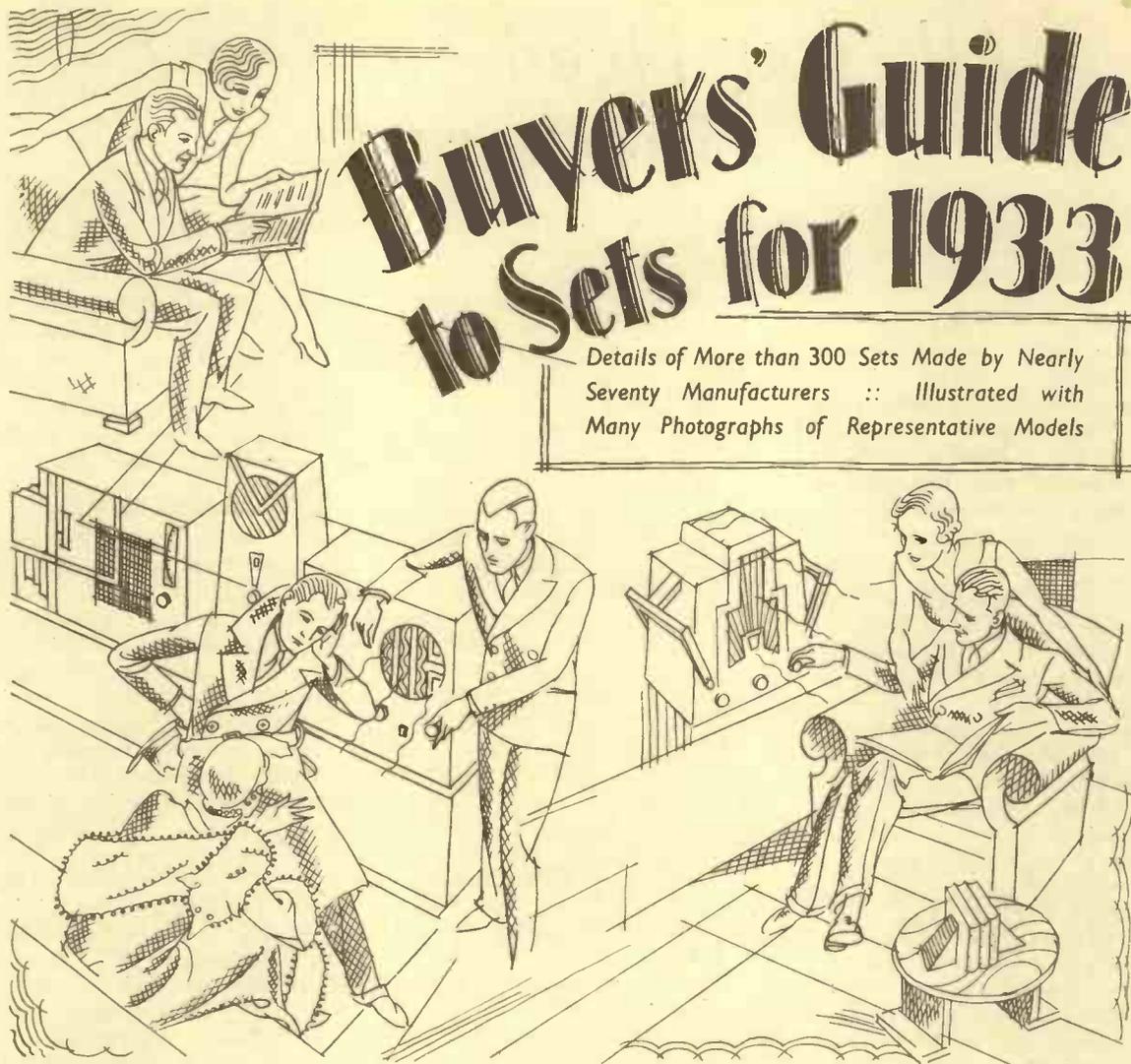
Increased Amplification

Apart from the increased amplification which a pentode will give—measurements show that the low-frequency output for a given signal is between two and three times as great for a pentode as for an ordinary triode—the screening between anode and control grid is sufficiently good in the case of the pentode to reduce the capacity feedback inside the valve very considerably.

The pentode is used in the same way as an ordinary valve, and about 60 volts should be placed on the screening grid instead of the full high-tension as is usual when the valve is used for output purposes.

Also, owing to the increased amplification, the filtering in the anode circuit must be slightly better than usual, otherwise high-frequency energy gets through into the low-frequency stages.

This effect may be minimised by the use of an efficient high-frequency choke and by parallel-feeding the low-frequency transformer. J. H. R.



Buyers' Guide to Sets for 1933

Details of More than 300 Sets Made by Nearly
Seventy Manufacturers :: Illustrated with
Many Photographs of Representative Models

Christmas Time Is Buying Time!

AT Christmas time many people begin to look round for a new set. This is, therefore, the very best time for the appearance of a set buyer's guide. It will appeal to all those who want to choose a new set for themselves—and it will also prove of great utility to all those constructors who are called upon by their non-technical friends for expert advice.

Remember, Christmas time is buying time!

As a result of the publication of this special guide the choice of a new receiver will be greatly simplified for many buyers. A great many of them will be newcomers to radio altogether. It is for their benefit that we make the special offer outlined on Page Nine.

We hope that everybody who buys a set as a result of consulting this supplement will apply for a free copy of "The How and Why of Radio." There is no competition and the offer is quite straightforward in every way. All

applications, of course, must be made on the form that appears on page 560.

In these pages the reader will find a very complete article explaining all that should be known before a set is bought. In the tables are details of over 300 different receivers made by nearly seventy manufacturers. There are nearly forty illustrations of representative types of sets—and a directory of brand names and makers' names and addresses for the benefit of those who want more detailed information about any particular model.

With the help of the footnotes and the special notes on page Sixteen even the completely non-technical reader should not have any trouble about picking out the particular types of sets in which he happens to be interested.

While every care has been taken to ensure the accuracy of the information contained in this supplement the Editor cannot take responsibility for any omissions or errors.

All You Need to Know Before You Buy A Set

In this special article by the "Wireless Magazine" Set Selection Bureau (full details of which appear on page 599) are explained all those points that the prospective buyer should know before finally deciding on a particular model. If you have never had a radio set before, you should read these notes carefully before buying one

FOR nearly three years we of the Set Selection Bureau have been conducting a service to readers that is assuredly unique. We have, in this period, helped hundreds of non-technical listeners to choose the right sets for their requirements. Our unbiased advice has come to be regarded as a safe anchor of the perplexed set-buyer against the cross-currents of local-dealer interests.

Our Shop Window

Our shop window is the whole of the radio trade, with its hundreds of sets in dozens of types. Our job is first to test these sets to see that they conform with modern requirements and then, providing they come up to our standard, they are recommended to readers whose requirements they seem to us to meet.

Every month, on the first page of the feature called "We Test Before You Buy," you will find a small panel in which are set out five leading questions framed to give us essential clues to your requirements.

Analysing the Questions

Let us analyse these questions and see just what they imply.

The maximum price. Is this for the complete installation or for the bare set?

Of course, in the end all technical considerations must bow to the question of price. What we are getting at in this question is rather more than that. We are implying that a wireless set is not of necessity a complete installation.

The price of the set itself may sometimes be less than the "extras" needed to make the set give actual reception.

Admittedly this is not so true this year as in the immediate past. The reason is that for the first time in wireless history we seem to have standardised on a type of set that is very nearly a complete installation, whereas in previous years there have been many sets that needed not only aerial and earth, but externals such as loud-speakers and batteries.

This year the table-cabinet set is the standard type. In it we now find the set chassis (basic instrument), the loud-speaker and batteries or equipment for getting the power supplies from the electric-light mains.

"Bare" sets are indeed the exception now. They are still available as "kits" for home-assembly, but among the factory-built sets there are hardly any that have not a self-contained loud-speaker.

Still, even when you have a set that includes the valve chassis, the loud-speaker and the power supply, you cannot obtain wireless programmes until you have installed an aerial and an earth. This aspect will be dealt with later.

Where will the set be used? That is our second question. By this we do not mean you to distinguish between the dining-room and the

attic, as some readers have, perhaps with some justice, imagined. We mean in what locality will the set be used. That is rather important.

If you propose to install a set within hailing distance of Brookman's Park, or any other B.B.C. regional station for that matter, you will need a much more selective set than for, say, the middle of Devonshire.

What Selectivity Means

Selectivity in a set is its ability to separate one station from its neighbours in the wavelength range. This is a much more difficult task when you live near a broadcasting station than, say, fifty miles from the nearest.

Moreover, the question of locality has to be answered to enable us to gauge how powerful a set will be needed to give you the desired range of programmes.

Aims in Reception

Which brings us to the third of our questions: *What particular stations are needed?* This question has, we admit, tended to imply to some readers that any given group of stations can be obtained provided a suitable set is purchased. We retain the question because it enables us to gain some idea of your general aims in reception.

We know, though you may not realise it, that no set on earth will



One of the most attractive sets on the market is the Pye model Q, a four-valve screen-grid battery receiver



The Standard model 330, a three-valve band-pass receiver for A.C. mains working

bring in a given list of stations when required. The ether is the master of the situation.

Stations more than 100 miles away come to you fortuitously. They were never intended to reach your set. Get that quite clear at the start. You may log twenty or even fifty stations on a fine night. That does not prove foreign stations are reliable, nor that modern sets have overcome natural limitations of the ether.

Outside the Service Area

It merely proves that you are enjoying a condition of the ether that permits, for the darker months of the year, a measure of entertainment value to be obtained from stations far outside the service areas for which they were erected.

We are not decrying distant listening. It is the basis of entertainment for thousands of set owners who have no use for local programmes, or who prefer a good mixture of the home and foreign programmes. What we are insisting upon is that foreign-station reception is really accidental, and not a part of the programme propagator's scheme of programme service.

A Typical Example

The new Leipsig station, as a typical example of what we are driving at, is coming over at such strength just now (early November) that in London it is more loudly heard on a three-valver than is the Midland Regional station. Yet the station manager of Leipsig is not catering for you—he is much too busy thinking about his German audience within the recognised service area of Leipsig station. And that area has not more than a 100 miles radius.

So do not laboriously compile a list of stations and expect that you will, on the set we recommend, get them just when you want them. *No set will do that.* But the more powerful the set the more easily you will be able to take advantage of good conditions in the ether.

If Conditions are Bad

If these conditions are bad the most powerful set in the world will not enable you to enjoy the foreign programme. In fact, very often the more powerful the set the worse is the reception, because the great amplification in the set tends to

accentuate the badness of the conditions.

Let us get the right idea about the relative abilities of sets. The small set, with its two or three valves, will bring in many of the foreign stations that are worth hearing provided conditions are good, the aerial and the earth system efficient, and the operator is fairly expert.

What, then, is the advantage of the bigger set, with its four, five, or even ten valves? There are many real advantages, but they are not crystallised in terms of a greatly increased station log. What the small set will do the big set does much better—with less personal trouble, and with almost any sort of aerial.

Most of the superiority of the big set lies in its increased high-frequency amplification. This means easier operation, since the set is working well within its capabilities and does not need critical control. Further, the great amplification does



A detector and two low-frequency stages are utilised in the Regentone "straight" three-valver, an A.C. set

away with the need for efficiency in the aerial and earth system. All that is lost in a poor aerial can now be made up by the amplification.

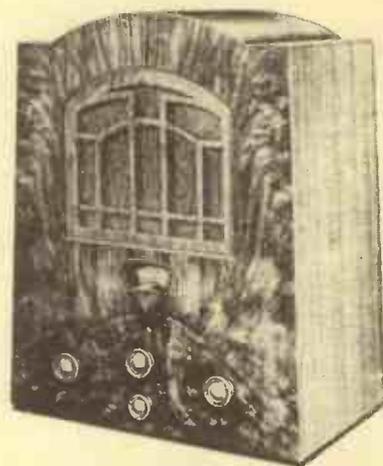
Another way in which the big set with its many valves beats the little two- and three-valver is in the larger power output valve, which means greater volume without distortion. This advantage is one we do not set too much store on, because there is a limit to the volume an ordinary household can stand.

We have digressed a little from the question in hand, which has to do with the number of stations you want. Take it that stations to-day come in with sufficient profusion to

enable you to make a good selection at any time in the evening, and that the broad distinction between the abilities of the small set, as exemplified by the twos and threes, and the large set, as exemplified by the fours and upwards, is not to be found in any great disparity in the number of stations heard, but in the manner in which they can be tuned in.

Particular Stations

Remember, too, that it is useless to stipulate, in your letter asking for advice on a set, any particular station, because that is outside the



An all-electric three-valver, the Brownie Dominon receiver. It has a moving-coil loud-speaker

control of the station and the set. If you give us a group of stations you would like, we can tell, taking all your other points into consideration, which sets are most likely to come up to expectations.

Our fourth question has often been misinterpreted. So let us clear it up for you. *Do you want a self-contained set, and do you want it with or without an aerial?*

Meaning of "Self-contained"

How can a self-contained set, you may ask, be so called if it has no aerial? Well, that is just where "want and use" conspire to confuse us. It has become the fashion to speak of a set with incorporated speaker and power supply as being self-contained. As practically all this year's sets are so designed, perhaps any question of distinction is apt to be taken as mere quibbling.

Actually it is not, because there is a type of set, admittedly in the

(Continued on page Five)

Classified Guide to Battery Sets

Arranged in Alphabetical Order under Brand Names

Brand Name	Type	Model	Finish	Price	No. of Valves	Anode Current	Valve Combination	Loud-speaker	Pick-up	Aerial	Remarks
Adey	SP	One-valve	L	£3 17 6	1	5	D	—	—	S	45-volt H.T. battery; complete with phones.
—	UP	4-valve Port.	WM	£15 15 0	4	5	2H-D-P	BA	—	S	Weight 12½ lbs.
Aerodyne ..	T	Battery 2	O	£4 19 6	2	6.5	D-L	BA	—	E	Price includes batteries.
—	T	SG3	W	£9 9 0	3	10.5	H-D-L	PMC	P	E	Variable-mu S.G.
Alba	T	22	O	£9 19 6	3	8	H-D-P	BA	P	E	With moving-coil loud-speaker £11 14 6
—	C	33	W	£11 19 6	3	8	H-D-P	BA	P	E	With moving-coil loud-speaker £13 9 6
—	C	44	O	£16 0 0	3	8	H-D-P	BA	P	E	Oak model with moving-coil £18 6 0. Walnut model with moving-coil £18 15 0.
			W	£17 5 0							
Atlas	T	RB2	W	£6 10 0	2	7	D-P	PMC	P	E	Complete with batteries.
Beethoven ..	SP	SG4	L	£10 10 0	4	9	H-D-2L	BA	—	S	With batteries.
Blue Circle ..	T	401	W	£5 15 6	3	7	H-D-L	M	—	E	Plugs for extra L.S.
—	T	402	W	£9 9 0	3	8.5	H-D-L	BA	—	E	With batteries.
Blue Spot ..	T	K252	W	£12 12 0	4	14	2H-D-L	I	P	E	Two variable-mu S.G.'s.
—	C	R336P	W	£17 8 6	4	14	2H-D-P	PMC	P	E	With output filter.
British General	T	Battery 2	O	£5 10 0	2	5	D-P	M	—	E	—
—	T	Battery 3	O	£11 11 0	3	7	H-D-P	MC	P	E	Variable-mu S.G.
Brownie .. .	T	Battery 2	O	£3 0 0	2	5	D-L	M	—	E	£3 19 6 with batteries.
—	T	Dominion SG4	W	£12 10 0	4	16	H-D-2L	PMC	P	E	With batteries.
Burndept ..	T	Merrymaker II	W	£5 15 0	2	8	D-P	M	—	E	With batteries.
—	T	Merrymaker III	W	£7 10 0	3	8	D-L	M	—	E	With batteries.
Chakophone ..	T	Eaglet Two	O	£5 8 6	2	4	D-L	BA	—	E	—
—	T	Eaglet Three	O	£6 19 6	3	6	D-2L	BA	—	E	—
Columbia .. .	T	351	O	£4 7 6	2	7	D-L	BA	—	E	—
—	T	353	O	£4 19 6	2	5	D-L	BA	—	E	—
—	T	354	O	£9 17 6	3	8	H-D-P	BA	P	E	—
—	SP	306	L	£13 13 0	4	13	H-D-2L	BA	—	S	—
—	P	380	W	£17 17 0	6	12	Super	BA	P	S	—
Cossor .. .	T	221	O	£4 4 0	2	9	D-L	M	—	E	De-luxe model £4 10 0.
—	T	732	O	£12 15 0	4	—	2H-D-L	BA	P	E	—
—	T	732/M	O	£14 0 0	4	—	2H-D-P	MC	P	E	—
Danipad .. .	UP	Popular	W	£4 0 0	3	7.5	H-D-L	M	—	S	—
—	SP	Suitcase 5	L	£5 10 6	5	8.5	2H-D-2L	M	—	S	—
Dario .. .	T	Regional	O	£4 12 6	3	8	D-2L	BA	—	E	£4 15 6 with frame aerial.
—	T	Europa	W	£7 17 6	3	10	H-D-P	BA	—	E	—
Eddystone ..	T	Overseas 4	O	£16 0 0	4	13	H-D-2L	—	—	E	Or in teak.
—	T	All-wave 4	—	£24 10 0	4	13	H-D-2L	—	P	E	Aluminium cabinet.
Edison Bell ..	TR	459	W	£21 0 0	5	10	Super	PMC	—	S	With turntable.
E!deco .. .	SP	SH6	L	£22 1 0	6	12	Super	BA	P	E	—
E.R.P. .. .	T	SG4	W	£10 10 0	4	9	2H-D-P	BA	—	S	—
H.M.V. .. .	UP	Super-het Port. 6	W	£17 17 0	6	10	Super	BA	P	S	—
K.B. .. .	T	Kitten 299	W	£3 15 0	2	7	D-L	M	—	E	Batteries extra.
—	T	Pup 247	O	£4 10 0	2	7	D-L	M	—	E	With batteries.
—	T	Kobra Junior 291	O	£6 5 0	3	9	D-2L	—	—	E	Batteries extra.
—	T	Kobra 274	O	£8 10 0	3	9	D-2L	M	—	E	With batteries.
—	T	KB281	W	£9 0 0	3	12	H-D-P	—	P	E	Batteries extra.
—	T	KB310	O	£10 15 0	3	12	H-D-P	EMC	P	E	Batteries extra.
Leytonia .. .	T	Transport 3	W	£5 15 0	3	5.5	D-2L	M	—	S	—
—	T	Var-mu SG3	W	£6 17 6	3	7.5	H-D-L	M	P	E	—
—	C	Var-mu SG3	W	£8 17 6	3	7.5	H-D-L	PMC	P	E	—
Lissen .. .	T	Popular 2	W	£4 4 0	2	8	D-P	M	—	E	—
—	T	LN8019	W	£8 17 6	3	10	H-D-P	BA	P	E	Single-dial tuning.
Lotus .. .	T	TC/BAT	W	£9 9 0	3	8	H-D-L	BA	P	E	—
—	SP	PS/33	L	£12 12 0	4	10	H-D-2L	BA	—	S	With batteries.

(Cont. on Page Six)

In the above tables the following abbreviations are used : Under TYPE, SP—Suitcase Portable, UP—Upright Portable, T—Table or Transportable Set, C—Console or Pedestal Model, TR—Table Radiogram, and CR—Console Radiogram. Under FINISH, B—Bakelite, L—Leather or Rexine, M—Mahogany, O—Oak, and W—Walnut. Under RECTIFIER, M—Westinghouse Metal Rectifier, and V—Valve Rectifier. Under VALVE COMBINATION, H—High-frequency Amplifier, D—Detector, L—Low-frequency Amplifier, and P—Pentode. Under LOUD-SPEAKER, BA—Balanced Armature, EMC—Energised Moving Coil, I—Inductor, M—Moving Iron, MC—Moving Coil, and PMC—Permanent-magnet Moving Coil. Under AERIAL, E—External Aerial and S—Self-contained Aerial.

ALL YOU NEED TO KNOW—Continued from Page Three

minority, that is really self-contained, and needs absolutely no external connections or accessories. We refer to the battery portable. In this type of receiver there is the set chassis, the loud-speaker, the power supply (batteries) and a frame aerial. The mains-operated counterpart, with set, speaker, power supply and frame aerial, is not strictly self-contained, as it has to be connected externally to an electric-light plug.

Mains-aerial Attachments

There are listeners who simply cannot put up any sort of aerial. For these the portable, either in battery or mains form, is apparently the only solution. While we agree that this type of set is very suitable for such listeners, we would stress the point that most of the new A.C. mains sets have what is known as a mains-aerial attachment.

With this simple device most of the so-called self-contained sets very nearly live up to their name, in that the only external then needed for reception is an earth.

Another aerial device has lately become possible, owing to the enormous sensitivity of the modern sets; we are thinking now of the internal aerial, a short length of wire supported inside the cabinet of the receiver. With this tiny aerial many sets will bring in a profusion of foreigners at good strength.

All of which comes down to this: If you really cannot put up an aerial

not is it to be A.C. or D.C. mains? Here the point is that if you have an electric-light supply count yourself a lucky listener and go in for a mains-operated set. There are many inexpensive sets of this type on the market, and though they may seem more expensive than a similar sort of set for battery working, this is more than offset by the elimination of upkeep worries—accumulator charging and so forth—and by the relatively low running costs.

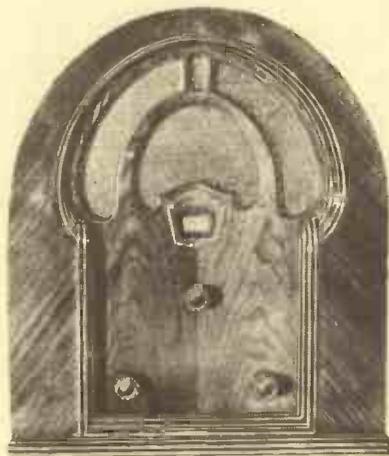
Eventually we shall have a standard A.C. voltage of 230 volts, but meanwhile the listener should make a careful study of his power supply. If it is a D.C. supply it is essential to find out from the supply company whether the mains are likely to be changed over to A.C. in the near

inquiries. May we ask you to be as explicit as possible, to word your requirements concisely, and to give us the latitude we have shown to be essential in dealing with the choosing of a wireless set?

As a sort of footnote to this



The Pegasus model 1616 is an A.C. three-valver. It has a polished walnut cabinet and moving-coil reproducer



The Philco Baby Grand is a four-valve all-mains super-het, now made in England

article we might sketch out the main types into which the hundreds of modern sets now fall:

Two-valvers: Either for battery or mains operation, with self-contained loud-speakers, either balanced-armature cones or moving-coils. Prices from £5 to £12.

Three-valvers: Either for battery or mains operation. Nearly all have moving-coil loud-speakers. Prices from £10 to £18.

Straight fours and super-hets: For mains operation. Give easy control, wide range of programmes, big volume. Price from £22 to £32.

Radio Gramophones

Radio Gramophones: For mains operation. Three-valve instruments as above, but with all facilities for record reproduction as well, from £25 upwards. Super-het radiograms up to 50 to 80 guineas.

Portables: For battery operation the price is around 12 guineas. For mains operation, 17 guineas upwards.

One last point of topical importance. All-wave sets are slowly coming into use. These sets have, in addition to the normal medium and long wavelength tuning ranges, a range for the short waves below 100 metres.

future. If so it is also of interest to find out whether the company proposes to indemnify owners of D.C. apparatus.

It is a mistake to think that all supply companies must by the law of the land replace machinery or apparatus rendered useless by a change in the nature of the electricity supply.

So much for the general method of arriving at the most suitable set for your particular conditions and requirements. Knowing all of these, and bearing in mind your price limit, we can very quickly narrow down your final choice to some three or four instruments.

As a result of this supplement on sets we anticipate a great rush of



A fine self-contained set with frame aerial—the McMichael Duplex Four, a battery receiver

there are plenty of sets that will give you good programme service without an external wire.

Our last question: The power supply. Is it to be batteries, and if

CLASSIFIED GUIDE TO BATTERY SETS (Continued from Page Four)

Brand Name	Type	Model	Finish	Price	No. of Valves	Anode Current	Valve Combination	Loud-speaker	Pick-up	Aerial	Remarks
Lotus (cont.)	T	B3/BAT	W	£14 14 0	3	10	H-D-P	PMC	P	S	—
Magnum	T	Universal 3/4	W	£12 12 0	3/4	12	H-D-L	PMC	P	E	Four valves on 15-80 m.
McMichael	T	Colonial	—	£15 0 0	4	10	Super	—	—	E	S.W. set with teak cabnt.
—	SP	Duplex 4C	W	£17 17 0	4	8	H-D-2L	M	—	S	With turntable
—	T	Duplex 4S	L								
Marconiphone	T	248	O	£4 19 6	2	5	D-L	BA	—	E	Self-contained batteries.
—	SP	252	O	£9 17 6	3	8	H-D-P	BA	P	E	With tone balancer.
—	T	66	W	£13 13 0	4	7	H-D-2L	BA	P	S	With turntable.
—	UP	255	W	£17 17 0	6	10	Super	BA	P	S	Automatic grid-bias.
Pegasus	T	Battery 2	W	£5 17 6	2	5.5	D-L	M	—	E	12 in. L.S. cone.
—	T	S.G. Bat.	W	£12 12 0	3	7.5	H-D-P	M	P	E	12-in L.S. cone.
Philco	T	237	W	£16 16 0	5	10	Super	PMC	—	E	Batteries extra.
Philips	T	830B	W	£11 11 0	4	10	2H-D-P	I	P	E	Extra regulator valve.
Portadyne	T	MC2	O	£6 9 6	2	6	D-P	PMC	—	E	—
—	SP	Atlantic	L	£12 12 0	4	7	H-D-2L	BA	—	S	—
—	UP	Challenger	W	£12 17 6	4	7.5	H-D-2L	BA	—	S	—
—	UP	BMC	W	£14 14 0	4	9	H-D-2L	PMC	—	S	—
Pye	P	Q	W	£14 14 0	4	8	H-D-2L	BA	—	S	With batteries.
—	P	Twintriple	W	£23 2 0	4	8	2H-D-P	—	P	S	With strap handle £22 10.
Rolls Caydon	SP	SG4	L	£11 11 0	4	8	H-D-2L	M	—	S	—
—	UP	Transport. SG4	W	£21 12 0	4	8.5	H-D-2L	M	—	S	With turntable.
—	UP	Cam Super 5	W	£15 15 0	5	10.5	Super	M	—	S	With turntable.
Sovereign	T	Comet	W	£4 7 6	2	7	D-L	M	—	E	With valves and batteries
—	T	Jupiter	W	£7 5 0	3	8.5	D-2L	BA	P	E	Console model £9 15 0.
—	T	Sirius	W	£7 7 0	3	10	D-2L	BA	—	S	—
—	T	Doric	W	£10 10 0	3	7.5	H-D-P	PMC	P	E	Console model £12 17 6.
Standard	T	S328	O	£5 0 0	2	10	D-L	M	—	E	—
Telsen	T	S92	B	£2 5 0	3	10	D-2L	—	P	E	Space for batteries.
—	T	S93	B	£3 15 0	3	10	D-2L	—	P	E	No loud-speaker.
—	T	S91	B	£5 5 0	3	10	D-2L	M	P	E	—
Terrytone	UP	Bat. 3	W	£6 15 0	3	6.5	D-2L	M	—	S	—
Wates	UP	Port.	O	£5 5 0	3	7	H-D-L	M	—	S	—
—	T	Transport.	O	£5 0 0							
—	T	B3	W	£12 12 0							
Yagerphone	T	BP3	O	£14 14 0	3	12	H-D-P	PMC	P	E	—
—	CR	BG3	O	£17 17 0	3	12	H-D-P	PMC	P	E	—

Classified Guide to Sets for A.C. and D.C.

Brand Name	Type	Model	Finish	Price	No. of Valves	Rectifier	Valve Combination	Loud-speaker	Pick-up	Aerial	Remarks
British General	T	S.G.3	W	£14 10 0	3	V	H-D-P	MC	P	E	Mains aerial.
—	T	Double B.P.3	W	£18 18 0	3	V	H-D-P	MC	P	E	Mains aerial.
—	CR	Radiogram	W	£30 9 0	3	V	H-D-P	MC	P	E	Dual loud-speakers.
Columbia	T	350	O	£8 17 6	2	M	D-P	BA	—	E	—
—	T	355	W	£16 16 0	3	V	H-D-P	EMC	P	E	Mains aerial.
—	T	356	W	£25 4 0	6	V	Super	EMC	P	E	Mains aerial.
—	CR	620	W	£33 12 0	3	V	H-D-P	EMC	P	E	Mains aerial.
—	CR	631	W	£54 12 0	6	V	Super	EMC	P	E	Mains aerial.
Danipad	T	Neptune	W	£12 10 0	3	V	H-D-P	MC	P	E	Mains aerial.
—	CR	Ambassador	W	£18 18 0	3	V	H-D-P	MC	P	E	Mains aerial.

(Cont. on Page Eight)

In the above tables the following abbreviations are used: Under TYPE, SP—Suitcase Portable, UP—Upright Portable, T—Table or Transportable Set, C—Console or Pedestal Model, TR—Table Radiogram, and CR—Console Radiogram. Under FINISH, B—Bakelite, L—leather or Rexine, M—Mahogany, O—Oak, and W—Walnut. Under RECTIFIER, M—Westinghouse Metal Rectifier, and V—Valve Rectifier. Under VALVE COMBINATION, H—High-frequency Amplifier, D—Detector, L—Low-frequency Amplifier, and P—Pentode. Under LOUD-SPEAKER, BA—Balanced Armature, EMC—Energised Moving Coil, I—Inductor, M—Moving Iron, MC—Moving Coil, and PMC—Permanent-magnet Moving Coil. Under AERIAL, E—External Aerial and S—Self-contained Aerial.

Reflecting
the
Latest
Practice...



A handsome two-valver, the Aerodyne A.C. set. It uses a Westinghouse metal rectifier and has a moving-coil



Cossar model 221 De Luxe, a battery two-valver. The loud-speaker adjustment is at the back



A Blue Circle receiver, a three-valver for battery operation; it has a balanced-armature loud-speaker



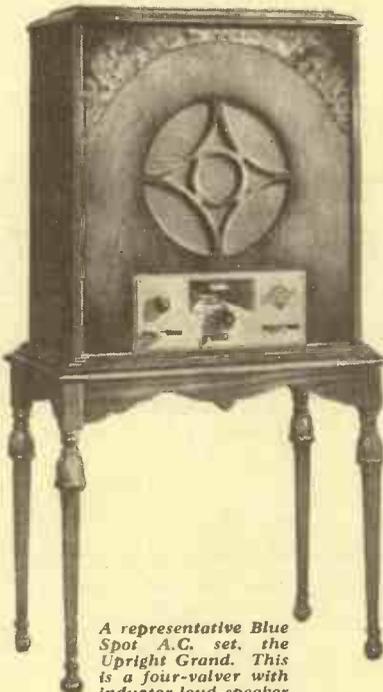
The Kolster Brandes Electric Kobra, a three-valver with a detector and two low-frequency stages



The Edison Bell super-het radio gramophone. It has five valves with an extra rectifying valve



The electric-clock model of the Ferranti super-het, of which the dial is marked with names of stations



A representative Blue Spot A.C. set, the Upright Grand. This is a four-valver with inductor loud-speaker



A typical suitcase portable, the Beethoven screen-grid four-valve model. The finish is blue lizard

CLASSIFIED GUIDE TO SETS for A.C. and D.C.

(Continued from Page Six)

Brand Name	Type	Model	Finish	Price	No. of Valves	Rectifier	Valve Combination	Loud-speaker	Pick-up	Aerial	Remarks
Ekco	T	M23	B	£15 15 0	3	M	H-D-P	MC	P	E	Mains aerial.
	T	SH25	B	£25 4 0	5	M	Super	EMC	P	S	Station-calibrated dial.
—	CR	RG23	W	{ £29 8 0 £31 10 0 }	3	M	H-D-P	MC	P	S	{ A.C. only. D.C. only.
E.R.P. . . .	T	Clarendon	W	£10 10 0	2	V	D-P	MC	P	E	—
	CR	Marlboro'	W	£25 4 0	3	V	H-D-P	MC	P	E	—
Faraday .. .	T	S620	W	£28 7 0	5	V	Super	EMC	P	S	15 to 2,000 metres.
Grafton .. .	T	405	{ W OM	{ £16 16 0 £24 3 0 }	3	V	H-D-P	MC	P	E	Mains aerial.
	TR	505	W	£25 4 0	3	V	H-D-P	MC	P	E	Mains aerial.
Halford .. .	T	Sackville	W	£34 2 6	7	V	Super	EMC	P	E	Push-pull output.
	C	Jacobean	O	£34 13 0	7	V	Super	EMC	P	E	Mains aerial.
—	T	Georgian	M	{ £34 13 0 £37 5 6 }	7	V	Super	EMC	P	E	Mains aerial.
—	C										
—	T	Gambell Super	W	£35 3 6	7	V	Super	EMC	P	E	£2 12 6 extra for pedestal.
—	C	Queen Anne	W	£37 16 0	7	V	Super	EMC	P	E	Push-pull output.
—	CR	Jacobean	O	{ £46 4 0 £48 6 0 }	7	V	Super	EMC	P	E	{ A.C. only. D.C. only.
—	CR	Gambrell	W	{ £53 11 0 £55 13 0 }	7	V	Super	EMC	P	E	{ A.C. only. D.C. only.
—	CR	Queen Anne	W	{ £53 11 0 £55 13 0 }	7	V	Super	EMC	P	E	{ A.C. only. D.C. only.
H.M.V. . . .	T	435	W	£17 17 0	3	V	H-D-P	MPC	P	E	Mains aerial.
	TR	Transport. Radiogram	W	£26 5 0	3	V	H-D-P	PMC	P	E	Mains aerial.
—	C	Lowboy 7	W	£33 12 0	6	V	Super	EMC	P	E	Mains aerial.
—	C	521	W	£40 19 0	4	V	2H-D-P	PMC	P	E	Mains aerial.
—	C	522	W	£48 6 0	4	V	2H-D-P	PMC	P	E	Mains aerial.
—	CR	Radiogram 7	W	£50 8 0	6	V	Super	EMC	P	E	Mains aerial.
Marconiphone	T	42	W	£16 16 0	3	V	H-D-P	PMC	P	E	Mains aerial.
	CR	330	O	£30 9 0	3	V	H-D-P	PMC	P	E	Mains aerial.
Ostar-Ganz ..	T	A/3	—	£10 10 0	2	V	D-L	EMC	P	E	Can be used on A.C. or D.C. without alteration
	T	B/4	—	£14 14 0	3	V	H-D-L	MC	P	E	Can be used on A.C. or D.C. without alteration.
Tyrela .. .	T	Norfolk	W	£16 16 0	3	V	H-D-P	EMC	P	E	—
—	C	Harewood	W	£18 18 0	3	V	H-D-P	EMC	P	E	—
Ultra .. .	T	Blue Fox	W	£10 10 0	2	V	D-P	PMC	P	E	Mains aerial.
	T	Tiger	W	{ £15 15 0 £18 18 0 }	3	V	H-D-P	EMC	P	E	Mains aerial.
—	C										
Varley .. .	T	Hidden Speaker	W	£15 15 0	3	V	H-D-L	EMC	P	E	—
Wates' .. .	T	Futura	WO	{ £21 0 0 £24 3 0 }	5	V	2H-D-2L	EMC	P	E	Mains aerial.
	CR										

Classified Guide to Sets for A.C. Mains

Aerodyne ..	T	AC2	W	£10 10 0	2	M	D-P	EMC	P	E	Mains aerial provided.
—	T	SG3	W	£15 15 0	3	M	H-D-P	EMC	P	E	Mains aerial provided.
Alba .. .	T	50	O	£14 14 0	3	V	H-D-P	EMC	P	E	—
	T	55	W	£17 17 0	3	V	H-D-P	EMC	P	E	£20 9 6 for 25 cycles.
—	T	66	W	£21 0 0	3	V	H-D-P	EMC	P	E	£23 12 6 for 25' cycles.
—	C	70	O	£23 2 0	3	V	H-D-P	EMC	P	E	—
—	C	77	W	£27 6 0	3	V	H-D-P	EMC	P	E	£29 18 6 for 25 cycles.
—	C	88	{ O MV	{ £32 11 0 £33 12 0 }	3	V	H-D-P	EMC	P	E	{ £35 3 6 for 25 cycles. £36 4 6 for 25 cycles.
—	CR										
Atlas .. .	T	RA2	W	£10 16 0	2	M	D-L	EMC	P	E	—

(Cont. on Page Ten)

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A Free Gift for the New Set Buyer!

THIS supplement will make a special appeal to hundreds, and perhaps thousands, of new readers who see "Wireless Magazine" for the first time this month. In most cases these newcomers will know very little about radio and therefore they will miss much of the enjoyment that comes from an understanding of the working of a receiver.

The supplement itself will help the newcomers to choose a satisfactory type of set, but we are going

a step further and are offering—free and post free—to every purchaser of a new set mentioned in these pages a copy of that well-known 2s. 6d. book, "The How and Why of Radio," which gives in concise and easily-understood form a complete explanation of the working of a modern receiver.

In order to qualify for a free copy of "The How and Why of Radio," readers must complete the form to be found on page 560 of this issue. The following conditions should be noted:—

(1) Only one copy of "The How and Why of Radio" will be presented to any reader.

(2) The form on page 560 must be completed and sent to: Set Selection Bureau, "Wireless Magazine," 58/61 Fetter Lane, London, E.C.4.

(3) The offer holds good only if the set bought is mentioned on Pages 4, 6, 8, 10, 12, 14 and 16 of this supplement. This condition will be strictly observed.

(4) The new set must have been bought after the publication of this issue of "Wireless Magazine," that is on or after November 23, 1932.

(5) In each case the dealer's name and address and the exact date of



The Columbia type 640 super-het radio gramophone, which incorporates an automatic record changer



A set from the Sovereign range, The Doric. It is a battery three-valver with moving-coil reproducer



This is the Tyrela Suffolk radio gramophone, which incorporates a three-valve chassis

purchase must be supplied to us so that we can verify if we wish to do so.

(6) In each case the Editor's decision must be accepted as final and legally binding.

Tell your friends about this special offer!

Sets Tested by "W.M."

A NUMBER of sets is tested each month by the "W.M." Set Selection Bureau, which also advises prospective buyers regarding the choice of suitable sets. Full details will be found on page 599 of this issue.

Following is a list of the sets actually reported on in the last five issues; all of the sets are still on the market:—

AUGUST, 1932

McMichael Duplex Four
K.B. Electric Kobra
Marconiphone Super-tuned Portable

SEPTEMBER, 1932

Ferranti Standard Super-het
Lotus Bud Two-valver
Ekco Model M23

OCTOBER, 1932

Marconiphone Model 248
Zetavox Model AT
Pye Model G
Bell Piano A.C. Three

NOVEMBER, 1932

H.M.V. Super-het Portable Six
Atlas A.C. Two-valver
Lotus Band-pass A.C. 3

DECEMBER, 1932

Columbia Model 355
Gecophone Nomad for D.C. Mains
Wates Futura Consolette
Philco A.C. Baby Grand
Bush A.C. Three-valver

Back numbers containing these reports can be obtained for 1s. 3d. each, post free, on application to the Publisher, "Wireless Magazine," 58/61 Fetter Lane, London, E.C.4.

CLASSIFIED GUIDE TO SETS FOR A.C. (Continued from Page Eight)

Brand Name	Type	Model	Finish	Price	No. of Valves	Rectifier	Valve Combination	Loud-speaker	Pick-up	Aerial	Remarks
Beethoven	T	Twin S.G.3	W	£14 14 0	3	V	H-D-P	MC	P	S	100-250 volts A.C.
Blue Circle	T	400	W	£13 13 0	3	V	H-D-P	MC	P	E	—
Blue Spot	T	W400	OW	£15 15 0	4	V	H-D-2L	—	P	E	No loud-speaker.
—	T	WS400	O	£17 17 0	4	V	H-D-2L	I	P	E	—
—	T	Table Grand	W	£21 0 0	4	V	H-D-2L	EMC	P	E	—
Brownie	T	Dominion 3	O	£9 9 0	2	V	D-P	EMC	P	E	—
—	T	S.G.P.4	W	£15 15 0	3	V	H-D-P	EMC	P	E	—
Burndept	T	Merrymaker II	W	£8 15 0	2	M	D-L	M	—	E	—
—	T	{Merrymaker de	W	£10 5 0	2	V	D-L	EMC	—	E	—
—	T	{de Luxe	W	£14 14 0	3	V	H-D-P	EMC	P	E	—
—	T	{Ethophone	W	£14 14 0	3	V	H-D-P	EMC	P	E	—
—	T	{Wandering	W	£16 19 6	3	V	H-D-P	EMC	P	E	—
—	T	{Minstrel	W	£16 19 6	3	V	H-D-P	EMC	P	E	—
Burne Jones	C	Stenode	W	£54 12 0	7	M	Super	MC	—	E	Mains aerial.
—	CR	Stenode	W	£63 0 0	7	N	Super	MC	P	E	Mains aerial.
Chakophone	T	Junior A.C.2	O	£9 9 0	2	M	D-L	BA	—	E	—
—	T	Selective A.C.2	W	£13 13 0	2	M	D-P	EMC	P	E	—
Clarion	T	Table Model	W	£18 18 0	4	V	2H-D-P	EMC	P	E	—
—	CR	Radiogram	W	£31 10 0	4	V	2H-D-P	EMC	P	E	—
Climax	T	BP111	W	£16 16 0	3	V	H-D-P	EMC	P	E	—
—	TR	AC111	W	£25 4 0	3	V	H-D-P	EMC	P	E	—
Clarith	T	County 5	W	£15 10 0	4	V	H-D-2L	MC	P	E	Mains aerial.
Columbia	T	352	W	£18 18 0	4	V	2H-D-P	EMC	P	E	Mains aerial.
—	C	602	O	£29 8 0	3	V	H-D-P	EMC	—	E	Mains aerial.
—	C	603	W	£35 14 0	4	V	—	EMC	—	E	Mains aerial.
—	CR	604	W	£44 2 0	4	V	—	EMC	P	E	Automatic record changer
—	CR	640	W	£94 10 0	9	V	Super	EMC	P	E	Automatic record changer
Cossor	T	233	O	£8 18 6	2	V	D-L	BA	—	E	—
—	T	222A	O	£11 15 0	2	V	D-L	MC	P	E	—
—	T	533A	O	£16 16 0	4	V	2H-D-L	MC	P	E	Variable-mu's.
Dario	T	Regional	W	£9 9 0	2	V	D-P	EMC	P	E	—
Decca	T	16	W	£16 16 0	3	V	H-D-P	MC	P	E	Mains aerial.
—	T	19	W	£19 19 0	4	V	2H-D-P	MC	P	E	Mains aerial.
—	C	22	W	£23 2 0	4	V	2H-D-P	MC	P	E	Mains aerial.
—	CR	29	W	£30 9 0	4	V	2H-D-P	MC	P	E	Mains aerial.
—	CR	39	W	£40 19 0	5	V	2H-D-2L	MC	P	E	Dual loud-speakers.
Eddystone	T	Overseas 4	O	£23 10 0	4	V	H-D-2L	—	—	E	Or in teak.
—	T	All-wave 4	—	£33 0 0	4	V	H-D-2L	—	P	E	Aluminium cabinet.
Edison Bell	T	—	—	£19 19 0	—	—	—	—	—	—	—
—	C	A.C.3.	W	£22 11 0	3	V	H-D-P	EMC	P	E	Wavelength calibrated.
—	CR		W	£30 9 0							
—	T		W	£22 1 0							
—	C	AC4	W	£25 4 0	4	V	2H-D-P	EMC	P	E	Wavelength calibrated.
—	CR		W	£33 12 0							
—	T		W	£28 7 0							
—	CR	Super 5	W	£38 17 0	5	V	Super	EMC	P	E	Wavelength calibrated.
—	T		W	£12 12 0							
Ekco	T	RS2	B	£12 12 0	3	M	H-D-P	BA	P	S	—
—	T	RS3	B	£17 17 0	4	V	2H-D-P	EMC	P	S	Station-calibrated dial.
—	C	C25	W	£29 8 0	5	V	Super	EMC	P	S	Station-calibrated dial.
—	CR	RG25	W	£44 2 0	5	M	Super	EMC	P	S	Station-calibrated dial.
Eldeco	T	AM6	—	£25 4 0	5	V	Super	MC	P	E	Tone control.
E.R.P.	T	Gainsboro' 4	W	£18 18 0	4	V	2H-D-L	MC	P	S	—
—	CR	{Gainsboro'	W	£31 0 0	4	V	2H-D-L	MC	P	S	—
—	CR	{Radiogram	W	£37 16 0	6	V	Super	MC	P	S	—
Epoch	T	FM3A O.M	W	£21 0 0	3	V	H-D-P	MC	P	E	Without L.S. if desired.
—	T	Standard	W	£23 2 0	—	—	—	—	—	—	—
Ferranti	T	Station	W	£24 3 0	6	V	Super	EMC	P	E	Station calibrated dial.
—	T	Clock	W	£26 5 0							
Gecophone	T	Gala	W	£15 15 0	3	V	H-D-P	EMC	P	E	Mains aerial.
—	T	Viking	W	£24 3 0	4	V	2H-D-P	EMC	P	E	Mains aerial.
—	C	Console	W	£25 4 0	4	V	2H-D-P	I	P	E	Mains aerial.

(Cont. on Page Twelve)

In the above tables the following abbreviations are used: Under TYPE, SP—Suitcase Portable, UP—Upright Portable, T—Table or Transportable Set, C—Console or Pedestal Model, TR—Table Radiogram, and CR—Console Radiogram. Under FINISH, B—Bakelite, L—leather or Rexine, M—Mahogany, O—Oak, and W—Walnut. Under RECTIFIER, M—Westinghouse Metal Rectifier, and V—Valve Rectifier. Under VALVE COMBINATION, H—High-frequency Amplifier, D—Detector, L—Low-frequency Amplifier, and P—Pentode. Under LOUD SPEAKER, BA—Balanced Armature, EMC—Energised Moving Coil, I—Inductor, M—Moving Iron, MC—Moving Coil, and PMC—Permanent-magnet Moving Coil. Under AERIAL, E—External Aerial and S—Self-contained Aerial.

What the
Modern
Designer
Offers You



The McMichael twin loud-speaker radio gramophone. The set is a three-valver for A.C. mains operation



A Clarion mains radio gramophone with automatic record changer—a handsome outfit



The Zetavox type ST seven-valve super-het receiver. It is housed in a bakelite cabinet



The H.M.V. table radio gramophone, a three-valve A.C. set with moving-coil loud-speaker. Also available for D.C.



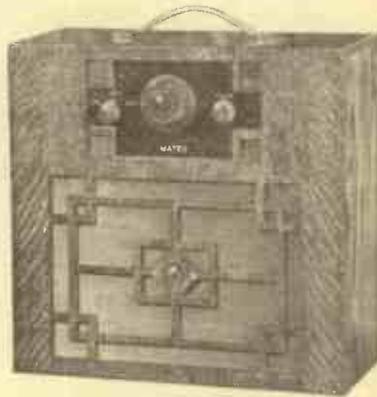
The Marconiphone table-model super-het receiver, model 256, which is provided with a tone control



A two-valve battery set, type S328, made by Standard Telephones and Cables, Ltd.



Alba model 66 for A.C. and D.C. mains, a three-valver with a moving-coil loud-speaker



The Wates transportable three-valver with self-contained aerial. A similar model without aerial is also available

CLASSIFIED GUIDE TO SETS FOR A.C. (Continued from Page Ten)

Brand Name	Type	Model	Finish	Price	No. of Valves	Rectifier	Valve Combination	Loud-speaker	Pick-up	Aerial	Remarks
Gecophone (cont.)	T	Super-het	W	£27 6 0	5	V	Super	EMC	P	E	Mains aerial.
—	CR	Carnival	W	£31 10 0	5	V	2H-D-2L	EMC	P	E	Heterodyne filter.
Halford	CR	Chippendale	M	£47 5 0	7	V	Super	EMC	P	E	Mains aerial; push-pull output.
—	CR	Autoradiogram	W	£65 2 0	7	V	Super	EMC	P	E	Automatic record changer
H.M.V.	CR	531	W	£73 10 0	9	V	Super	EMC	P	E	Automatic record changer with special cabinet, £89 5 0.
—	CR	Super-het 10	W	£84 0 0	9	V	Super	EMC	P	E	Automatic record changer with special cabinet, £99 15 0.
K.B.	T	A.C. Pup	O	£7 10 0	2	V	D-L	M	—	E	Mains aerial.
—	T	A.C. Kobra 305	O	£11 6 11	3	V	D-2L	EMC	P	E	Mains aerial.
—	T	321	W	£14 17 6	3	V	H-D-P	EMC	P	E	Arranged for S.W. reception.
—	T	320	W	£17 17 0	4	V	2H-D-P	EMC	P	E	Arranged for S.W. reception.
—	T	279	W	£18 18 0	3	V	H-D-P	EMC	P	E	—
—	C	Kolstar	W	£24 17 6	6	V	Super	EMC	P	E	Arranged for S.W. reception.
—	CR	283	W	£31 10 0	3	V	H-D-P	EMC	P	E	Mains aerial.
Lissen	T	8001	B	£7 7 0	2	V	D-P	BA	—	E	Special model available for 100-125 volts A.C.
—	T	8023	W	£17 17 0	3	V	H-D-P	{MC}	P	E	Mains aerial.
—	T	8026	S	£14 14 0							
Loewe	T	Super Power	W	£9 12 6	—	V	D-2L	—	P	E	With multiple valve.
—	T	Super Power	O	£10 10 0	—	V	D-2L	BA	P	E	With multiple valve.
—	T	Super Power	O	£12 12 0	—	V	D-2L	PMC	P	E	With multiple valve.
Lotus	T	AC2/250	W	£10 10 0	2	M	D-L	EMC	—	E	Mains aerial.
—	T	TC/250	W	£15 15 0	3	V	H-D-P	EMC	P	E	—
—	T	B3/250	W	£16 16 0	3	M	H-D-P	EMC	P	E	Mains aerial.
—	T	TC4/250	W	£21 0 0	4	M	2H-D-P	EMC	P	E	Mains aerial.
Macnamara	T	Golden Voice	W	£15 15 0	3	V	H-D-P	EMC	P	E	Chassis only, £12 12 0.
Magnum	T	Universal 4/5	W	£23 0 0	4/5	M	2H-D-P	MC	P	E	Super-het on S.W.
Marconiphone	T	253	W	£16 16 0	3	V	H-D-P	EMC	P	E	Mains aerial.
—	T	256	W	£25 4 0	6	V	Super	EMC	P	E	Mains aerial and tone control.
—	CR	258	W	£57 15 0	6	V	Super	EMC	P	E	Automatic record changer.
—	CR	535	W	£40 19 0	6	V	Super	PMC	P	E	Mains aerial.
—	CR	536	W	£48 6 0	6	V	Super	PMC	P	E	Automatic record changer.
McMichael	T	Duplex 4	W	£22 1 0	4	M	2H-D-P	EMC	P	S	25-cycle model £23 2 0.
—	CR	Radiogram	W	£42 0 0	3	M	H-D-P	MC	P	E	Dual loud-speakers.
M.P.A.	T	Ethatrope	W	£24 3 0	4	M	H-D-2L	EMC	P	E	Automatic tuning.
M.P.R.	T	2VP	O	£7 7 0	2	M	D-P	—	P	E	—
—	T	2VP/MC	O	£8 10 0	2	M	D-P	PMC	P	E	—
—	T	3VP/MC	O	£11 15 0	3	M	H-D-P	PMC	P	E	—
M.R.G.	T	Phantom 3	W	£14 14 0	3	V	H-D-P	EMC	P	E	—
—	T	Phantom 4	W	£21 0 0	4	V	2H-D-P	EMC	P	E	—
—	C	Console 3	WO	£24 0 0	3	V	H-D-P	EMC	—	E	—
—	C	Pedestal clock	W	£25 0 0	3	V	H-D-P	EMC	P	E	With electric clock.
—	CR	Radiogram	O	£30 0 0	4	V	2H-D-P	EMC	P	E	—
—	CR	Radiogram	W	£33 0 0							
Pegasus	T	II	W	£11 0 0	2	M	D-P	EMC	P	E	—
—	T	1616	W	£16 16 0	4	M	H-D-P	EMC	P	E	—
—	T	254	W	£25 4 0	4	M	2H-D-P	EMC	—	E	Arranged for S.W. rec'n.
—	C	276	W	£27 6 0	4	M	2H-D-P	EMC	—	E	Arranged for S.W. rec'n.
Philco	T	55E	W	£14 14 0	4	V	2H-D-P	EMC	—	E	—
—	T	56A	W	£16 16 0	4	V	Super	EMC	P	E	—
—	C	55E	W	£19 19 0	4	V	2H-D-P	EMC	—	E	—
—	C	56A	W	£23 2 0	4	V	Super	EMC	P	E	—
—	CR	256	W	£36 15 0	4	V	Super	EMC	P	E	—
—	C	71X	W	£46 4 0	6	V	Super	EMC	—	E	Dual-matched L.S.
—	CR	71XL	W	£68 5 0	6	V	Super	EMC	P	E	As above.

(Cont. on Page Fourteen)

In the above tables the following abbreviations are used: Under TYPE, SP—Suitcase Portable, UP—Upright Portable, T—Table or Transportable Set, C—Console or Pedestal Model, TR—Table Radiogram, and CR—Console Radiogram. Under FINISH, B—Bakelite, L—leather or Rexine, M—Mahogany, O—Oak, and W—Walnut. Under RECTIFIER, M—Westinghouse Metal Rectifier, and V—Valve Rectifier. Under VALVE COMBINATION, H—High-frequency Amplifier, D—Detector, L—Low-frequency Amplifier, and P—Pentode. Under LOUD-SPEAKER, BA—Balanced Armature, EMC—Energised Moving Coil, I—Inductor, M—Moving Iron, MC—Moving Coil, and PMC—Permanent-magnet Moving Coil. Under AERIAL, E—External Aerial and S—Self-contained Aerial.

Directory of Brand Names

Aerodyne.—Hustler Simpson & Webb, Ltd., 317 Hoe Street, Walthamstow, E.17.
Alba.—A. J. Balcombe, Ltd., 52-58 Tabernacle Street, E.C.2.
Adey.—Adey Portable Radio, 99 Mortimer St., W.1.
Atlas.—H. Clarke & Co. (M/CR), Ltd., George Street, Patricroft, Manchester.
Beethoven.—Montague Radio Inventions & Development Co., Ltd., Gt. College Street, N.W.1.
Blue Circle.—H. J. Fletcher & Co., Ltd., New North Road, N.1.
Blue Spot.—The British Blue Spot Co., Ltd., 94-96 Rosoman Street, E.C.1.
British General.—British General Mfg. Co., Ltd., Brockley, S.E.4.
Brownie.—Brownie Wireless of Gt. Britain, Ltd., Nelson Street, Mornington Crescent, N.W.1.
Burndep.—Burndep, Ltd., 51/53 Church Street, Greenwich, S.E.10.
Burne Jones.—Burne-Jones & Co., Ltd., 296 Borough High Street, S.E.1.
Chakophone.—Eagle Engineering Co., Ltd., Warwick.
Clarion.—British Clarion Co., Ltd., Canterbury Road, N.W.6.
Climax.—Climax Radio Electric, Ltd., Parkhill Road, Hampstead, N.W.3.
Clarith.—Clarith Reproducers, Ltd., 76 East Street, Leeds.
Columbia.—Columbia Graphophone Co., Ltd., 98 Clerkenwell Road, E.C.1.
Cossor.—A. C. Cossor, Ltd., Highbury Grove, N.5.
Danipad.—Danipad Rubber Co., Ltd., 5/7 Market Street, Finsbury, E.C.2.
Dario.—Impex Electrical, Ltd., 538 High Road, Leytonstone, E.11.
Decca.—Decca Gramophone Co., Ltd., 1/3 Brixton Road, S.W.9.
Eddystone.—Stratton & Co., Ltd., Bromsgrove Street, Birmingham.
Edison Bell.—Edison Bell, Ltd., Gleggall Road, S.E.15.
Ekco.—E. K. Cole, Ltd., Southend, Essex.
Eldeco.—Electrical Devices Co., 62 Conduit Street, W.1.

E.R.P.—Electrical and Radio Products (1931), Ltd., Salfords, near Redhill, Surrey.
Epoch.—Epoch Radio Mfg. Co., Ltd., Exmouth House, Exmouth Street, E.C.1.
Faraday.—Faraday All-Wave Wireless, Ltd., 1 Salcott Road, S.W.11.
Ferranti.—Ferranti, Ltd., Hollinwood, Lancs.
Gecophone.—General Electric Co., Ltd. Magnet House, Kingsway, W.C.1.
Grafton.—Manuwares Co., 79 Lots Road, Chelsea, S.W.
Halford.—Halford Radio, Ltd., 39 Sackville Street, W.1.
H.M.V.—Gramophone Co., Ltd., 363-367 Oxford Street, W.1.
K.B.—Kolster-Brandes, Ltd., Sidcup, Kent.
Leytonia.—Wholesale Radio Supplies, 126 High Road, Leyton.
Lissen.—Lissen, Ltd., Worple Road, Isleworth, Mdx.
Loewe.—Loewe Radio Co., Ltd., Fountayne Road, N.15.
Lotus.—Lotus Radio, Ltd., Liverpool.
Macnamara.—See Telsen.
Magnum.—See Burne Jones.
Marconiphone.—Marconiphone Co., Ltd., Tottenham Court Road, W.1.

Many prospective buyers of sets, after having read this supplement and having narrowed down their final choice to two or three particular models, will want further details than it has been possible to include in these pages.

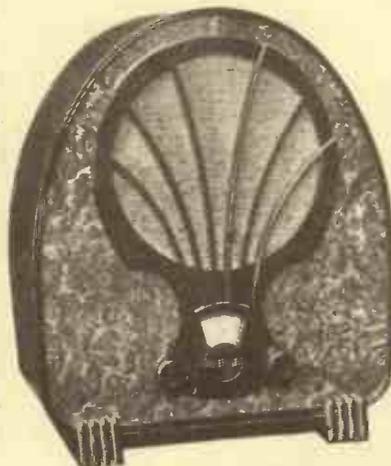
Their best procedure is then to write to the particular manufacturers concerned and ask for further details, mentioning on which pages of this supplement the sets are listed.

In order to help those who are unfamiliar with radio trade names we present here a directory of brand names of all the firms whose products are dealt with in this supplement. In writing to any of these manufacturers make certain of mentioning "Wireless Magazine," for your inquiry will then receive prompt attention



A representative receiver from the Lotus range, a three-valver available for A.C. or D.C. mains

Portadyne.—Portadyne Radio, Ltd., Gorst Road, N. Acton, N.W.10.
Pye.—Pye Radio, Ltd., Africa House, Kingsway, W.C.2.
Regentone.—Regentone, Ltd., Bartlett's Buildings, Holborn Circus, E.C.4.
R.G.D.—Radio Gramophone Development Co., Ltd., 18-20 Frederick Street, Birmingham.
R.I.—Radio Instruments, Ltd., Purley Way, Croydon, Surrey.
Rees Mace.—Consolidated Radio Co., Ltd., 75 Kilburn Lane, W.10.
Rolls Caydon.—See Rees Mace.
Royal.—Royal Radio Co., 5 Buckingham Road, E.18.
Sonochorde.—Sonochorde Reproducers, Ltd., 1 Willesden Lane, N.W.6.
Sovereign.—Sovereign Products, Ltd., 52-54 Rosebery Avenue, E.C.1.
Standard.—Standard Telephones and Cables, Ltd., St. Chad's Place, Gray's Inn Road, W.C.
Telsen.—Telsen Electric Co., Ltd., Aston, Birmingham.
Terrytone.—Terrytone Radio Products Co., Ltd., 33 Crouch Hill, N.4.
Tunewell.—Tunewell Radio, Ltd., 54 Station Road, New Southgate, N.10.
Tyrela.—Tyrela Electric, Ltd., 21-26 East Road, N.1.
Ultra.—Ultra Electric, Ltd., Chalk Farm, N.W.3.
Varley.—Varley (Oliver Pell Control, Ltd.), 103 Kingsway, W.C.2.
Wates.—Wates Radio, Ltd., 184/188 Shaftesbury Avenue, W.C.
Yagerphone.—Yagerphone, Ltd., Ponders End, Middx.
Zetavox.—Zetavox Radio & Television, Ltd., Coles Green Rd., N.W.2.



An attractive arbolite cabinet houses the Philips Super-inductance Four, with wavelength calibrated dial

McMichael.—L. McMichael, Ltd., Wexham Road, Slough, Bucks.
M.P.A.—M.P.A. Wireless (1930), Ltd., 62 Conduit Street, W.1.
M.P.R.—Mains Radio-Gramophones, Ltd., Vaughan Street, Bradford.
Ostar-Ganz.—Charterhouse Radio, 2 and 3 Charterhouse Square, E.C.1.
Pegasus.—Pegasus, Ltd., Lower Wortley, Leeds.
Philco.—Philco Radio & Television Corporation of Gt. Britain, Ltd., 1 Argyll Street, W.1.
Philips.—Philips Lamp, Ltd., 145 Charing Cross Road, W.C.2.
Philomel.—Philomel Radio Equipment Trading Estate, Slough, Bucks.

CLASSIFIED GUIDE TO SETS FOR A.C. (Continued from Page Twelve)

Brand Name	Type	Model	Finish	Price	No. of Valves	Rectifier	Valve Combination	Loud-speaker	Pick-up	Aerial	Remarks
Philips	T	830A	—	£16 16 0	4	V	2H-D-P	PMC	P	E	Arbolite cabinet.
—	T	630A	W	£24 3 0	5	V	2H-D-2L	PMC	P	E	—
—	CR	870A	W	£35 14 0	4	V	2H-D-P	PMC	P	E	—
Philomel	T	MT3C	—	£17 17 0	3	M	H-D-P	PMC	P	S	{ Cabinets in black, red, cream and chromium.
—	CR	RG3	WM	£29 8 0	3	M	H-D-P	PMC	P	S	—
Pye	T	K	W	£12 12 0	2	M	D-P	EMC	P	E	Special L.F. coupling.
—	T	MM	W	£17 17 0	3	M	H-D-P	EMC	P	S	Wavel'th calibrated dial.
—	T	G	W	£18 18 0	3	M	H-D-P	EMC	P	E	Special L.F. coupling.
—	T	S	W	£28 7 0	6	M	Super	EMC	P	E	Wavel'th calibrated dial.
—	T	Twintriple	WM	£29 8 0	4	M	2H-D-L	EMC	P	S	Also for 25 cycles.
—	CR	Radiogram	WM	£39 18 0	4	M	2H-D-P	PMC	P	E	Also for 25 cycles.
			O	£37 16 9							
Rees Mace	TR	Table Radiogram	W	£25 4 0	3	M	H-D-P	MC	P	E	Mains aerial.
Regentone	T	A.C.2	B	£6 15 0	2	M	D-P	—	P	E	—
—	T	A.C.2	W	£8 0 0	2	M	D-P	BA	P	E	—
—	T	Straight 3	W	£12 0 0	3	M	D-2L	MC	P	E	Mains aerial.
—	T	Super 3	W	£16 16 0	3	M	H-D-P	MC	P	E	Mains aerial.
R.G.D.	CR	701 A.C.	W	£50 8 0	6	V	Super	MC	P	E	{ Automatic record changer extra.
—	CR	901 A.C.	O	£84 0 0	8	V	Super	MC	P	E	Dual loud-speakers
R.I.	T	Madrigal	W	£17 17 0	3	V	H-D-P	PMC	P	S	{ £1 1 0 extra for 25-cycle model.
—	T	A.C. Super	W	£26 5 0	5	V	Super	EMC	P	S	{ £1 1 0 extra for 25-cycle model.
Rolls Caydon	T	A.C.3	W	£15 15 0	3	M	H-D-P	MC	P	E	—
—	T	A.C.3	W	£18 18 0	3	M	H-D-P	MC	P	E	Mains aerial.
Royal	TR	Balmoral	W	£12 12 0	3	V	H-D-P	EMC	P	E	—
—	CR	Buckingham	W	£18 18 0	3	V	H-D-P	EMC	P	E	—
Sonochorde	T	Standard	W	£15 15 0	3	V	H-D-P	EMC	P	E	Mains aerial.
—	T	De Luxe	W	£16 16 0	3	V	H-D-P	EMC	P	E	With electric clock.
—	C	Grandfather clock	W	£21 0 0	3	V	H-D-P	EMC	P	E	With clock.
Standard	T	S322	W	£9 10 0	2	V	D-P	EMC	P	E	Mains aerial.
—	T	S330	W	£16 16 0	3	V	H-D-P	EMC	P	E	—
Terrytone	T	A.C.3	W	£13 12 0	3	V	H-D-L	EMC	P	E	—
—	T	A.C.3	W	£16 15 0	3	V	H-D-L	MC	P	E	Wavel'th calibrated dial.
—	TR	A.C.3	W	£24 2 0	3	V	H-D-L	MC	P	E	—
Tunewell	CR	Radiogram	O	£28 7 0	3	V	H-D-P	EMC	P	S	Royalties extra.
Tyrela	C	Radio Clest	W	£23 2 0	5	V	Super	EMC	P	E	Mains aerial.
—	C	Elgin	W	£25 4 0	5	V	Super	EMC	P	E	Mains aerial.
—	CR	Suffolk	W	£29 8 0	3	V	H-D-P	MC	P	E	—
—	CR	Derby	W	£34 13 0	5	V	Super	MC	P	E	—
—	CR	Burghley	W	£52 10 0	5	V	Super	MC	P	E	—
Ultra	T	Panther	W	£18 18 0	4	V	2H-D-P	—	P	E	—
—			W	£23 2 0							
—	TR	Panther	W	£33 12 0	4	V	2H-D-P	EMC	P	E	Mains aerial.
Varley	T	Square Peak 3	W	£17 17 0	3	V	H-D-P	EMC	P	E	—
—	T	Square Peak Superhet	W	£27 6 0	5	V	Super	EMC	P	E	—
—	C	Super-het Console	W	£36 15 0	5	V	Super	EMC	P	E	{ £1 1 0 extra for 25-cycle model.
—	CR	Superhet Radiogram	W	£50 8 0	5	V	Super	EMC	P	E	—
Yagerphone	T	M5	W	£18 18 0	4	V	2H-D-P	EMC	P	E	—
—	C	MP5	O	£21 0 0	4	V	2H-D-P	EMC	P	E	—
—	CR	MG5	W	£29 8 0	4	V	2H-D-P	EMC	P	E	—
Zetavox	T	AT	W	£19 19 0	4	V	2H-D-P	EMC	P	E	—
—	T	ST	B	£26 5 0	7	V	Super	EMC	P	S	—
—	CR	AG	W	£33 12 0	4	V	2H-D-P	EMC	P	E	{ Automatic record changer available.
—	C	APT	W	£36 15 0	4	V	2H-D-P	EMC	P	E	Press-button tuning.
—	CR	SG	W	£50 8 0	7	V	Super	EMC	P	E	{ Automatic record changer available.
—	CR	SGT	W	£66 3 0	7	V	Super	EMC	P	S	Dual loud-speakers.

In the above tables the following abbreviations are used : Under TYPE, SP—Suitcase Portable, UP—Upright Portable, T—Table or Transportable Set, C—Console or Pedestal Model, TR—Table Radiogram, and CR—Console Radiogram. Under FINISH, B—Bakelite, L—leather or Rexine, M—Mahogany, O—Oak, and W—Walnut. Under RECTIFIER, M—Westinghouse Metal Rectifier, and V—Valve Rectifier. Under VALVE COMBINATION, H—High-frequency Amplifier, D—Detector, L—Low-frequency Amplifier, and P—Pentode. Under LOUD-SPEAKER, BA—Balanced Armature, EMC—Energised Moving Coil, I—Inductor, M—Moving Iron, MC—Moving Coil, and PMC—Permanent-magnet Moving Coil. Under AERIAL, E—External Aerial and S—Self-contained Aerial.

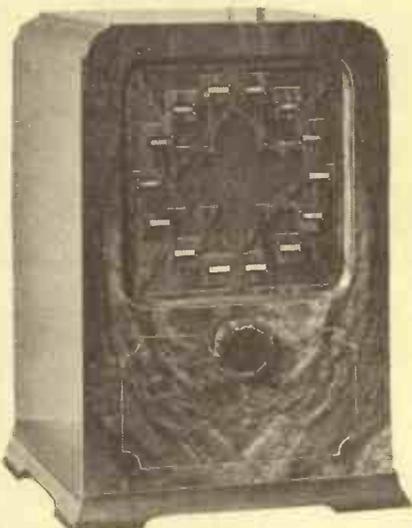
The Latest Technique



The Atlas two-valver, available for battery, A.C. or D.C. mains operation, has a moving-coil reproducer



The K.B. model 320 four-valve receiver. An extra coil is available for short-wave reception on 25 to 75 metres



The M.P.A. Eshatropé, an A.C. four-valver, with automatic tuning for twelve stations



The Ekco model RG25 all-electric radio gramophone, incorporating a super-het receiver. The dial is marked with names of stations



Epoch type FM3 receiver for A.C. and D.C. mains. The chassis can be obtained separately if desired



The Philips Super-inductance Five, a most attractive and efficient receiver for modern conditions



From the Varley range—the Square Peak five-valve super-het radio gramophone for A.C. mains



From the Royal range—the Buckingham radio gramophone, a three-valver with moving-coil loud-speaker

Classified Guide to Sets for D.C.

Brand Name	Type	Model	Finish	Price	No. of Valves	Valve Combination	Loud-speaker	Pick-up	Aerial	Remarks
Aerodyne	T	D.C.2	W	£10 10 0	2	D-P	EMC	P	E	Mains aerial.
Atlas	T	R.D.2	W	£10 10 0	2	D-P	EMC	P	E	Mains aerial.
Edison Bell	C	D.C.3.	W	£19 19 0	3	H-D-P	PMC	P	E	Mains aerial.
				£22 10 0						
				£33 12 0						
—	C	D.C.4	W	£22 10 0	4	2H-D-P	PMC	P	E	Mains aerial.
				£25 4 0						
				£36 15 0						
Gecophone	T	Nomad	W	£24 3 0	4	2H-D-P	MC	P	E	Mains aerial.
K.B.	T	290	O	£7 10 0	2	D-L	M	—	—	—
	T	304	W	£16 16 0	3	H-D-P	EMC	P	E	—
Lissen	T	8012	B	£7 7 0	2	D-P	BA	—	E	—
Loewe	T	Super Power	O	£10 0 0	—	D-2L	BA	P	E	Multiple valve.
Lotus	T	D.C.2/250	W	£11 11 0	2	D-P	EMC	—	E	Mains aerial.
	T	TC/DC	W	£15 15 0	3	H-D-P	EMC	P	E	.25-ampere valves.
—	T	B3/DC	W	£16 16 0	3	H-D-P	EMC	P	E	.1-ampere valves.
	T	TC4/DC	W	£21 0 0	4	2H-D-P	EMC	P	E	.1-ampere valves.
	T	248	W	£16 16 0	5	Super	EMC	—	E	—
Philco	T	247	W	£30 9 0	8	Super	EMC	—	E	—
	T	830C	—	£16 16 0	4	2H-D-P	PMC	P	E	Arbolite cabinet.
Pye	T	Twintriple	WM	£29 8 0	4	2H-D-P	BA	—	S	—
Rees Mace	TR	Table Radiogram	W	£26 4 0	3	H-D-P	MC	P	E	Mains aerial.
R.G.D.	CR	701 D.C.	W	£50 8 0	7	Super	MC	P	E	Automatic record changer available.
Rolls Caydon	CR	901 D.C.	O	£84 0 0	8	Super	MC	P	E	Dual loud-speakers.
	T	D.C.3	W	£15 15 0	3	H-D-P	MC	P	E	Mains aerial.
	T	Band-pass 3	W	£18 18 0	3	H-D-P	MC	P	E	—

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Notes on Using the Classified Guides

BRAND NAME.—In each case sets are listed under the brand name used by the particular manufacturer. If you are not certain to which firm any particular brand name belongs turn to the special directory on Page Thirteen.

TYPE.—Under this heading is indicated the particular kind of cabinet in which the set is housed. In most cases it will be found that portables are completely self-contained with batteries and frame aerial. If you are wanting a radio gramophone just run a finger down the second column of the tables until you come across the letter "R." In each case receivers marked "C" are of the type provided with legs for standing on the floor.

NAME OF SET.—This column gives the particular name by which the maker designates the design. In

some cases sets are given numbers instead of names.

NUMBER OF VALVES.—This column indicates the actual number of receiving valves in the set. In other words, rectifying valves in A.C. sets are not included with the total number of valves. That will explain why some A.C. sets are listed with only four valves in this particular column whereas the makers call the set a "five-valver."

RECTIFIER.—Valve rectifiers and Westinghouse rectifiers are indicated in the case of A.C. sets. Of course, D.C. sets and battery sets have no rectifier. In the classified guide to battery sets this column is replaced by one giving the approximate anode current in milliamperes.

VALVE COMBINATION.— This column will be clear from the footnotes that appear at the bottom of

each page of tables. No differentiation is made between different forms of high-frequency amplification. Most present-day sets have screen-grid valves, these being in many cases of the variable-mu type. In the case of sets with more than one low-frequency stage the designation "L" is used even if the set has a pentode.

It should be clearly understood that sets in the section entitled "A.C. and D.C. sets" will not work both on A.C. and D.C. mains, with one exception. In other words, this classification simply means that for any particular A.C. set there is a corresponding D.C. version. The exception is Ostar-Ganz sets; these make use of high-voltage mains valves and can be used on A.C. or D.C. mains at will without any alteration.

The Story of A Radio Play

by
WHITAKER-WILSON



Quite recently WHITAKER-WILSON, the "Wireless Magazine" Music Critic, has turned radio playwright, his "Sir Christopher Wren" being broadcast twice during October. In this interesting article he explains just how a radio play is produced—every listener will be intrigued by these revelations

ONE of the most interesting commissions I ever executed in my life was writing a biography of Sir Christopher Wren. I always admired what I knew of him, but by the time I had completed my book I really wished I had lived in the days of Charles II and had met him personally.

Contemporary Evidence

That is what happens when you search for every piece of contemporary evidence you can find about a great personality.

I wrote the book for the Tercentenary of the great architect, which occurred on October 20. Afterwards I began to wonder whether London would really take much notice of Wren's 300th birthday or not.

One day in the summer a member of the B.B.C. editorial staff spent a day with me and we talked about the book, which he had just read. He told me the B.B.C. did not intend to pass over the Tercentenary and thought a play might be acceptable.

A few days later Val Gielgud invited me to lunch

with himself and Eric Maschwitz at their club and asked me for a synopsis.

Had the play been for a theatre I might, indeed, have been hard put to it to comply with the request owing to the difficulty of representing enough scenes on a theatre stage, but knowing the resources of the microphone and also that I should not need scenery other than that which I could conjure up in the mind of the listener, I found the task easier than it would otherwise have been.

I sent Val Gielgud a synopsis and found that he had already arranged for the date of the Tercentenary to be kept open for me. Also another night in that same week.

When it came to writing I found it fairly easy to set out the play because, having written Wren's life,

I naturally knew the story. That is the first point about writing a microphone play: you *must* know your yarn!

I realised from the beginning that my play would have all the worst faults of a bad theatre play because I should have to bring in historical facts: people would have to "reminisce."

Reassurance

On the other hand, I had heard so many radio plays in which the authors had made use of narrators that I decided to go ahead and see how it all came out.

After all, I told myself, the play was a *chronicle* play and it was being written to celebrate Wren's 300th birthday. I therefore felt I could let my narrators set the atmosphere by telling a little about his attainments before we really began.

Acting on a suggestion made by Eric Maschwitz I showed Wren at the end of his life first of all. That accounted for the scene in St. Paul's with the German tourist.

As the story was supposed to be told by the old verger to this

"Sir Christopher Wren"

A Microphone Play in Ten Scenes Celebrating the Tercentenary of the Birth of England's Greatest Architect, by C. Whitaker-Wilson

Produced by Howard Rose

SCENES :

- I. *St. Paul's Cathedral, February 25, 1723.*
- II. *St. Paul's Drapery Garden, April, 1666.*
- III. *King Charles's private Study, Whitehall Palace, two days later.*
- IV. *St. Paul's Churchyard, Monday morning, August 27, 1666.*
- V. *The Great Fire of London, September 2 to 5, 1666.*
- VI. *The Home of Sir John Coghill, Blechington, Oxon, September, 1666*
- VII. *Blowing up the Piers of old St. Paul's, 1668.*
- VIII. *Balding new St. Paul's, 1674.*
- IX. *Same as Scene I.*
- X. *Epilogue—St. Paul's Cathedral, October 20, 1932.*

THE STORY OF A RADIO PLAY—Cont.



A recent photograph of Whitaker-Wilson, whose "Sir Christopher Wren" was broadcast in October. In this article he tells the story of the production of a radio play

German visitor it was easy enough to "fade" back to the cathedral at intervals in the play, using the organ to suggest St. Paul's.

The next idea was to portray John Evelyn and Dean Sancroft discussing the state of the old building. Although I did not want to overload the dialogue with historical matter—surely a bad fault—I had to risk making references to St. Paul's as it stood in those days.

Second Cathedral

Actually the cathedral which they were discussing was the second on the site. It was begun in the reign of William Rufus. Strangely enough, the Conqueror thought of taking down the first St. Paul's (built by Æthelbert of Kent for Bishop Mellitus about the year 600), but a fire destroyed it, thus preventing the necessity.

History certainly repeated itself when Wren wanted to take down the second cathedral in 1666, for the Great Fire destroyed it!

The scene with Evelyn and the Dean was founded on fact; Evelyn did see the King on the Dean's behalf, suggesting Wren should be made deputy-surveyor and that he should take the cathedral in hand. The scene where Evelyn sees the King was one of the easiest to write;

it seemed to come very naturally.

The scene in St. Paul's churchyard where the Dean, Evelyn, Wren, the Bishop of London, and the government representatives all met to discuss what should be done, was not hard to write as Evelyn's diary and Wren's own reports helped me a great deal.

I drew the Bishop as rather a "silly ass"; that, also, was founded on fact. Dr. Humphrey Henchman was not a very brilliant man.

Five days only after the meeting the Fire broke out. The only way for this was to use the narrators and any effects the B.B.C. could supply. Michie, of the effects department, is capable of creating any noise ever thought of; so that did not worry me.

A fade-back to the cathedral to find the verger and the German tourist climbing the steps to the lantern above the dome served to introduce the fact that Wren was about to marry Faith Coghill. I wanted this scene as a relief from men's voices and also for a little love-making.

I did not dare to suggest Wren was "engaged," because he was not actually betrothed to Faith for a year or two afterwards. So I had to be content with his being "a bit enamoured of her," as the verger put it.

The scene where Wren blew up the piers of old St. Paul's was merely conversation founded directly on "book." The part where the workman picks up the bit of tombstone with *Resurgam* ("I shall rise again") engraved on it is one of the best-

known stories about Wren. It naturally suggested a little drama.

He could so easily predict that one day he could say of the cathedral, not *Resurgam*—"I shall rise again"—but *Resurrexi*—"I have risen!" Thus there was a chance of some real drama.

Then, knowing that an hour only was allowed me, I began to think of ending it. Naturally a fade back into the first scene in St. Paul's cathedral was the only thing. The verger was being thanked by the German for taking him round. I had still to tell how George I dismissed Wren from the Surveyor-Generalship, but felt disinclined for the narrators again.

Comedy Fashion

So the verger told the yarn and gave a good deal more information at the same time, all in a comedy fashion.

As Wren appeared old and tired—as he would do on the day of his death at nearly ninety-one—it was necessary to refer to him again. So I got rid of the German tourist, the verger telling him to have a look at St. Martin-in-the-Fields as he walked along the Strand. I admit I dragged in that bit about James Gibbs (Wren's pupil) building St. Martin's at the time, because the church is so popular with listeners.

Having got rid of the tourist, Wren



History certainly repeated itself when Wren wanted to take down the second cathedral in 1666, for the Great Fire destroyed it!

BY WHITAKER-WILSON

naturally appeared. He talked in rather a metaphysical fashion to the verger, as probably a deep scholar, such as he, might do. Finally, he bade the verger good-night, changing it to good-bye as he realised this was the last time he would ever see his cathedral.

Wren's Death

The verger's exit seemed the moment for me to end the play by letting Wren give his thanks for having been allowed to see every stone in his cathedral in its place. Then the narrator could give a few lines recording his wonderful death at his house in Hampton Court Green. I have seen that house and the room where he breathed his last. Somehow that did not end the play.

Then the thought of the architect's 300th birthday occurred to me. Why not write a fantastic Epilogue and have him in the cathedral once more on October 20, 1932? The Epilogue was easy enough to write, but I had a bit of a fright about the spirit voices. The two narrators were to speak the part together. Even with the echo helping them it was found that there was no mystery about the effect. They sounded too human.

Unfortunately I had to leave before the end of the "dress" rehearsal. I went away from Broadcasting House very dejected, feeling that this Epilogue would be a failure. In the train, on my way to keep another appointment, I hit on the idea of setting the dialogue to music, using plainsong tones. After my appointment I rushed back to town by the next train.

Spirit Voices

In a café I set the words and suggested to Howard Rose, a few minutes before the broadcast, that I should intone the part. He agreed and, without rehearsal, I played the part of the spirit voices, trusting to the echo to help me produce an ethereal effect. [The Epilogue was omitted on the occasion of the second broadcast because of the time factor.—Ed.]

Then came the production. My manuscript, sadly hacked about by myself and Howard Rose (who was to produce the play) was handed to a typist and "roneoed." Nothing ever happens at Broadcasting House until plenty of copies are struck off. All

these plays, you must understand, are allotted by Val Gielgud, who is director of these productions, to one of the actual producers.

For my play he chose Howard Rose—and very good he proved to be. I can tell you he taught me something in dramatic production! I decided to be at every rehearsal just to see what really took place.

Naturally he does these things in rotation. When I first asked whom he had cast for the various parts, he had not the remotest idea what he was going to do. When I next made inquiries I found the whole play had been cast.

The two narrators—George Relf and Harman Grisewood—were evidently chosen because their voices were not in the least alike. For Wren, Rose cast Peter Ridgeway, whom I came to know fairly intimately during the production. His idea there was obviously to get someone who could be charming and who could also make his voice sound old for the cathedral scenes, quick and decided for the young surveyor, and also virile for the spirit who returns to earth in the Epilogue.

The casting of Sancroft and Evelyn—both serious characters—might have been a failure had not the producer contrasted men like Scott-Gatty and Patrick Curwen. Those two were a great success.

Wilfred Fletcher, as King Charles—candidly speaking—was a bit of a shock to me. I was caught badly. He did not look like King Charles at all.

That is where any unwary person might be caught at first. I forgot he would not be seen and that the voice was the only thing that mattered. His interpretation of the part pleased me enormously in the end

Lady Coghill and her daughter

Faith—Ann Stephenson and Gwen-dolen Evans—were obviously chosen carefully. Both proved admirable.

We all met a week before the first broadcast. There were to be four rehearsals in the studio—personal rehearsals, that is—and four from the dramatic control panel. At the first the play was read. I rather imagined Howard Rose would just *let* it be read. Not he! He began on inflections immediately. Neither did he cease until he persuaded everybody he was right. He certainly persuaded *me*.



The scene with Evelyn and the Dean was founded on fact; Evelyn did see the King on the Dean's behalf, suggesting Wren should be made deputy-surveyor and that he should take the cathedral in hand

After the rehearsal he told me he thought we should have to cut a good bit out as the play was too long. I spent the whole afternoon with him and we cut every possible sentence that *could* be cut without damaging the play.

Disturbing Experience

The experience of hearing lines one has written spoken by other people—and in such sincerity, too—is rather disturbing. I came away miserable after the first rehearsal. It all sounded hopeless to me. After the second rehearsal it certainly sounded better and I began to appreciate that Howard Rose had soaked himself in the atmosphere of the play.

His own copy of it was marked all over with inflection signs. Evidently

THE STORY OF A RADIO PLAY—Cont.

he was taking no chances. At the fourth rehearsal it began to go smoothly and the actors began to "gag in" bits here and there.

Aubrey Mather, who was so clever as the verger, convulsed us with some of his lines. I began to think I had really written a comedy part for him.

German Convulsions!

As for Abraham Sofaer, he determined to be a German tourist and nothing *but* a German tourist for that play. I left him free to do more or less what he liked so long as he kept to the character. He convulsed us all with his German observations.

When it came to the control panel things began to sound more like broadcasting. I went with the producer and sat near the panel to watch the various controls. There is a large loud-speaker in one corner of the room and a microphone for the producer's use. The actors remained in 7B and 7C as before.

When they spoke we heard them. When the switch was reversed, they could hear us through *their* loud-speaker, but we could not hear their replies. So that a conversation meant juggling with the switch a good deal.

Naturally the actor's voices, no matter how many studios are in use, are under direct control at the panel, and a controller sits there throughout the play. The effects department is also connected up and can be spoken to through the microphone.

The actors are "flicked"—in other words, they are given lights when to begin.

In difficult scenes, like the one where the battering ram was used by Wren to raze the piers of the old cathedral, lights are given during speeches.

Peter Ridgeway (as Wren) could not *hear* the crashes. He simply waited for them and "took a light" for his next sentence.

Controlling one of these radio productions is no child's play. You have to keep your wits about you or the result may be the reverse of what you really want. The effects

department has to be signalled when necessary, even though they have their own copies, well marked, and can hear the play by headphones.

The experience of writing my first radio play has taught me that every sentence of what I may write in the future *must* be rehearsed by myself *aloud* before letting it go down on to paper.

Surprisingly little of my dialogue was altered, as a matter of fact, but what we did alter—often at the suggestion of the actors themselves—*could* have been right originally had I had any previous experience. To say that it is fascinating—this experience of hearing others deliver what you have written—is saying the least of it.

Watching your actor build up his part by careful inflection, and delivery generally, is absolutely thrilling.

You soon get out of the way of long

characters are *in your first lines*. We are all getting good at taking in drama through the ear alone, but we cannot be expected to work miracles.

Another thing that has occurred to me is that it is no good to write very short parts. I had to do it in "*Wren*" because I wanted historical characters who actually lived and who were important in the story, but in *Mozart*, the first of a series of radio plays I am writing for Broadcasting House on the lives of the musicians, I am trying to do with less people and make their parts longer. I was very struck with the thorough methods of the B.B.C.

Heat of Inspiration

Talking to Val Gielgud about *Mozart* I suggested we might have a record or so of the composer's music here and there. "Not a record," he said. "I will get you the E Orchestra and the Wireless Chorus. We may as well do it properly." From that I think the best way is to write at white heat of inspiration and ask boldly for what you want when it comes to the point. They seem to expect you to do so.

One of the radio critics recently said he was of opinion that there were a lot of amateur producers at Broadcasting House. You can take it from me that it is not so by any means. Broadcast plays have a great future before them.

Val Gielgud is not asleep: neither is he an amateur. As for Howard Rose. I say frankly I have the greatest admiration for the thorough way in which he works. I

do not suppose he realised it, but he made me quite uncomfortable that he should take so much trouble to have my lines done just as they should be.

I felt inclined at times to suggest altering the lines, but he simply went on as though I had been Shakespeare or somebody. I am sure I am right in saying if you write a play for broadcasting, all you have to do is to cry for the moon.

They will give it you.



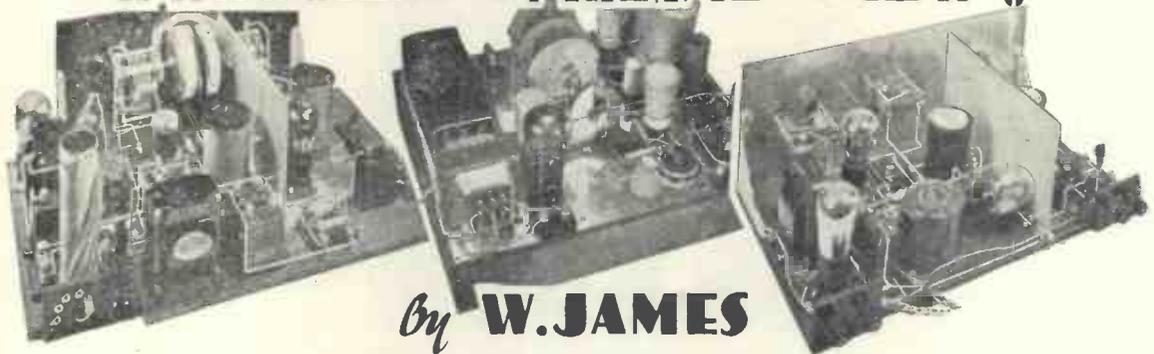
I did not dare to suggest Wren was "engaged", because he was not actually betrothed for a year or two afterwards. So I had to be content with his being "a bit enamoured of her", as the verger put it

speeches and learn to split things up. Also, you soon learn to make the characters call each other by name, remembering that you *yourself* know who's who, but that the listener does *not* know until you have taught him.

I have often been bewildered when playwrights have not exercised sufficient care in this very important matter and I determined to make it quite clear who was speaking.

Another point, I found, is that you must make it clear where your

CAN YOU DESIGN A THREE-VALVE SET?



By **W. JAMES**

IF you have been interested in wireless for some time you can probably take three valves and couple them with a few components to produce a working receiver. That is not design, however.

You can call it design, if you will, but how different from the commercial man upon whose work the fortunes of his firm rests, who painstakingly, day after day, examines this part and that part, tests circuit after circuit, and all the time tries to produce better results with more reliable working—and all for less money than before!

Difficult Subject

When you come to look into the matter a little more fully you sense the magnitude of the subject.

I have made a sketch (Fig. 1) showing a few of the possibilities, leaving out many important things such as the power supply, the plate circuit decoupling, and the grid-bias arrangements.

There are three valves, one naturally being the high-frequency amplifier, the next the detector, and the last the power valve. Then there are the various parts which are connected to provide such selec-

tivity, quality, power, and magnification as seems to meet the requirements.

There are several ways of starting to work out a design. A good way is to work from the loud-speaker end. Thus we can start by fixing on the loud-speaker and power valve, as we know how much volume can be obtained from various valves and loud-speakers when the stage is fully loaded.

When the power is to come from the mains we can, if we like, disregard the voltage and current required and choose, say, a moving-coil loud-speaker and the valve capable of providing the necessary output.

A large pentode may be chosen when great volume is needed, or a smaller pentode or a triode for less output.

The high-tension voltage supply can be fixed to suit, the valve being run at its maximum voltage and current or at a lesser value. Thus there is scope here and the merits of directly-heated and indirectly-heated valves may be considered.

Now the loud-speaker must be

coupled to the valve and a tone-correcting or a safety resistance be provided in the case of a pentode.

We can use a transformer coupling with or without a choke-condenser filter. The connections are shown in Figs. 2 and 3. Here there is scope for experiment, and the parts can be arranged in various ways.

First the transformer or choke

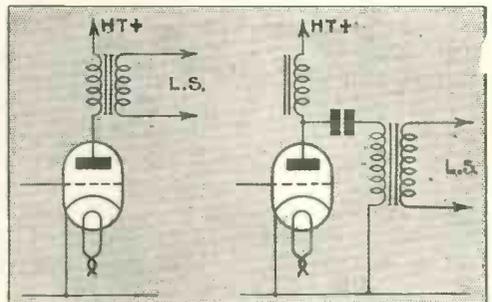


Fig. 2.—Output circuit for three-electrode valve, with and without a choke-condenser filter

must have enough inductance when carrying the plate current. If the inductance is too little, low notes will be lost. If the ratio of the transformer is wrong, power will be lost.

Secondly the coupling condenser must have enough capacity or there will be a reduction in the strength

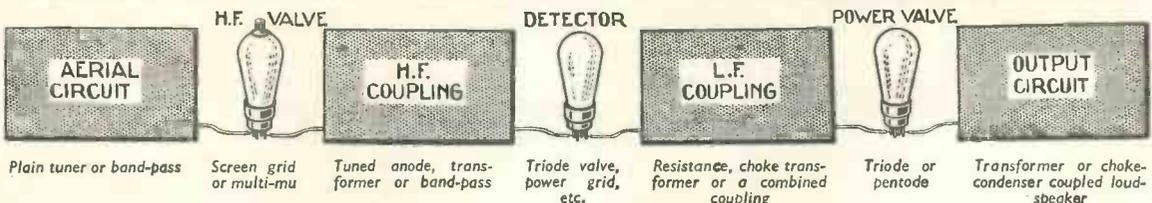
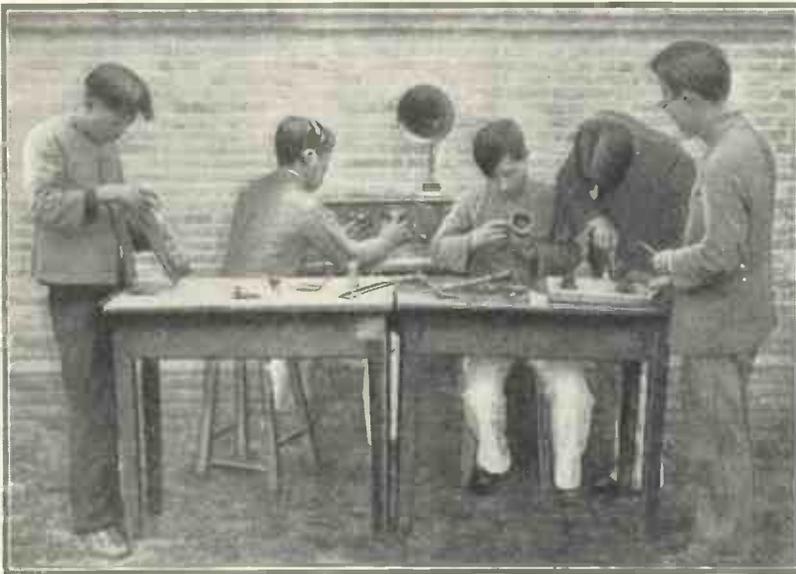


Fig. 1.—Skeleton layout of three-valve circuit with the chief combinations indicated

CAN YOU DESIGN A SET?—Continued



RADIO "RESEARCH" IN THE FAR EAST

A radio class at a school run by English missionaries among the poor classes of Japanese

of the low notes. Its rated working voltage must be high enough, too, or it might break down after a while.

The third point is in connection with the resistance-condenser filter used with the pentode of Fig. 3.

High Notes Reduced

If you lower the resistance the strength of the high notes will be reduced, and this will also happen if you increase the capacity of the condenser. The values must be proportioned to suit the valve and loud-speaker.

One diagram shows a resistance and condenser joined to the auxiliary grid of the pentode. These parts

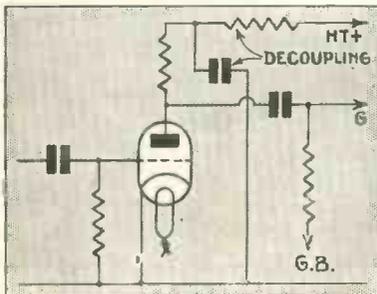


Fig. 4.—Decoupled detector circuit with resistance coupling to next valve

are sometimes necessary for decoupling the grid or for reducing the value of the high tension applied to the grid.

It is easy enough to work out the value of resistance if you know the current passed, as 1,000 ohms drops 1 volt per milliampere. Usually

though, the best value of resistance is found by experiment.

A condenser of 1 microfarad is nearly always suitable, but it must be capable of withstanding the full pressure of the high tension and a bit more for safety.

An examination of the various sets described in "Wireless Magazine" will show usual values which can be used as starting points if you are producing something new yourself.

Having thus roughly described the output stage—and don't forget to test quality with the loud-speaker in the cabinet—we must look at what is really a much more complicated stage. This is the detector and its coupling.

The detector rectifies the high-frequency signals. We get reaction from the detector, and we couple this valve with the grid of the power valve.

Now there are several possible couplings. We could use a resistance coupling, for example. With a resistance coupling we might obtain a magnification of about 80 per cent. of the amplification factor of the valve, that is, 28 when the valve has an amplification factor of 35. This means that if the power valve has a grid bias of negative 20 volts the detector must handle a strong signal to load it.

Power-grid detection would be

suitable, but as the voltage of the plate might be rather low owing to the fall in voltage across the anode resistance (Fig. 4) and the decoupling resistance, which is practically always necessary, the chances are that choke coupling would be better.

Choke Coupling

The choke coupling (Fig. 5) has the advantages that the voltage drop in it is less than that across a resistance, and the magnification may be a little greater. This is a good arrangement when power-grid detection is desired. You cannot have power-grid detection and a step-up transformer with the usual detector valve.

With the transformer connected as in Fig. 6 and having a 1:4 ratio, with a power valve having a grid bias of 20 volts, the voltage of the speech frequencies which must be set up across the primary fully to load the power valve is about 5. The input to the detector is but a fraction of this, as the usual mains valve has an amplification factor of 35.

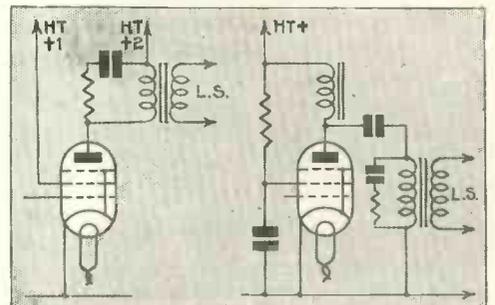


Fig. 5.—Output circuits for pentode valve, with and without a choke-condenser filter

Not every transformer would be suitable for the circuit of Fig. 6. The plate current might be 5 milliamperes or more and many transformers when carrying this current would give poor results.

A different circuit can be used, as in Fig. 7, which shows a resistance-coupled transformer. There are variations of this circuit.

"Auto" Coupling

A choke may be used instead of the resistance and the transformer may be auto-coupled. The value of the condenser is important, chiefly in connection with the strength of the low notes, and it must be capable of withstanding the maximum pressure in the circuit, which may well be much above the normal high tension.

USEFUL HINTS BY W. JAMES

If the value of the anode-circuit choke or resistance is too low the amplification will suffer and the relative strength of the high and low notes may be affected.

A transformer designed to work with a small or no direct current in its primary winding may be chosen instead of the usual type.

In the circuits of Figs. 4 and 5 there is a grid leak. This must not be of high value when working into a fair-sized power valve and it should normally be no greater than about 200,000 ohms in resistance.

From this value it is possible to fix a suitable size of coupling condenser.

If this were, say, .0005 microfarad, there would be a great loss in the lower notes as the impedance of the condenser would be so high in comparison

with the resistance of the grid leak.

A good value would be .1 microfarad, but the insulation resistance must be very high. With these two values (of leak and condenser) all notes would be transmitted very well.

There are, of course, capacities across the grid leak and anode resistance or choke, but these would normally not be enough to weaken the high notes.

The detector will have a grid condenser and leak (anode bend not being used these days) and also certain components in the anode circuit to carry high-frequency currents.

It is necessary to do two things. First, to provide a means for stopping any high frequency reaching the power valve; and secondly, to provide a satisfactory path for high-frequency currents from plate to filament or cathode. There is also the reaction circuit to be considered.

Fortunately, one combination is all that is necessary as a rule. We see this in Fig. 8. There is a high-frequency choke, a by-pass condenser and the reaction circuit, comprising a coil and tuning condenser.

Briefly we may say that the high-frequency choke tends to stop any high - frequency current from reaching the low-frequency circuit, and the by-pass condenser provides an easy path for the high - frequency currents to pass to the cathode or filament. There is also a second reaction circuit.

Now the larger the condensers, the easier is the path for the high-frequency currents, and the better the results from this point of view. But the larger the capacities the more are the top low-frequency notes reduced.

Here, then, is a good opportunity for experimenting and a further point to note is the relative values of the by-pass and reaction condensers. I have used a by-pass of from .0001 to .002 microfarad and a reaction condenser

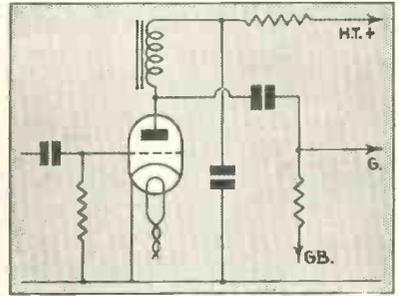


Fig. 5.—Choke-coupled detector circuit to avoid large drop in high-tension voltage

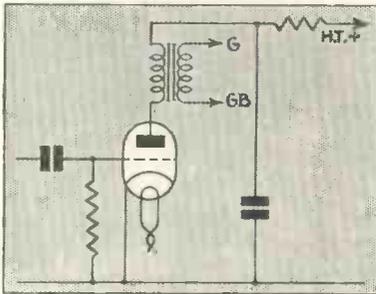


Fig. 6.—Typical circuit with standard low-frequency transformer coupling

of .0002 to .0005 microfarad.

Much depends upon the low-frequency coupling and the valve, for when the valve is of low impedance and when the anode resistance is low as well, large capacities may be used.

When using a valve of higher resistance the capacities must be smaller in order to reduce high-note loss. But, of course, when a pentode is used a bigger loss can be tolerated than when the output valve is a triode.

There is much scope here for hours of experimental work.

Grid Leaks and Condenser

Usual values for the grid condenser and leak are .0002 microfarad and 2 megohms. The values can often be reduced with advantage to .0001 microfarad and 1 megohm or even less, down to .25 megohm. As the values are reduced so is the high-note loss in the grid circuit of the detector reduced.

The values of the parts associated with the detector affect the smoothness or roughness of the reaction. Quality, sensitivity, power-handling



THE HOME OF THE TERMINAL AND THE WANDER PLUG

Part of the main show at the Belling Lee factory. In the foreground can be seen clamping and eyeletting processes, with a power bench on the left.

CAN YOU DESIGN A SET?—Continued

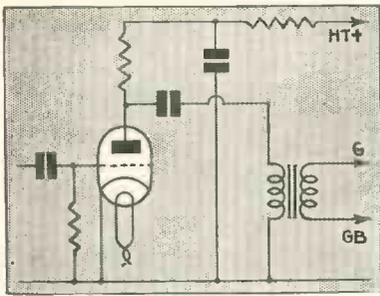


Fig. 7.—Transformer circuit with resistance feed to conserve the primary inductance at a high value

capacity and the reaction have all to be considered, therefore.

The valve before the detector, a screen-grid, can be of the ordinary type or of the multi- μ pattern. Then there are the tuned circuits and the volume control to be considered.

Easy Volume Control

There is no doubt about the ease with which amplification can be controlled when the valve is of the multi- μ type. This is a big point.

With regard to the tuning and selectivity, two or three circuits may be necessary. If there are to be two circuits (shielded, of course) one will couple the aerial to the grid of the high-frequency valve, and the

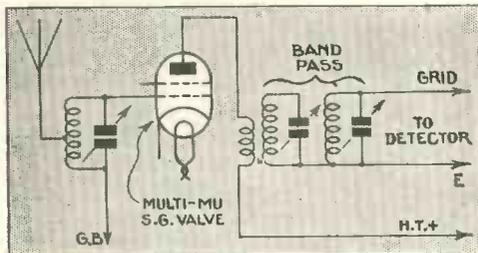


Fig. 9.—Circuit with band-pass tuning between a variable- μ valve and the detector

other will couple its plate and the detector.

When, however, three circuits are necessary, the point arises as to whether the band-pass circuit shall couple the aerial and valve, or the high-frequency valve and detector.

This point can be decided after the high-frequency valve has been chosen and, personally, I would put the band-pass circuit between the valves when using a multi- μ screen-grid, but between the aerial and the high-frequency valve when using an ordinary screen-grid valve as in Figs. 9 and 10.

There are, of course, several ways of arranging the circuits themselves. You can use a high-frequency trans-

former type of coupling between the valves or a high-frequency choked circuit.

The results as regards selectivity and possible magnification may not vary much whichever method be used, and it is possible to have equal stability.

The whole matter is really one of which is the best to use from the points of view of convenience and cheapness.

Similarly with the aerial circuit, a tapped coil or transformer can be used, with suitable switching. There is much to be said for simple switching, of course, and simple coils may be decided upon in order to gain the advantage of fewest switch contacts.

The whole subject of the design of coils is a vast one and there is here ample scope for experiment.

From this brief outline it will be seen that there are many possible arrangements and values of parts. The results depend upon the working of the parts collectively, that is upon the whole arrangement. An individual section may be well designed, but a poor aerial coil may halve the sensitivity.

Interaction between wiring may be the cause of instability and low high-frequency magnification. The parts may be poorly placed and lead to hum in a mains set, and so on.

It will, therefore, be seen that there are many factors for consideration. If you are experimentally inclined, but do not know very much about the subject, the finest method is to build one of the published sets upon a large baseboard and then to take one circuit at a time. Change the components and note results. Try the

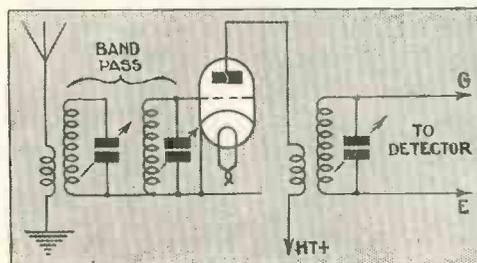


Fig. 10.—Circuit with band-pass tuning between the aerial and the valve

effect of altering this part and that.

Experiments with high-frequency circuits may usually be made at little cost as coils are easily wound and there is no need for switching in an experimental set.

But great care must be taken afterwards when switching is included, as it is possible that couplings may be produced by the contacts and wiring.

There is one particular point to look out for and that is the obtaining

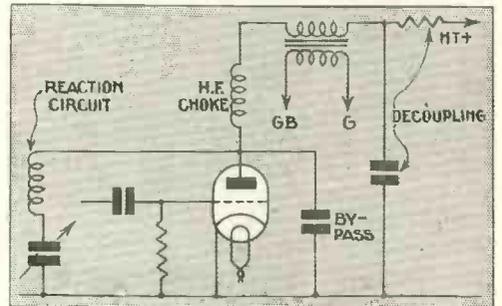


Fig. 8.—Transformer-coupled circuit with addition of high-frequency choke and anode by-pass condenser

of exceptional results with definite valves.

You might find it possible to hot up a high-frequency circuit with the particular high-frequency valve used only to discover that the circuit is unstable with a different valve.

But still, there is no doubt about the exceptional results which can be obtained when a circuit is gone over and full use is made of all parts, much the same as a hot-up car can be made better than a standard one.

Chief Interest

It is here that the chief interest in experimenting lies for many people.

The ear is not able to detect slight differences in volume or sensitivity, and it is advisable to use meters as far as possible. When experimenting with the high-frequency circuit, for example, a meter connected in the anode circuit of the detector will be of great help.

A number of small improvements which, by themselves, do not produce an audible change in results will probably together make a marked difference.

In fact, the importance of making measurements instead of relying upon the ear cannot be over-estimated. Inexpensive meters will serve for many measurements.

A Popular Quintet



An impression in caricature of the Gershom Parkington quintet who, since their first broadcast on December 27, 1928, have frequently delighted listeners with their transmissions of popular orchestral music

NEW LOSSES BALANCE NEW GAINS

By

PERCY W. HARRIS M. Inst. Rad. E

WHEN times are prosperous and a company is making money hand over fist, extravagance goes unchecked. Somebody thinks it would be good to build palatial new premises, so up they go, and it is nobody's business to find whether the new expenditure is justified.

Hard Times

But what a different story when times are hard! Every item of expenditure is examined to see whether it is necessary, or whether some way can be found to achieve the same purpose at lower cost.

If any profit at all is to be made—indeed if bankruptcy is to be avoided—every penny has to be conserved.

In radio to-day, at least so far as technical progress is concerned, we are suffering from over-prosperity. Almost daily we hear of new increases of power at the transmitters, the power radiated is modulated almost to the full extent, while receiving apparatus has gone up so much in sensitivity that results are obtained to-day with only three valves which only a few years ago were unobtainable with *any* number.

Now I have been examining the position recently in connection with new research work I have undertaken, and I am appalled at the terrible extravagance to which we calmly acquiesce.

Our valves have increased so much in efficiency and the gain per stage is so much higher than it was that we are blind to the fact that we are not getting one-half of the sensitivity which we should obtain if we went right out for efficiency.

Take, for example, coils. The losses in the average modern screened coil makes me shudder! It is not long ago that investigations were made into the losses of the average coil (I am referring to the time when plug-in coils were used and the modern dual-wave coil was unknown), the result of the investigations being that losses were reduced to a minimum. Attention having been directed to the subject of losses, investigations were stretched over a wide field and variable condensers were found to be well down the scale in efficiency.

Prior to the low-loss investigations inefficient coils and poor condensers

had been the rule. Losses due to the passage of the field through dielectric material of poor quality had been the main trouble with the coils; concentration of the electrostatic field through solid dielectric of poor quality was the main trouble with variable condensers.

In the case of coils a big improvement was made by choosing suitable formers, using the correct gauge of wire, and arranging the coil in such a way as to have a high proportion of inductance to resistance.

Startling Improvements

When this was done the improvements effected were startling. Condensers were raised to a high level of efficiency by redesigning them in such a way that insulating separators were not only reduced to a minimum but they were so placed that only a weak electrostatic field could pass through them.

As soon as we were through this stage the valve manufacturers decided that it was time to put up the efficiency of valves, whereupon mutual conductances became steadily higher.

Then, like a gift from the gods, came the screen-grid valve and the overall efficiency of the set went up with a bound. By this time, too, everyone insisted on having tuning coils made in such a way that the change-over from the medium to the long waveband could be made by one movement of the switch.

And now came another trouble. The open type of coils had not given much trouble when the gain was relatively low, but with the new high gain it was found



MODERN COIL EFFICIENCY
This fine chassis for an A.C. set is equipped with quite large and efficient coils, which can be seen in the centre of the set

necessary to shield them. If you put the shield too close to the coil the losses become very high and thus you must either make a very large shield for a normal size of coil or else make a very small coil in a reasonable size of shield.

Lower Efficiency

You cannot make a small coil without reducing the size of wire for a given inductance and, with the concentration of the long-wave winding and the reaction winding into the small space available, efficiency began to drop considerably.

Have we noticed this? Not in most cases!

I find, too, that some of the cheap condensers now being marketed have reverted to the old pernicious method of construction with which the electrostatic field is concentrated through small insulated washers. But nobody seems to worry, we have gain to spare, so why make anything efficient?

This is not how progress should be made. If you want to know what you are missing with some modern coils you should take a 2½-in. former and wind, not a dual-wave, but just a medium-wave coil with some sixty turns of about No. 20 gauge wire, spacing the turns with a thread.

At the bottom end of this coil wind on about a dozen turns of fine wire as a reaction winding and ignore the long-wave side.

Connect this up to a high-grade variable condenser and tap the aerial about two-thirds of the way down through a .0003-microfarad air-dielectric variable condenser. Connect it up to a detector valve and one transformer-coupled low-frequency stage and you will be agreeably surprised at what can be brought in on an average night.

Not All Condemned

Do not think for a minute that I am condemning all of the coils now sold. In this regard I think the larger coils (not screened) sold for home constructors are by no means bad, and some of the screened types are good.

The whole subject is worthy of attention, and I am inclined to think that if we have efficiency to throw away we might carefully consider where is the best place to sacrifice it. By having low-efficiency coils and condensers we are sacrificing one of the things we need most—selectivity.

Think it over!

Keeping Stations on Their Wavelengths

FOR some years past the radio station attached to the National Physical Laboratory has been transmitting at regular intervals fifteen different radio frequencies for the accurate calibration of wavemeters and other apparatus, in order to help transmitting stations to keep to their allotted wavelengths.

It has now been decided to change the programme. The fifteen radio frequencies are replaced by the

G.M.T.

- 10.40 Announcement in morse. "CQ de G5HW (three times). Standard frequency transmission at 1,000 cycles per second."
- 10.45 Transmission of modulation frequency uninterrupted.
- 11.45 Modulation frequency changed minus 2.5 parts in a million. (This is so that those receiving the transmissions can decide whether their own frequency of 1,000 cycles is above or below that of the National Physical Laboratory standard).



THE POST OFFICE MEASURES FREQUENCY
At Dollis Hill, in north-west London, the Post Office owns a research station. This photograph shows part of the frequency-measuring equipment

transmission of a single audio frequency superimposed on a radio-frequency carrier wave.

This standard transmission is made on the second Tuesday of each month on a wavelength of 830 metres, the modulation having a frequency of 1,000 cycles. The accuracy is about two parts in ten million.

A second standard frequency transmission, intended largely for amateur experimenters, will be maintained in the form of a continuous wave on 168 metres. This is transmitted on the first Tuesday in March, June, September and December.

The following time tables give full details of the two transmissions:—

1.—STANDARD FREQUENCY OF 1,000 CYCLES.

Standard Frequency.—1,000 cycles.
Carrier-wave Frequency.—360 kilocycles (830 metres).
Date.—Second Tuesday in month.
Time.—10.40 to 12.00 G.M.T.

- 11.55 Announcement in morse. "CQ de G5HW. Correction to standard frequency $\frac{\text{plus}}{\text{minus}}$ x parts in 10 million" (three times).
- 12.00 Programme terminates.

2.—STANDARD FREQUENCY OF 1,785 CYCLES.

Standard Frequency.—1,785 cycles (168 metres).

Date.—First Tuesday in March, June, September, and December.

Time.—21.00 to 22.00 G.M.T.

- 21.00 Announcement in morse. "CQ de G5HW (three times). Standard frequency transmission at 1,785 kilocycles per second."
- 21.02 Continuous dash.
- 21.10 Announcement as at 21.00.
- 21.12 Continuous dash.
- 21.20 Announcement as at 21.00.
- 21.22 Continuous dash.
- 21.30 Announcement as at 21.00.
- 21.32 Continuous dash.
- 21.40 Announcement as at 21.00.
- 21.42 Continuous dash.
- 21.50 Announcement as at 21.00.
- 21.52 Continuous dash.
- 22.00 Programme terminates.

Automatic Volume Control

SINCE I wrote the two articles already published* on the subject of automatic volume controls, it has occurred to me that there are two other types of circuit that should be mentioned, since each has certain advantages over those I have already dealt with.

The first is interesting in that it

By P. WILSON, M.A.

A Mazda UU2 valve answers the requirements very well indeed.

Of course, in this arrangement, as in the ordinary diode detector, the low-frequency signals are not amplified in the detector stage.

Nor is there a separate anode

standing idle inviting to be used either for the purpose of a tuning indicator, as previously described, or merely in order to obtain a better grid-current characteristic; both the anodes are

atically cancels out inside the valve.

This is a feature that the Wunderlich valve has in common with the arrangement of two valves coupled together as a push-pull detector, though the actual operation of the Wunderlich is better described as push-push rather than push-pull.

Of course, a two-valve push-pull arrangement could equally well be used though naturally it is more expensive.

Effect of Modulation

The other type of circuit is based on a different principle altogether, and to appreciate its operation and its characteristics it is best to go back to the statement of the fundamental requirement which I gave in my first article.

This was as follows:—

The principle of an automatic volume control is simply this: We have to find some part of a circuit after the high-frequency amplification in a receiver, or we have to design a special circuit for the purpose, in which a voltage is built up varying with the signal strength as passed on by the high-frequency amplifier... Then we have to feed back this varying voltage to the high-frequency amplifier in such a way that it will reduce the amplification as the signal strength increases and increase it as the signal strength decreases.

Note the words *in italics*. In all

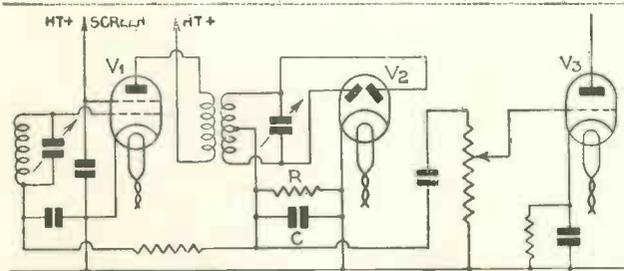


Fig. 9.—Automatic volume control operating from a full-wave detector

employs a full-wave rectifier as detector, though in other respects it is similar in its operation to the diode grid-leak rectifier. The fundamental circuit arrangement is shown in Fig. 9.

Here v_1 is a variable-mu screen-grid valve, v_2 is a full-wave rectifying valve acting as a double diode detector, and v_3 is the following low-frequency valve.

Full-wave Detection

The grid rectifying elements are R and C , but for the latter a tuned acceptor circuit can well be substituted as previously described. These rectifying elements are connected at one end to a centre-tap of the tuned-grid coil, the ends of which are respectively connected to the two anodes of the rectifier.

By this artifice full-wave rectification is in effect secured and the grid current passing through the grid leak R is roughly doubled.

Provided a suitable valve is used for v_2 , therefore, the efficiency both as a rectifier and for the purposes of automatic volume control is considerably increased.

A suitable valve is one in which the two anodes are symmetrical with respect to the cathode and in which the grid current is of the right order.

here used, as it were, as grids.

In a special valve introduced in America this season, and known as the Wunderlich, this requirement has been met. This valve has one anode and two grids, which are insulated from each other but intermeshed so as to be symmetrical with respect to the cathode.

In this case the two grids can be connected to the ends of the tuning

coil (Fig. 10) with the rectifying elements joined up to a centre-tap, as above, and the anode can be used either in the ordinary way for connection to the succeeding valve as in a grid-leak triode detector, in which case the low-frequency signals will be amplified before being passed on, or alternatively it may be used for either of the special purposes I have mentioned.

In the former case, the arrangement has a very special advantage in that the high-frequency signals arrive at the two grids in opposite phase and therefore no high frequency is carried on past the anode; it auto-

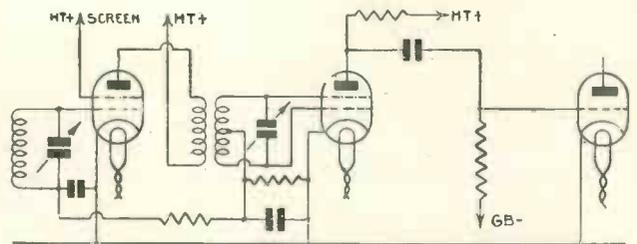


Fig. 10.—Automatic volume control with a Wunderlich valve detector

the examples so far given the varying voltage has almost thrust itself upon us in the detector circuit. Our only real concern has been to make the range of variation big enough. But it should be noticed that these methods concern themselves only with the signal strengths of the amplified carrier wave. They have no concern at all with the depth of modulation.

* "Automatic Volume Control," page 354 of October and page 462 of November.

If two stations produce carrier-wave signals of equal strengths the automatic volume controls so far described will choose the same particular degree of amplification for the high-frequency (or intermediate-frequency) portion of the receiver, notwithstanding the fact that one station may be modulating the carrier much more deeply than the other.

The audio-frequency signals passed on by the detector stage may therefore be of very different strengths in the two cases.

In short, the controls are not really automatic *volume* controls at all, though I have no doubt the name will continue to stick to them; they are automatic *sensitivity* controls.

Volume-level Control

The method I am now going to describe is an automatic *volume level* control in the strict sense. The voltages fed back to control the high-frequency amplification are proportional to and are derived from the audio-frequency currents as fed to the loud-speaker. In this way variations in depth of modulation between different stations are effectively dealt with.

At first sight this appears to be a better idea altogether. But if you think for a moment you will appreciate that there is a hidden snag of rather a serious kind. Consider, for example, what will happen when an orchestra is playing.

If it produces a loud note there will be a relatively large audio-frequency current fed to the loud-speaker. The automatic volume control will then function so as to reduce the amplification.

Distortion

On the other hand, when a soft note is being produced there will be a small audio-frequency current and the control will operate to increase amplification.

In other words, the control will make loud notes softer than they should be and soft notes louder. And since the loudness of a note depends not only upon the current being fed to the loud-speaker, but also upon its frequency, the control will operate differently for notes of different pitch.

Seeing His Relations

*In days gone by great-grandpa used to say :
" I hope to see you all on Christmas Day."
Relations gladly flocked to him in dozens,
Grandchildren, nieces, nephews, great and small,
His house was large enough to hold them all—
Babies in arms, wee tots, and countless cousins.
But now when flats—and incomes—are so small
The host, who cannot take this view at all,
Is less hospitable, though, doubtless, wiser :
The modern grandpapa is wont to say
To all his relatives : " On Christmas Day
I hope to see you—on my televisor !"*

LESLIE M. OYLER.

Such a control, therefore, is very far from being distortionless.

In practice, I understand, these disadvantages are not nearly so disturbing as they may appear on paper. And since this is the method adopted by one of the leading firms in America and since in any case it is easily added to an existing receiver, I came to the conclusion that my description of automatic volume controls would be incomplete if it had no reference to it.

I therefore give the fundamental circuit in Fig. 11, though I have not actually tried it myself. It will be seen that some of the audio-frequency current from the output valve is fed through a potentiometer P, which controls the diode rectifier and V, produces a uni-directional current flowing in the resistance R, which is connected between the grid circuit and the cathode of the screen-grid valve. The potentiometer P governs the range of the automatic control.

The direction of the *positive* current in the rectifier being from

anode to cathode, the direction of the current in the outside circuit is therefore as shown by the arrows. The grid of the screen-grid valve is thus negative to the cathode, as of course it should be.

On the whole, it appears that of the methods I have described those which are the most satisfactory, from the point of view of causing the least distortion, are the diode grid rectifier and its derivatives.

Improved Characteristics

My own method, described in the second article, is in one sense a derivative of the diode grid rectifier though, owing to the use of a definite positive voltage on the anode, it appears to have substantially different and improved characteristics.

Of the methods using triode detectors the push-pull grid-detector and the Wunderlich detector have distinct advantages in that high-frequency currents are kept out of the low-frequency amplifier, but both of them are limited in the input they will stand by the curvature of the anode current/grid volts characteristic of the valve.

For this reason as soon as we get a Wunderlich type of valve in this country I shall proceed to use it after the manner of my own circuit, in which, of course, it will still function as a full-wave rectifier, though I shall lose the high-frequency cancellation property.

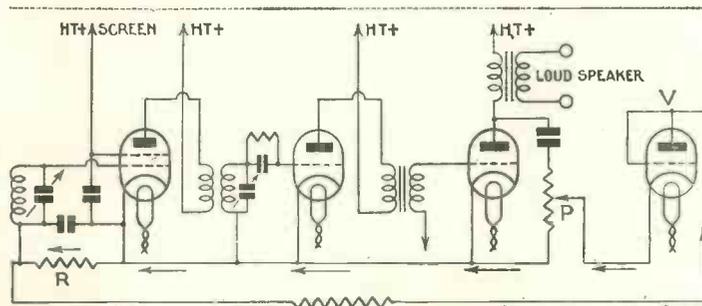


Fig. 11.—Automatic volume control operating from an extra valve controlled by the output circuit

RADIO IN REVIEW

Battery-driven Sets :: Electrostatic Loud-speakers :: Telephone Recorders
Sidebands Again :: Super-het Developments

ONE great advantage of using the mains is that one need not be over-economical in current consumption. With a battery-driven set, on the other hand, anything which helps to cut down high-tension current, without affecting volume or quality, is well worth consideration.

The power amplifier, of course, makes the biggest drain on the high-tension battery, and it does this so long as the set is "alive," that is, whether signals are being received or not.

Cutting Off the Current

A recent improvement is designed to cut off the anode current of the power valve so long as signals are not actually being received, thus saving what is clearly an unnecessary drain on the high-tension supply.

The method employed, which is very similar to that used in certain systems of automatic volume control, consists of applying a heavy negative bias to the grid of the power amplifier so that it is normally "paralysed."

As soon as a signal is received, the carrier wave of the signal is rectified and produces a voltage which opposes the negative bias already on the power valve, so that the latter is now ready for ordinary operation.

Directly the incoming signal ceases, the original bias is again restored to the point where the amplifier passes practically no plate current.

Biasing Voltage

The electrostatic type of loud-speaker, which is already beginning to make its mark, is handicapped to some extent by the necessity of providing a fairly high biasing voltage across its terminals. This does not, of course, involve any appreciable consumption of energy—as is the case in a mains-energised moving-coil speaker, where the magnetic field is produced by a constant flow of current.

The biasing required for an electrostatic loud-speaker is similar to that applied to the grid of a valve,

By MORTON BARR

It must be there, but it consumes practically no power.

In one of the new Vogt loud-speakers the bias is produced very simply and conveniently by inserting an extra anode in the mains rectifier valve and using it to provide the extra voltage without in any way interfering with the normal supply of high tension to the valves of the set.

The principle of the home recorder as used for making gramophone records in the family circle, or for "bottling" favourite broadcast items, is now being used to solve a troublesome problem in telephony.

It often happens that an urgent telephone call is made when there is no one to receive it. Sometimes, too, it might prove very convenient to have available for future reference an "official" record of a two-sided conversation.

The "automatic secretary" is a device which claims to do both. It has been developed in the Loftin-White laboratories in New York—already famous for various radio inventions.

The idea is to place a pick-up coil near the bell-box of the telephone so that it is energised by the magnetic leakage from the ordinary "repeater" windings to make a gramophone record, either of an incoming message alone or of a two-way conversation.

Once bottled in this way, the messages can be repeated as and when required.

The claims made on behalf of the Stenode Radiostat receiver, when it first appeared, were such as to raise considerable doubt—even amongst those well qualified to judge—as to whether they could be reconciled with the physical existence of sidebands in the ether.

In fact, for some time there were two definite schools of thought, one supporting the text-book theory, the other holding that the so-called sidebands were simply a mathematical

conception without any physical counterpart.

Last year the Radio Research Board appointed a special committee, under the chairmanship of Professor Appleton, to explore the whole subject. The report, which is now available, states definitely that sidebands do exist, and that the performance of the modern ultra-selective receiver is not inconsistent with this fact.

Still to Be Solved

The report goes on to state that whilst razor-edged tuning of the high-frequency circuits, combined with tone correction on the low-frequency side, will prevent actual overlap between two programmes, the problem of excluding the type of interference due to heterodyne "whistles" and "chirrup" still remains to be solved.

The minimum number of valves in the early type of super-het set was eight. Nowadays we get better results using only five stages, due in part to the superiority of the modern valve and in part to recent improvements in circuit design.

Another drawback of the older super-het was the "background" of hisses, chirrups, and whistles nearly always present when not actually receiving a programme. By contrast, the modern super-het receiver is remarkably silent on the in-between settings, owing to the special high-note filter circuits used to eliminate heterodyne "mush."

"Image" Frequencies

Another difference is to be found in the tuning of the intermediate-frequency stage. The present practice is to use a much higher fixed tuning—of the order of 120 kilocycles as compared with 60 kilocycles—which has the advantage of only passing one of the two so-called "image" frequencies.

This means that each station is heard only at one definite point on the tuning dial, instead of coming in at two different settings.



A scene in the Portadyne factory

WE have now tried out a goodly number of the new season's mains sets. The question of mains hum in these sets, though not often dealt with at length in our reports, sometimes causes us a great deal of bother. There are, we regret to say, many mains sets that produce a very high level of mains hum in the loud-speaker.

Opposing Factors

There are two opposing factors. On the one hand, we have the undoubted advantage of high-capacity electrolytic condensers assisting the smoothing. On the other hand though, many of the modern moving-coil units tend to introduce hum of their own, or to accentuate the hum, noise already present in the set.

Some sets we have tried must have inherently well-smoothed mains circuits because, on connecting an external loud-speaker, the objectionable hum is much less than on the self-contained loud-speaker.

If you are choosing a mains-operated set you should certainly make a test of hum level in the reproduction. The way to do this is to de-tune the set so that, while giving maximum sensitivity, it is not actually bringing in any station. Remove the aerial if you like, but, keep on the earth lead.

Then listen carefully at a distance of about one yard from the loud-speaker. You should hear only a high-pitched hum, if anything at all. At one foot or closer, you will, even in a well-smoothed set, hear a much lower pitched "growling" noise, but since normally you are several yards away from the loud-speaker, this obviously does not condemn the set.

Should you hear the "growling" noise at a yard distance or more, the set is not, in our opinion, adequately smoothed. It will probably sound rough when reaction is pushed to the limit, and will certainly be worse when the earth lead is taken away.

We suggest that a well-smoothed mains set should not need the earth lead to keep down the mains hum. It ought not to be very noticeable, unless the mains supply is known to be noisy, with or without the earth.

It will be interesting to see what eventually becomes of the wireless aerial. Sets are getting so sensitive that the old ideal of a 100-ft. length

of wire suspended on a 40-ft. pole no longer applies. Indeed, with the latest super-hets and with straight sets using two stages of high-frequency amplification, the aerial is obviously an afterthought.

Some sets this year, we note, are including what is termed an internal aerial. This is usually a short length of wire tacked inside the cabinet, having a total length of 2-3 ft.

Good Reception

Even with a three-valver, this small aerial works quite well. We have logged half a dozen foreign stations on the internal aerial with more than one three-valve mains set. Flat-dwellers should be specially interested in this idea.

Often when the mains aerial system, whereby the mains conduit is used as an aerial through a small fixed condenser, fails to give clear reception of the local stations, the internal aerial, or a makeshift bit of wire tacked inside the cabinet and joined to the aerial terminal of the set, will work wonders.

What would you say is the best value-for-money type of radio at present on the market? Not, we think, the "natty" little two-valvers, good though they are, but the handsome three-valve radio gramophones around 30 guineas.

For this relatively moderate price—and take into account easy-payment agreements—you obtain a machine that will provide an unending source of entertainment.

Once you have owned a radio-gramophone you will never return to a straight radio set.

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.

Columbia Model 355

THIS is one of the sets that is called a four-valver when really it has only three receiving valves, the fourth being the mains-rectifier valve. Apart from this objection in nomenclature we have nothing but praise for the excellence of the design.

The full, round tone will appeal to all music lovers. There is ample power in reserve, and most of the worth-while foreign stations come rolling in with the volume control far below its maximum setting.

A look inside the large and handsome walnut cabinet shows that plenty of good-quality material has been used. This set is one of the best examples of the classic three-valve sequence of screen-grid, three-electrode detector and transformer-coupled super-power pentode.

Loud-speaker with Good Tonal Quality

These valves work into a mains-energised moving-coil loud-speaker notable for its robust tonal quality and its ability to handle the full output without rattling.

Band-pass aerial tuning precedes the screen-grid



A NEAT A.C. THREE
The Columbia model 355 has a very attractive appearance. The tuning scale is calibrated in wavelengths

valve, and there is the usual intervalve tuning between the screen-grid and detector valves. The three tuned circuits are controlled by a three-gang condenser, with a cord-drive to the knob on the front.

Shielding has been carried out very thoroughly. The detector and pentode valves have a special shield round them. This has to be removed by undoing a milled nut when inserting the two valves.

Every set user will be impressed with the layout of the controls. The horizontal tuning scale is a sheer delight when one operates the knob in the central position on the escutcheon. A pointer moves along the illuminated scale, which is clearly marked in wavelengths. These markings are quite accurate.

A NUTSHELL SPECIFICATION

MAKERS: The Columbia Graphophone Co., Ltd.

PRICE: £16 16s.

VALVE COMBINATION: Screen-grid (Marconi MS4B), detector (Marconi MH4), pentode (Marconi MPT4), and Marconi U12 rectifier.

POWER SUPPLY: A.C. mains of usual voltage and frequency.

TYPE: Table-cabinet set with moving-coil loud-speaker.

REMARKS: A de-luxe three-valver of high-class workmanship and full-toned quality.

The knob on the right actuates the wavelength switch and also brings into operation the pick-up function of the set, as well as switching off the mains when reception is not wanted. As this switch knob changes the circuit connections it very ingeniously turns the whole scale, so that the appropriate wavelength range comes up for radio and the other markings for "gramophone" and "off" are equally helpful as an

indication of what the switch knob is doing.

The only other knob is the volume control on the left, which acts as a sensitivity control on the screen-grid valve for the greater part of its rotation and adds a little reaction at the maximum setting.

As we have before mentioned, this idea provides a progressive increase in volume for both weak and strong signals, though it is not possible to get the last ounce out of the selectivity because reaction cannot be increased while the overall input is decreased.

Fortunately, in this set the inherent selectivity is very good. The band-pass input has a lot to do with this point, but the accuracy of the entire tuning system also helps. With our standard aerial of 60 ft. we

were able to get Müh-lacker with London Regional only faintly heard in the background.

Thanks to the efficient band-pass tuning we could get foreigners without interference, save for an occasional heterodyne whistle.

On the mains aerial it was possible to hear a dozen stations at loud-speaker strength. This was with a mains point at the top of the building. There is no increase in the hum when using this aerial.

Three aerial tap-pings are fitted at the back so that any re-

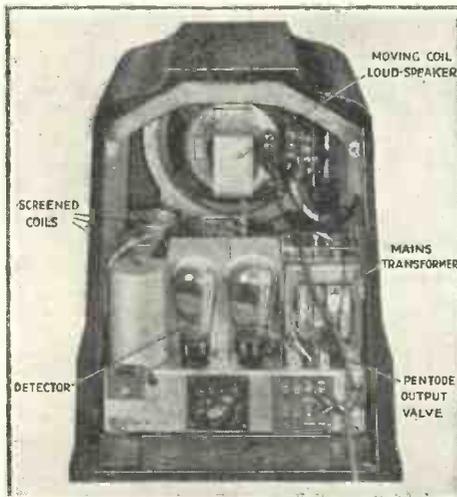
quired degree of aerial coupling can be obtained simply by rotating a small switch. The aerial lead itself does not have to be moved.

Volume of Record Reproduction

If a gramophone pick-up is used, and the good quality of reproduction certainly justifies it, there is no need for a separate volume control, as the knob for radio volume control is also coupled to a separate "gramo" potentiometer inside.

Mains hum is quite moderate, and can be cut down when the mains are bad by a slight adjustment of a potentiometer at the back

A good set—recommended for family use.



A WELL-DESIGNED CHASSIS
This interior view shows the arrangement of the components on the metal chassis. Provision is made for adding a pick-up

Gecophone Nomad for D.C. Mains

ALTHOUGH the grid system is supposed to be spreading its tentacles over the country with a standard 230-volt A.C. supply, there remain, without any early hope of being changed over, hundreds of localities with a D.C. supply. It is to cater for listeners on D.C. that the Nomad was introduced some months ago.

Its success was instantaneous. The Nomad is now accepted as a model of all that a D.C.-mains set should be. In the first place, the

new Osram D.C.-mains valves provide a high degree of amplification. These valves are indirectly heated and are practically as good as A.C. valves.

An important result of using these new valves is the reduction in running cost. The .25-ampere filaments enable the total wattage to be kept down to a reasonable figure.

Still another advantage of the new valves is the reduction in mains hum. Tests show that with normal D.C. mains the Nomad has an absolutely silent background. In this it is definitely superior to many A.C. sets.

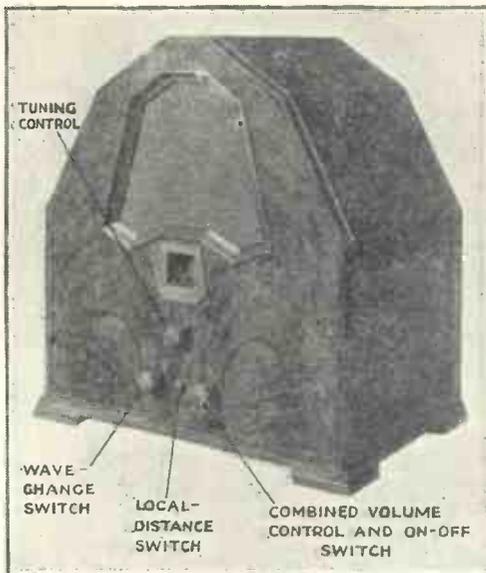
Of course, the smoothing has to be good in a D.C. set because of the nature of the supply. The designers have made a virtue of this necessity, with the result that even when you listen close to the loud-speaker during a silent period in a programme there is so little hum that it might almost be a battery set.

Difficulties of D.C. Receiver Design

One of the well-known difficulties in designing a D.C. set, and one that probably deters many makers from catering for the much-neglected D.C. market, is the need for very complete screening, not only to reduce the chance of mains hum, but to make the set safe from giving the operator electric shocks.

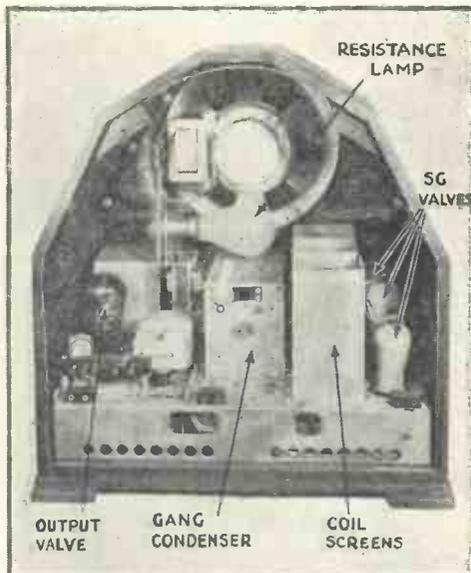
This problem has been solved in the Nomad by arranging an inner screen for the detector components—the most vulnerable for hum—within the main earthed chassis screening. The whole job is sound engineering, as we would expect from this firm.

The valve sequence is unusually sensitive. In addition to the two screen-grid valves for high-frequency amplification there is a



DIGNIFIED APPEARANCE

The dignified appearance of the Nomad is certainly pleasing. The cabinet, of solid walnut, is typical of G.E.C. design.



THE WORKMANLIKE DESIGN

The interior of the set. The mains-voltage adjustment panel and fuses are on the left. All essential parts are shielded.

screen-grid detector and this is coupled to a pentode power valve.

Controls are well arranged on the front of the matt-walnut cabinet. The tuning is done with a single knob working a three-gang condenser and a wavelength-calibrated tuning scale.

Novel Form of Volume Control

The volume control is novel. For the first part of its rotation it works a series aerial condenser and at the maximum setting applies a little reaction. At minimum this knob switches off. The wavelength knob is also the gramo-radio switch.

A very useful auxiliary control is the local-distance switch mounted below the tuning control. For local-station reception we found this switch invaluable in cutting down the volume, which would otherwise have been too much for the volume control to handle.

We liked the quality of the reproduction. The ample size of the cabinet enables good bass-note output to be given. The bass is very free from "boominess." Top-note response is a little above the average.

Volume is more than enough for most listeners, the pentode valve delivering nearly one watt of power to the loud-speaker without any sign of distortion.

The range and selectivity of the Nomad with a normal aerial and earth are completely satisfying. When the controls are properly handled the overall performance is exceptional. On long waves the selectivity is very good, Zeesen coming through clear of Daventry and Radio Paris.

Apart from the absence of mains hum this Nomad set is commendable for its very small degree of background noise.

BRIEF DETAILS

MAKERS: The General Electric Co., Ltd.

PRICE: £24 3s.

VALVE COMBINATION: Screen-grid (Osram DSB), screen-grid (Osram DSB), screen-grid detector (Osram DSB), and transformer-coupled pentode (Osram DPT).

POWER SUPPLY: D.C. mains of 200 volts and upwards.

TYPE: Table-cabinet set with self-contained moving-coil loud-speaker.

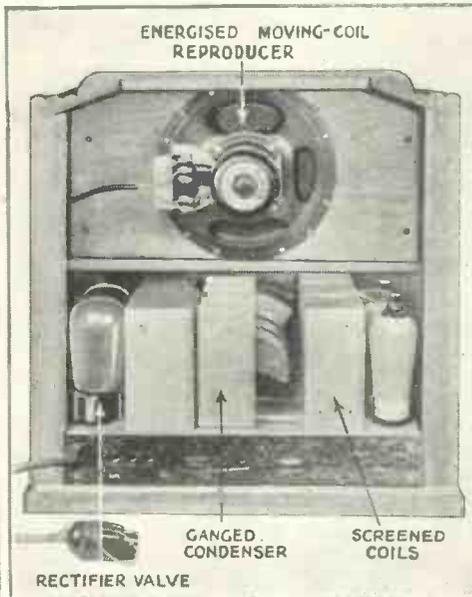
REMARKS: One of the few really satisfactory sets for D.C. mains. Entirely free from mains hum.

Wates Futura Console



VERY MODERN APPEARANCE

The modern design of the Futura cabinet is very striking. The tuning scale is calibrated in wavelengths and the principal stations are marked



ALL PARTS SCREENED

An interior view of the Futura, showing that all coils, condensers and mains gear are screened. The chassis is neatly laid out

HERE is a set that is out of the rut of standard practice. The valve sequence is unusual yet highly effective in giving great power from as many foreigners as are normally clear of bad interference.

Circuit of Distinction

The first distinction in the circuit is the use of two variable- μ high-frequency valves before the detector. There is no doubt about the value of the extra valve, which enables reaction, and all its hazards, to be dispensed with.

Control is thereby simplified, and there is the certainty that, however non-technical the operator may be, he will be able to bring in a host of stations at full loud-speaker strength.

Next, there is an anode-bend detector, quite a novelty in these days of power-grid detectors. Increased selectivity may be claimed for this system of detection, which in this set precedes a resistance-capacity coupling.

Between the detector valve and the final power valve there is an intermediate stage of low-frequency amplification—again an unusual practice. As might be imagined, the overall amplification is much above the average, and for this reason a large power output valve is used.

With so many valve stages it is essential to include a good number of well-designed tuning circuits. In the Futura Set we find three tuned circuits, one for the aerial input and two for the intervalve couplings.

Volume is controlled by means of variable resistances in the cathode circuits of the screen-grid valves.

The moving-coil loud-speaker is, of course, part of the circuit, its

field winding being energised by shunting it across the rectifier output, instead of the more usual method of using the winding as part of the smoothing system.

This set bristles with points of distinction. The whole circuit is well thought out and is interpreted as a table set of pleasing lines.

The modern metal-chassis system is utilised, but instead of cylindrical cans for the tuning coils the makers have designed rectangular boxes, which seem just as efficient and are certainly more compact.

The layout of the controls can be seen from one of the photographs. There are only three knobs; for volume on the right—this also works the on-off switch; for wavelength changing on the left; and for tuning in the centre.

There is a wide wavelength-calibrated scale. The scale itself remains stationary, while the tuning knob actuates a pointer that moves horizontally across it. There is a bulb behind the scale that lights up when the set is switched on.

Although the Futura Six is really only a five-valver, the sixth valve being the mains rectifier, it is one of the most sensitive sets we have come across, and makes us realise how much we are missing by standardising on the three-valver.

Background Noises Quite Moderate

There is just a little mains hum—not annoying when listening to programmes. The set itself is remarkably free from “mush” and even when working “full out” the valve background noises are quite moderate.

Selectivity, in view of the great amplification, is really outstandingly good. We had no trouble in getting Zeesen clear of Daventry on the long waves, nor in getting clear reception of foreigners three channels away from the London stations.

Reproduction has been carefully balanced. There are just enough high notes to keep things brilliant, and more than enough real bass for most listeners' tastes. The quality is not affected by altering the volume control.

Owing to the power valve used in this set an exceptionally large undistorted output can be obtained.

BRIEF SPECIFICATION

MAKERS: The Standard Battery Co.
PRICE: £21.

VALVE COMBINATION: Two variable- μ screen-grid (Mullard MM4V), detector (Mullard 345V), low-frequency valve (Mullard 354V), power output (Mullard ACO64), and mains rectifier (Mullard DW3).

POWER SUPPLY: A.C. mains of usual voltage and frequency.

TYPE: Table-cabinet set with energised moving-coil loud-speaker.

REMARKS: An exceptionally powerful set giving great volume from large number of stations. Quality clean-cut.

Philco A.C. Baby Grand

NOW that Philco sets are being made in this country great interest is being taken in the latest model, which is a five-valver (including rectifier) using the super-het system.

The main outline of the set follows the now universal convention. That is to say, there is a small table cabinet in which is fitted the metal chassis for the set. Above this is a diminutive moving-coil loud-speaker. The complete set is more compact than usual.

When we remember that this is an all-electric set, for the usual A.C. mains supplies of this country, and that everything for reception except the aerial and earth is contained within the cabinet, the compactness of the design is more readily appreciated.

Following the best practice, this new set has a stout metal chassis, with one of the most robust looking three-gang condensers we have yet seen. Around this are arranged the five valves (one of which, remember, is the mains rectifier) and electrolytic condensers. The rest of the components are underneath the chassis.

The super-het circuit includes two screen-grid valves, a high-frequency pentode, and a pentode power output valve. This powerful combination of valves, which are Philco-made in America, produces enormous overall amplification, as later tests showed. The screen-grids and high-frequency pentode are well screened.

No Sign of Instability

Except when the volume control is pushed far beyond the power output valve's good-quality output limit, there is no sign of instability. At the maximum volume there is a sort of subdued motor-boating, but this does not interfere with the normal working of the set.

The controls are simple. There are three knobs.

The centre knob under the escutcheon is for tuning. It works the three-gang condenser and an illuminated scale which, unlike most of this year's range, is marked in "channel numbers."

An example will show what this means. North National is on 300 metres, which corresponds to 1,000 kilocycles. This station is tuned in on the Philco at the "100" mark on the scale. Adding a nought to this number gives the station's frequency.

The result is that as you go up the wavelength range you decrease in numbers. Rather confusing, perhaps, but only because we are so used to wavelengths.

Another thing is that the spacing between the num-

A NUTSHELL SPECIFICATION
MAKERS: Philco Radio and Television Corporation of Great Britain, Ltd.
PRICE: £16 16s.
VALVE COMBINATION: Super-het sequence, using two screen-grid high-frequency valves (Philco 365G), high-frequency pentode (Philco 44), pentode power output (Philco 42), and mains rectifier valve (Philco 80).
POWER SUPPLY: A.C. mains of usual voltages and frequency.
TYPE: Table-cabinet super-het with moving-coil loud-speaker.
REMARKS: A powerful super-het giving very wide range of programmes with very simple control.

bers widens for a given numerical difference. Thus there is more space between the "55" and "60" marks than between the "60" and "65" marks. The whole idea is logical in view of the fact that stations are separated by frequencies and not wavelengths. You soon get used to the scale.

The volume control works very well. It cuts down or increases signal strength without altering the tone. For most stations received

during the test—and nearly every worth-while station in Europe seemed to be logged!—the volume control had to be reduced considerably to avoid overpoweringly loud signals. Background noises are only noticeable with maximum volume.

Clean-cut Separation Between All Stations

The super-het action works wonderfully well. There is a clean-cut 9-kilocycle separation between *all* stations. This applies just as much to locals as to foreigners. We got Mühlacker absolutely clear of London Regional. Such normally difficult feats of separation as Breslau and Poste Parisien were tackled with ease by this set.

Naturally we listened very closely to quality. It is very satisfying, in spite of the small cabinet. It is the sort of quality most listeners will like. Plenty of bass and not too much top.

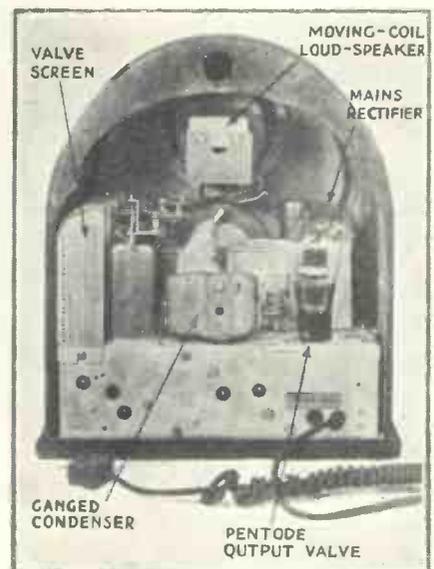
Mains hum is at a low level. It is less than usual.

Another good point is that the long-wave side works quite satisfactorily, in spite of the technical difficulties. We got Zeesen clear, though not very loudly, of all interference from its noisy neighbours. About six long-wavers were really worth hearing.

For listeners who like a wide choice of foreign stations this set is highly recommended.



A COMPACT RECEIVER
 The Philco A.C. super-het is housed in a neat walnut-finished cabinet, the height of which is only 18 in. The design is quite attractive, as can be seen here



NEAT INTERIOR DESIGN
 All the component parts in this set are shielded. The small moving-coil loud-speaker is seen at the top of the cabinet. The cabinet is open at the back

Bush A.C. Three-valver

BEING the first set of a firm new to the radio industry, the Bush three-valver for A.C. mains naturally interested us more than usual. We find, after lengthy tests, that this is one of the "cleanest" designs in the three-valve class, providing exceptional volume from a large number of foreign stations, with an ease of control more usually found in larger sets.

In fact the ease of control is so marked that we have no hesitation in recommending this set to non-technical listeners, in spite of the fact that reaction is applied at the maximum setting of the volume control.

THE SET IN BRIEF

MAKERS: Bush Radio, Ltd.

PRICE: £17 17s.

VALVE COMBINATION: Screen-grid high-frequency amplifier (Mullard 54VA), screen-grid detector (Mullard 54VA), and transformer-coupled pentode output valve (Mullard Pen24M), with valve rectifier (Mullard DW3).

POWER SUPPLY: A.C. mains, of usual voltage and frequency.

TYPE: Table-cabinet set with moving-coil loud-speaker.

REMARKS: An exceptionally sensitive three-valver.

Following the general lines of three-valvers, this model is housed in a table cabinet of rather distinctive shape, smaller than usual, yet, owing to careful design, tolerably free from box resonance.

The set chassis is mounted at the bottom, leaving plenty of room for the moving-coil loud-speaker—a Magnovox—at the top. There is no back to the cabinet—a wise omission in view of the small dimensions.

Access to the valve sockets is easy, and there is a neat little covered panel for altering the transformer tappings to suit the mains voltage.

The circuit is "straight," with the novelty of a screen-grid valve for the detector position. Preceded by band-pass tuning for the first screen-grid valve it is not surprising to find on test that the selectivity is above the average. Strasbourg was clear of London Regional, as was Scottish Regional.

Adjacent station separation away from the locals is not difficult, once the aerial-trimmer device behind the set has been adjusted.

The aerial connection can be made to one of two points, one giving much less volume, but greater selectivity than the other. Then, in addition to the ordinary aerial connection, there is an internal aerial.

This is a small metal plate mounted inside the cabinet. It works in an amazing fashion.

It enabled us to get no fewer than seventeen stations at loud-speaker strength on the medium waves, including the home stations.

The great power of many foreigners makes such reception possible, though we must add that the screen-grid detector in this set partly accounts for the surprising log on the plate aerial—an ideal device for flat dwellers. We commend the makers on their forethought.

Easy Searching for Foreign Stations

The search for stations is made easy by the very clear marking of the tuning scale. Medium waves are marked in steps of 50 metres, in red, and long waves in steps of 100 metres, in black. The scale moves against a stationary hair-line on the celluloid cover.

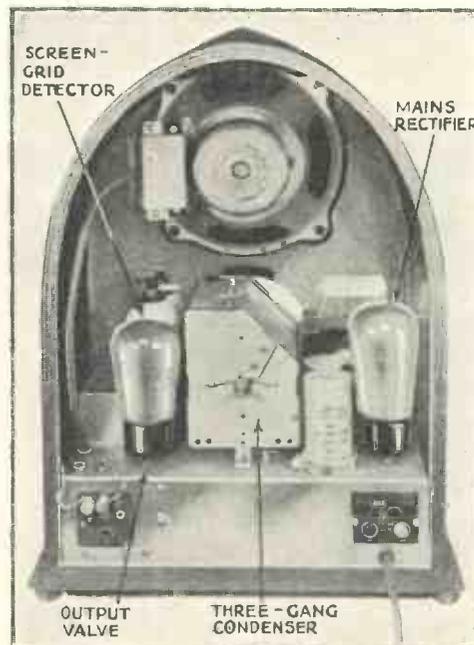
We liked the "feel" of the volume control. It reduced the powerful locals to inaudibility. The range of audibility is notable for its width and for the entire absence of any bad effect on quality.

At the minimum setting of the volume control the set is switched off. It is a simplification of control.

The quality from the moving-coil is much better than we should have thought possible in such a small cabinet. It just shows what can be done by eliminating actual box resonance. Though this cannot have anything to do with the production of real bass its absence must, as in this set, do a lot to provide a clean-cut output.

Controlling Record Volume

We think the reproduction justifies use being made of the pick-up terminals, fitted at the back. Owing to the great amplification of the screen-grid detector and the pentode output power valve, it would be essential to use an external volume control.



THE "WORKS" DISCLOSED

A photograph showing the internal layout of the Bush A.C.3. Dry electrolytic condensers are used for mains smoothing



ORNAMENTAL FRET

The appearance of this three-valver is unusual. The cabinet is finished in walnut veneer and is certainly attractive

Components As I Know Them

SOME LOW-FREQUENCY MODIFICATIONS

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

IN an earlier article, when dealing with low-frequency transformers, I described the main principles adopted in the design of these components and just what we have to aim at. We have since dealt with resistances, and condensers have also been touched upon in the series.

Combination Couplings

This month I want to talk about sundry low-frequency coupling schemes which combine all three of these components.

Low-frequency transformers, when

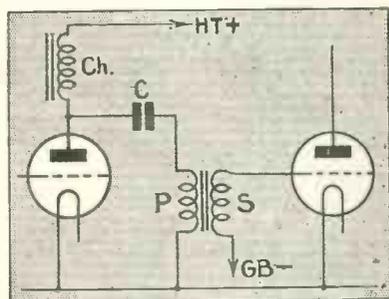


Fig. 1.—Valve anode circuit with iron-cored low-frequency choke

first made, were used only for the reception of telegraphic signals—there was no broadcasting to worry about. The sole object of the designer was to raise the voltage applied to the grid of the subsequent valve to the highest possible figure, and he did this by using as high as possible a step-up ratio.

Power Transfer

This meant a great deal of fine wire on the secondary, for the primary itself had to be fairly large, otherwise there was an insufficient transfer of power, and a step-up ratio in turns was needed.

No one troubled then about what we now call a "response curve" and it was only when broadcasting began that the main defects of such transformers were realised.

Now you cannot have a lot of wire, and very fine wire at that, wound on a small, compact former without having at the same time a good deal of capacity between the winding, layers, and adjacent turns. Similarly, you cannot have an inductance combined with the capacity without forming a resonant circuit.

It so happened that transformers as then made "tuned" to about 1,000 cycles, responding very strongly to this frequency and not much to frequencies on either side.

As this is a very convenient musical note for the reception of continuous-wave signals, all was well; but, on the other hand, directly we started to receive telephony reproduction was "tinny" or "metallic," lacking bass and strongly accentuating certain frequencies in a very irritating fashion.

This metallic sound was very frequently attributed to the metal used for the loud-speaker horn, but actually it had nothing whatever to do with this, as was proved by the fact that the defect was not removed when wood and composition horns were used.

Without going into details, we can say it was found that in order to get a good bass reproduction, a large inductance was required in the primary. This meant

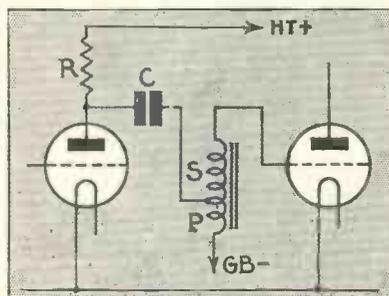


Fig. 3.—A further modification with the primary and secondary of the transformer connected together

plenty of wire and plenty of iron.

The iron circuit had to be very carefully designed so as to give the maximum inductance to the coil for a given number of turns and there had to be enough iron to prevent

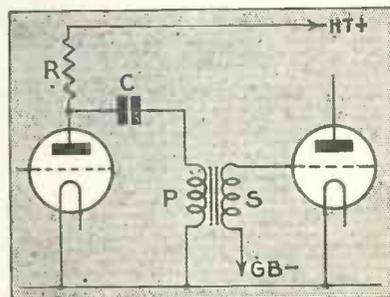


Fig. 2.—A high resistance substituted for the low-frequency choke of Fig. 1

saturation with the current which was likely to be passed through the winding.

Two or three years ago a new form of iron was introduced into the transformer world—or rather, a new iron alloy was invented, containing a certain percentage of nickel and other elements. This was found to possess certain very valuable properties.

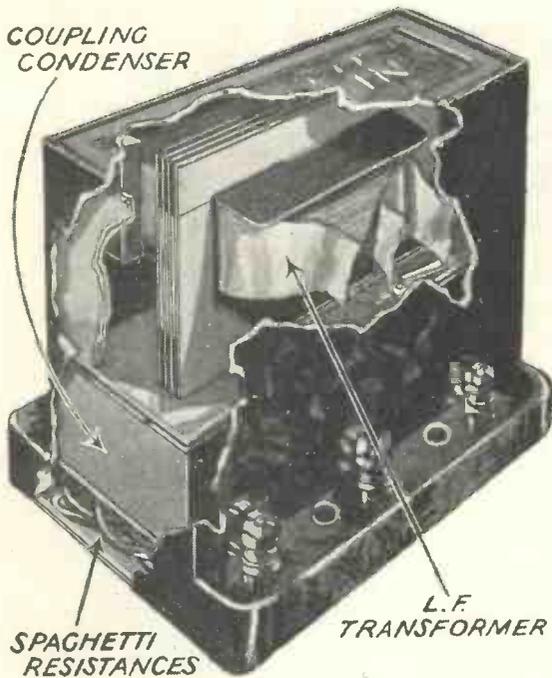
Bigger Inductance

Translated into practice, it meant that, with a given core, a core of the new iron gave a very much bigger inductance than the same amount of the older iron.

Two advantages immediately followed; by retaining the same size of transformer we could get a much higher inductance from the same amount of wire or, alternatively, we could get the same inductance as before with a very much smaller transformer containing less iron and fewer turns.

At first, everything in the radio garden appeared to be particularly lovely, but it was soon found that as a partial counterbalance to this

LOW-FREQUENCY MODIFICATIONS—Cont.



A sectional view of the Bulgín Transcoupler, one of the first examples of the parallel-feed transformer. Note the use of spaghetti resistances

advantage the magnetic effect fell rapidly as the current flowing in the primary increased.

Thus a transformer having a primary inductance of, say, 50 henries fell to perhaps 20 henries with very few milliamperes of current flowing.

What was the way to get over this defect? If only we could remove the direct current from the transformer, leaving only the alternating-current component, we should get the same transfer of energy with a very much lower saturation effect.

Choke Feed

Look at Fig. 1 and you will see that in the anode circuit of the valve I have placed an iron-cored choke. The voltages set up across this are applied through the condenser *c* to the primary of the transformer. The direct-current supply passes through the choke and only the alternating current goes through the transformer. This scheme was found to work very well indeed, but had the disadvantage of requiring a second iron-cored device.

A very similar effect is obtained as in Fig. 2 by substituting a resistance of some 30,000 ohms for the choke and a still further modification is shown in Fig. 3, where primary and

secondary of transformer are joined together so as to form an auto-transformer and give a bigger step-up.

It is therefore very much to our advantage to remove from the primary any unwanted D.C. current, for in this way we can maintain the highest inductance in working conditions.

The parallel-feed method of using the high-grade low-frequency transformer was first popularised in this country in the well-known Hyper-mu transformer, although it was invented to the best of my knowledge by my friend, Mr. Kendall Clough, chief engineer of the Silver

Marshall Company, Chicago, and was sold by that company for some time prior to its introduction into England.

After the Hyper-mu, several other manufacturers followed the lead, the N.P.L. and other curves produced for transformers correctly used in this way being remarkable for their uniformity throughout the whole musical range.

It soon came to be realised that while most transformers can be used with the parallel-feed method so as to show an improvement, if we like to sit down and design a transformer exclusively for parallel-feed work we can make it very small, efficient, and inexpensive.

This was done in the case of the Parafeed transformer and others which followed it. Recently a number of excellent devices known as Transfeeda's, Multicoupler's, and by other trade names have been placed on the market, embodying in one casing the feed-resistance, coupling condenser and transformer.

Considerable ingenuity has been shown by manufacturers in this regard and some of the devices are so made that a variety of connections is possible to suit different circuits, valves, and conditions.

Value of Direct Feed

It must not be thought, however, that the parallel feed has made the old direct feed obsolete. It is a good and inexpensive scheme with relatively small anode currents, but on large power amplifiers and where expense is not a first consideration the direct-feed scheme is preferable.

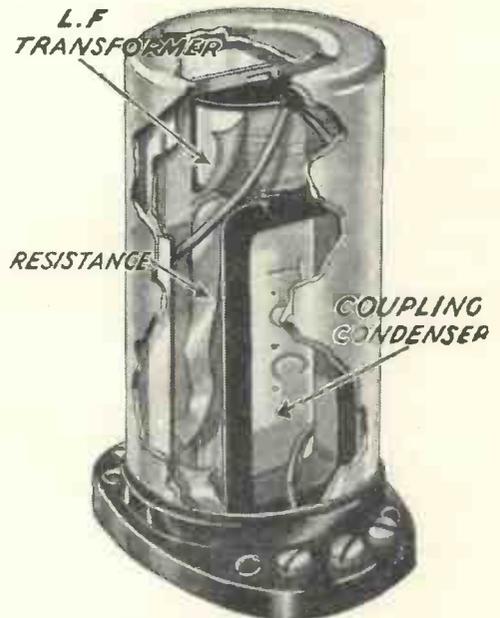
There are a number of minor disadvantages, too, in the way of feedback effects and one should not jump to the conclusion that the resistance feed actually decouples the transformer from the battery.

J. H. Reyner has shown some interesting figures * in this regard which should be studied by the serious student. On the balance, however, the parallel-feed scheme is a very useful and valuable addition to our low-frequency range.

Uniform Amplification

We now come to a very interesting aspect of low-frequency amplification, the importance of which is rapidly growing. In all the earlier low-frequency work the aim

* "Wireless Magazine," December, 1931



In the Benjamin Transfeeda the coupling resistance is wound on a special bobbin, as shown in this sectional view

SPECIAL ARTICLE BY PERCY HARRIS

throughout was to obtain as far as possible uniform amplification in the low-frequency coupling over all frequencies which we desire to reproduce. It was assumed that the ideal form of coupling was one with a "straight line."

It is now clearly realised that a "straight-line" transformer, or any other form of straight-line audio-frequency coupling, connected to a modern selective receiving circuit gives a falling characteristic to the output of the receiver, the high notes being progressively attenuated.

Stenode Principle

Until the invention of the Stenode by Dr. James Robinson it was universally thought that if we were to correct this attenuation of the high frequencies by using a "tilted" amplifier with a rising curve to balance out the falling curve given at the detector, we should restore all the interference which has been reduced by the sharpness of tuning.

Dr. Robinson showed (and his discovery has recently been confirmed by the issue of Report No. 12 of the Radio Research Board) that the selectivity is *not* reduced by audio-frequency correction, so that henceforth the tendency will be to use, not straight-line audio-frequency devices, but either rising characteristics or else, better still, coupling devices in which the shape of the curve is modifiable at will.

The first practicable device of this latter kind to be marketed was the Multitone low-frequency transformer, an interval transformer with a 4 to 1 ratio and a double function.

First of all, when used in conjunction with a potentiometer, it gives a *real* tone control on any set and, secondly, it functions in the usual way as a high-impedance interval transformer.

Additional Terminals

Externally, it appears to be like any other transformer, except that two additional terminals are provided for connection to a very high-resistance potentiometer, the best

value of which is something over 2 megohms, although it can be brought down to .5 megohm with some sacrifice of strength.

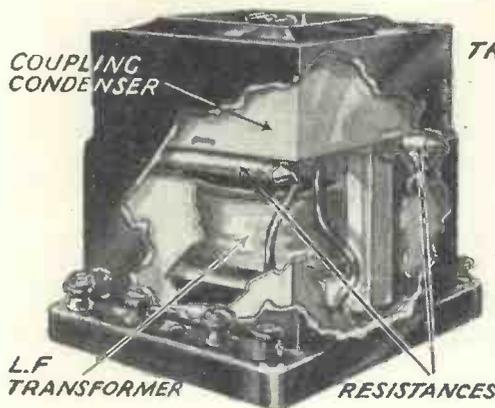
This transformer is most interesting to use in practice as in a sharply selective circuit with attenuation of high frequencies these latter can be restored so as to give a uniform overall performance.

The effect of such a scheme is particularly noticeable on a sharply-tuned long-wave circuit, where attenuation is usually so pronounced that we have become accustomed to a poor audio performance on this band.

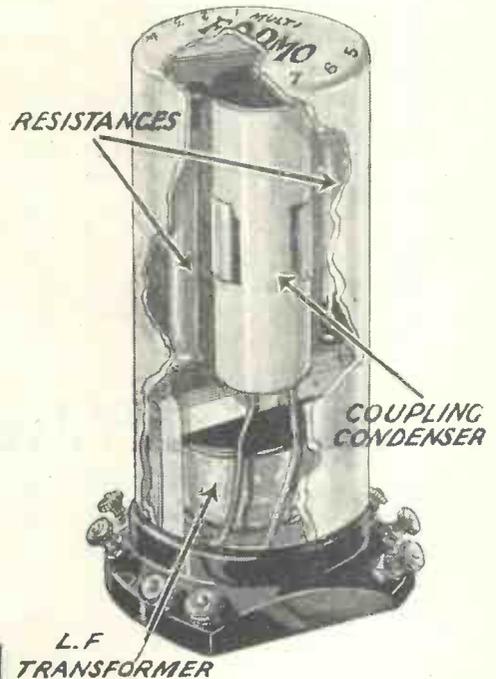
Running round the broadcasting stations in Europe one sometimes finds stations, such as the Spanish ones, which are rather "topy," with a deficiency of bass. By adjusting the potentiometer the quality can be brought out in a more natural way, while other stations tending to be "boomy" and deficient in top can be

taking elaborate precautions to get the straight-line effect in our receivers if the loud-speaker has large peaks and depressions in its own curve.

Another interesting tone-correcting device is the Rectatone, the overall curve of which can also be modified by means of the potentiometer.



The R.I. Parafeed Coupling Unit contains the original Parafeed transformer, which has enjoyed so much popularity during the past few years



The low-frequency transformer is placed at the bottom of the case of the Formo Multicoupler, which has a tubular coupling condenser

This instrument is mainly designed to provide, in addition to a good "straight-line" transformer, a transformer with a rising characteristic when required to compensate for lack of top in some gramophone records and in wireless receivers using high-selectivity circuits.

Special Base

Lissen, too, have recently introduced what may be termed a tone-correcting base for their own transformer, four straps from the primary and secondary terminals going down to four corresponding terminals on the base and three others being brought out to a potentiometer for panel control.

While designed primarily for their own transformer and fitting most conveniently to this, the base can be used with other transformers by joining up the correct terminals.

Apart from transformers, there are many other combinations of resistance,

similarly corrected for quality.

So far I have referred to the type of received signals and the distortion caused by a highly-selective circuit. We must not, however, overlook the importance of a tone-correcting device in compensating for defects in the overall curves of the loud-speakers we use.

Nowadays it can be said that our sets are much better than our loud-speakers, so far as uniformity is concerned, and obviously it is useless

LOW-FREQUENCY MODIFICATIONS—Cont.

capacity and choke which will give tone correction and enable us to prepare an overall characteristic suitable for our particular purpose.

Experimental Work

When experimenting with tone-control devices, particularly resistance coupling, one may be misled into thinking that to obtain a steadily rising characteristic all that it is necessary to do is to use the conventional form of resistance coupling with a small coupling condenser which will offer a high impedance to low notes and a negligible impedance to high notes.

In practice, however, such a seemingly simple device has an overall curve which is by no means satisfactory. Bass is, it is true, reduced very considerably, but at the same

time the top falls off very rapidly and we are left with a curve which is deficient in both bass and treble. The inclusion of certain inductances can, however, correct this.

Although it is not strictly connected with an article on "Components As I Know Them," it is worth while mentioning here that the utmost care should be taken, when performing experiments with low-frequency amplification, to remove all possible sources of confusion.

For example, when comparing two different forms of coupling, totally erroneous conclusions may be drawn if we do not allow for the most careful decoupling of the high tension.

To give a simple example, if we are using a low-frequency coupling device which is badly deficient in bass, then a relatively high-resistance

source of high tension may not cause any trouble with motor-boating.

Substitute for this another form of coupling which has a better bass response, or perhaps an exaggerated bass response, and even what is normally a stable set may either motor-boat or else give so much low-frequency reaction as to make the plotting of a true curve impossible.

Question of Stability

In my opinion, far too little attention has been given in the past to low-frequency stability. Too often it has been assumed that if a set does not actually motor-boat it is satisfactory, whereas unless we remove every trace of low-frequency reaction and feedback, humps and depressions can be introduced into our curve.

That Hilversum-Huizen Puzzle

SO many listeners have become confused over the quarterly change-over carried out by the Dutch broadcasting studios that a few explanatory words may prove useful.

In effect, the actual transmitters do not alter their wavelengths, Hilversum working regularly on 296.1 metres and Huizen on 1,875 metres. What actually happens is that the Hilversum and Huizen studios exchange stations every three months.

In consequence, at certain periods of the year the Huizen programmes are announced through the Huizen transmitter, at others through Hilversum. What puzzles the listener who

does not know what has happened is when the Huizen announcement is received by him on the Hilversum wavelength.

The latter station possesses two transmitters, at present, one with a power of 7 kilowatts and one of 20 kilowatts. In order to save money during the day, when the number of listeners is comparatively reduced as compared to the evening hours, transmissions are sent out on a lower energy and the 20-kilowatt plant is only brought into operation towards 7.40 p.m. G.M.T.

In the present quarter (October-December) the A.V.R.O., V.P.R.O.,

R.V.O. and V.A.R.A. associations are putting out their broadcasts through Hilversum on 296.1 metres; and the K.R.O., H.I.R.O., and N.C.R.V. clubs are transmitting on 1,875 metres (Huizen). The next change-over will take place on the last day of the year.

Listeners should also note the calls put out by these two popular broadcasters. Hilversum announces itself as "Here Hilversoom," with the addition of the words "de ar-vro" or "de far-ah" according to the association sponsoring the programme. Huizen's call is just "Here Hoyzen."
J. G. A.

The Absent-minded Announcer

*A deep depression may be here
If I forget the Christmas cheer,
Our chance of joy be dull and murky
If I don't buy a plump, young turkey.
General inference : may clear ;
Unsettled nursery atmosphere :
With gloom it may be rather foggy
Unless I buy that white plush doggy :
"Daddy, the one that wags its ears !"
And if I don't, some showers—of tears.
When Spot receives his share of plunder,
His bones, there'll be occasional thunder.*

*If Baby's gifts, some woollen balls,
Are not produced, prepare for squalls.
If my "in-laws" arrive 4.20
And I, believing I have plenty
Of time to shop, armed with a list,
Go off to my tobacconist
And leave them waiting, uncollected
A touch of frost may be expected.
Bright intervals. For Christmas Day
The "further outlook's" very gay,
Though people may not have much money
Greetings will make this old world sunny !*

LESLIE M. OYLER.



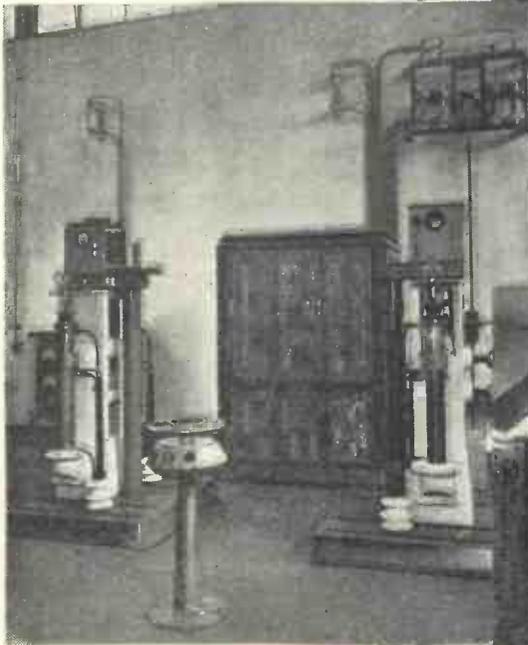
The New German Giant

A new German broadcasting station has started operations on high power at Leipzig and should be received at good strength by British listeners. The wavelength being used is 389.6 metres, just below Midland Regional. Another recently opened transmitter is that at Frankfort, which works on a wavelength of 259.3 metres. Both these stations should be added to your log as soon as possible!

Wooden aerial mast of the Leipzig high-power station



Interior of the main transmitter hall at the 17-kilowatt Frankfort station



Switchgear at the new Leipzig broadcasting station. The output stage is duplicated in case of breakdowns



General view of the Leipzig transmitter gear which works at very high power

For wavelengths of other popular broadcasters see the "World's Broadcast Wavelengths" feature at the beginning of this issue



BEFORE CONVERSION
 Fig. 1.—Bureau set utilising the Chapman-Reinartz circuit described in "Amateur Wireless" four years ago

DURING the past few years the question which has exercised the minds of wireless constructors more than any other, perhaps, is the following: Must I build an entirely new set or can I re-build my present set in such a way as to meet modern requirements successfully?

In my case this very poignant question was placed most emphatically before me immediately the North Regional station began its transmissions on 479 metres. At the time the North Regional station was built I had in general use the receiver illustrated in Fig. 1.

As will be seen from this reproduction of the photograph, the set was housed in a bureau which formed a pleasing addition to the furniture of the room.

A Local Job

This bureau was made for me by a local cabinet maker. Its sloping lid was of the type which pulls over into a horizontal position, and which is supported in that position by horizontal runners which come out automatically as the lid is pulled over. In the horizontal position the lid formed a convenient writing desk.

A sloping panel, attached to a baseboard, occupied the top part of the bureau. In the cupboard underneath were placed accumulators,

Rejuvenating An Old Set

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

dry batteries, spare parts, and the various little odds and ends one likes to have easily to hand in wireless work.

The leads from the receiver to the batteries were taken through holes in the top of the cupboard.

The circuit used in this bureau set was the Chapman-Reinartz circuit first

coil at will, five flexible leads were brought out from the receiving set through holes on the left of the top vertical strip of the panel. These leads corresponded to A, E, R, F, G of Fig. 2 and the Clix connectors at the ends were coloured yellow, white, red, blue and green to correspond with the sockets.

Although the set had given good service and possessed selectivity well above the average, it did not perform satisfactorily under the new conditions brought about by the establishment of the North Regional station some forty miles away.

Regional "Spread"

The powerful North Regional transmitter "spread itself" over a portion of the range of the medium-wave coil and, worse than that, this transmitter "broke through" on to the long-wave coil.

Selectivity on the medium-wave coil was increased by shortening the A-E portion, but all attempts to prevent the "break-through" trouble proved unavailing. Loading inductances and additional tuned circuits were tried without success.

Finally it was decided to add a stage of screen-grid high-frequency amplification to the set. The bureau with its sloping panel was, of course, to be retained. It was also decided to retain the method of coil connecting and coil changing.

Transformer Coupling

Hence high-frequency transformer coupling between the screen-grid valve and the detector valve was ruled out, since this would have meant having two flexible leads carrying high-tension current at the front of the sloping panel.

Accordingly, the more usual choke-condenser method was used.

After exhaustive tests on selectivity, a circuit was evolved in which the lead from the anode of the screen-grid valve was taken to the

In this article a keen experimenter explains how he reconstructed an old set to conform to modern conditions—particularly as regards selectivity. These hints will be of value to many who have old sets; they show how to rejuvenate any simple type of "detector and low-frequency" set by adding a screen-grid valve and new tuning coils

described in *Amateur Wireless* during October, 1928. Three valves were employed, a detector valve followed by two low-frequency amplifying valves, transformer coupled.

An interesting feature of the set was the complement of six coils which, in all, covered a wavelength range of 30 to 1,950 metres. These six coils were mounted on the baseboard behind the sloping panel and the five leads A, E, R, F, G, from each coil, as shown in Fig. 2, were taken to a row of five Clix sockets.

Each coil had its own row of Clix sockets, the top row belonging to the biggest coil and the bottom row to the smallest coil. Reading from left to right, the sockets had insulating washers, visible on the face of the panel, of the following colours: A, yellow; E, white; R, red; F, blue; and G, green.

In order to make contact with any

R (reaction condenser) end of the detector-valve coil RFG (see Fig. 3), instead of to the G (grid) end as is common practice.

With this arrangement there is the advantage that the selectivity of the coil RFG is under control. In any particular coil, the shorter we make the RF portion in comparison with the FG portion, the greater will be the selectivity of the coil.

Aerial-series Condenser

An aerial-series condenser of the variable type with a low minimum value was added to give selectivity in the aerial circuit. The full circuit diagram of the re-designed four-valve receiver is given in Fig. 3.

The first point of importance to be considered in the reconstruction of the set was the screening of the screen-grid valve stage.

Screening this stage was obviously necessary and this meant the separation of the five connecting leads into two groups: A and E into one group in the screen-grid valve section; and R, F and G into a second group in the other section of the receiver.

With the help of plastic wood the original sloping panel was saved. The original holes for R, F and G, eighteen in all, and the three holes through which the corresponding coil-connecting leads came out at the top of the panel, were filled up with plastic wood as neatly as possible.

Filament Rheostats

There were three filament rheostats in the old set. Two of these were dispensed with in the newly arranged set, and the two vacant holes were also filled up with plastic wood.

The way in which the panel

components were re-arranged can be seen in Fig. 4, which is a reproduction of a photograph of the new panel. On the left-hand side at the top of the panel are the aerial and earth terminals.

The A and E sockets of the aerial-earth coils are arranged in groups of two, A (left), white in colour; E (right), blue in colour.

The corresponding coil-connecting leads come out of two holes immediately above at the top of the panel. Below the A and E sockets, and a little to the right, is the knob controlling the aerial-series condenser.

The aerial-circuit controls are completed by the left-hand Indigraph dial. This dial controls the aerial-circuit tuning condenser of .0003 microfarad.

The middle Indigraph dial controls the reaction condenser of .0005 microfarad. Between this dial and the aerial-circuit dial are the six rows of Clix sockets corresponding to F, R and G of Fig. 3. In each row the sockets are: First or left, F, yellow; second or middle, R, red; and third or right, G, green.

Immediately above this row of sockets are the three coil-connecting leads F, R, G, with their Clix connectors of corresponding colours: Yellow, red and blue, in that order from left to right.

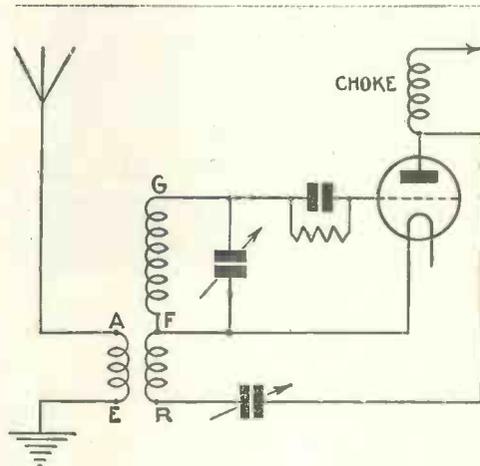
The right-hand Indigraph dial controls the variable condenser which tunes the grid-filament circuit of the detector valve. To the right of this dial and below it is the one rheostat which controls the four valves.

Fig. 5 is a reproduction of a

photograph of the set from the back. The one sheet of screening, bent at right angles into a horizontal portion and a vertical portion, can be seen in position.

The vertical portion was cut to fit closely up to the sloping panel. This screen separates the aerial circuit and aerial coils from the rest of the receiver and it serves its purpose admirably.

Altogether there are six pairs of coils in the newly designed and



OLD DETECTOR CIRCUIT
Fig. 2.—The old detector circuit, which has been altered for increased selectivity

rebuilt receiver. Each pair of coils consists of an aerial-earth coil in the screen-grid section, and a detector-valve coil in the other section of the receiver.

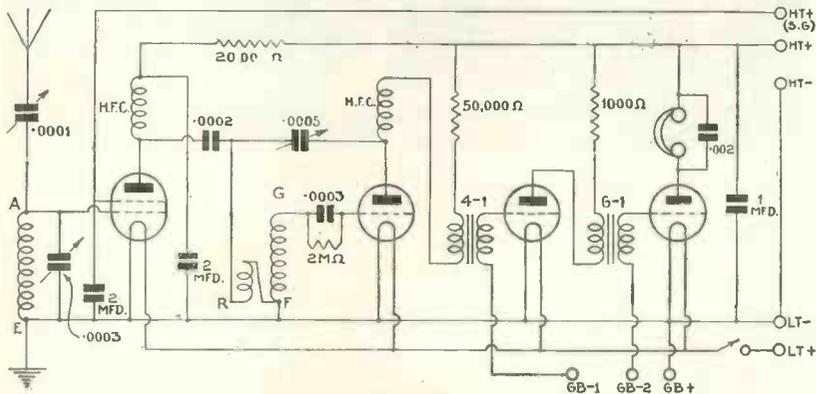
The largest aerial coil and the largest detector coil are connected to the top row of sockets in their respective groups. The next largest aerial coil and the corresponding next largest detector coil are connected to the second row from the top in their respective groups of sockets.

Decreasing Size

The corresponding pairs of coils decrease in size and in wavelength range from the top row of sockets downwards, the smallest coils being connected to the lowest row of sockets in each group.

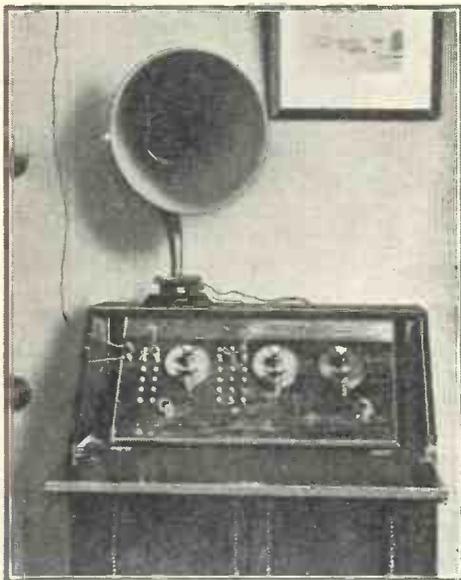
When the photograph of Fig. 5 was taken there were only two pairs of coils in the receiver, the largest pair and the next largest. The two aerial coils can be seen to the right of the photograph.

The detector coil, in full view to the left of the screen, is the second largest detector coil. The largest detector coil can just be seen lying



NEW SCREEN-GRID FOUR-VALVE CIRCUIT
Fig. 3.—A screen-grid valve has been added and the new combination is a screen-grid amplifier, detector, and two transformer-coupled low-frequency stages

REJUVENATING AN OLD SET—Cont.



NEW TUNING CONTROLS

Fig. 4.—This photograph shows the arrangement of the new tuning controls. The set has a wavelength range of 23 to 1,950 metres

flat on the baseboard behind and between two of the valves.

In making these aerial and detector coils a convenient form of coil holder was used. This holder consists of a piece of thin plywood an inch wide, at the centre of which is drilled a $\frac{1}{2}$ -in. hole, and a piece of $\frac{1}{2}$ -in. rod passing through the hole and fitting tightly.

This $\frac{1}{2}$ -in. diameter rod is an inch or so longer than the piece of plywood, and the extra inch is used for fixing the completed coil in a $\frac{1}{2}$ -in. hole drilled in the baseboard of the receiver. The wire of the coil is wound in slots cut in the plywood and rod from the outside inwards towards the centre.

Simple Coil Holder

Figs. 6a and 6b show the method of constructing and fixing this type of coil holder, the measurements given being those for the largest aerial coil.

It now remains to describe the coils used in the new receiver. The work of making these coils to cover suitable wavelength bands has proved most interesting and well worth the trouble involved.

Starting with the largest coils, which we may call Coils 6, the measurements of the wooden holder for aerial coil 6 have been given in Fig. 6a. The wire wound on this coil holder was 110 ft. of No. 32 d.s.c. copper wire.

Coil 6 for the detector-valve circuit was wound on a holder made from a piece of three-ply wood 5 in. long and 1 in. wide, and a piece of $\frac{1}{2}$ in. diameter rod 6 in. long. The winding slot was $1\frac{1}{2}$ in. deep at each end of the plywood and at the top of the rod.

At the bottom of the rod the slot was cut to a depth of $2\frac{1}{2}$ in., the cut being first made through the extra inch of rod used for fixing the holder in the $\frac{1}{2}$ -in. hole in the baseboard.

A severe test of selectivity was applied to Coils 6. It was determined to obtain Königswusterhausen clear of Daventry National and Radio Paris.

This was eventually done by using for Detector Coil 6 a winding of 20 ft. of thin flex followed by 125 ft. of 32 d.s.c. wire. The thin flex was of a special type made up of two strands, one red and one white. The conductor in each strand consisted of five enamelled wires of No. 39 gauge.

There is no need, however, to go to the trouble of obtaining this special type of flex. Two wires of No. 32 d.s.c., the first 20 ft. long

two wires are wound together in the slots of the holder until the shorter reaction winding is complete, and then the grid winding is continued alone.

Fig. 7 shows the method of connecting the windings, the letters R, F and G corresponding to similar letters in Figs. 2 and 3.

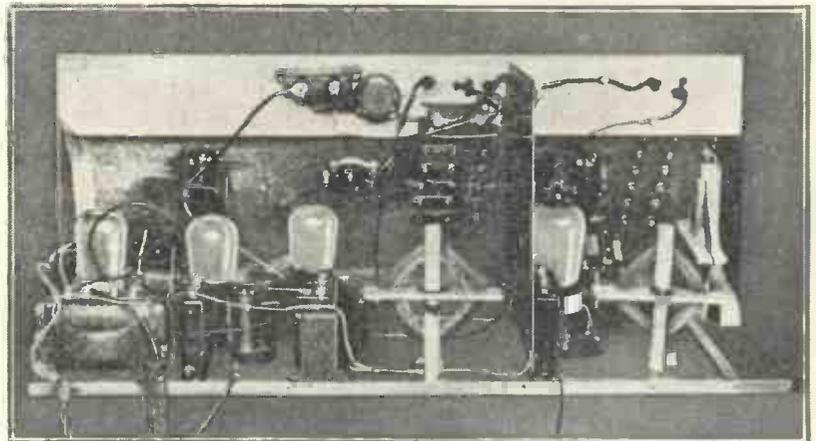
Long-wave Stations

Using Aerial Coil 6 and Detector Coil 6 excellent loud-speaker reception has been obtained from ten long-wave stations, including Königswusterhausen which, by careful adjustment of the aerial-series condenser, can be heard without a trace of Daventry National or Radio Paris.

Nearer Daventry it would, of course, be more difficult to obtain Königswusterhausen, but selectivity could be increased by shortening the RF portion of this detector-valve coil to 15 ft., say.

The range of this Detector-valve Coil 6 is 800 to 2,000 metres. Aerial Coil 6 has a range of 850 to 1,925 metres, but it is easily possible to receive Heston on 833 metres with this aerial coil by making use of the aerial-series condenser.

Coil 5 for the aerial circuit consisted of 32 ft. of No. 32 d.s.c. wire



INTERIOR OF THE CONVERTED SET

Fig. 5.—A view of the new four-valve receiver. Note the unusual tuning coils on the right and the two low-frequency transformers on the left

and the second 145 ft. long, would do equally well, the latter wire being equivalent to one strand of the flex 20 ft. long plus the 125 ft. of No. 32 d.s.c.

With the two lengths of wire for this coil, the winding is made in the manner designed by the writer for the original Reinartz circuit. The

wound on a holder of which the plywood piece measured 3 in. by 1 in., and the wooden rod 4 in. The winding slots were $\frac{1}{2}$ in. deep, the slot at the bottom of the rod being cut through the extra inch and being, therefore, $1\frac{1}{2}$ in. long in all.

Detector Coil 5 was wound on a holder made from plywood $3\frac{1}{2}$ in. by

PRACTICAL HINTS FOR THE AMATEUR

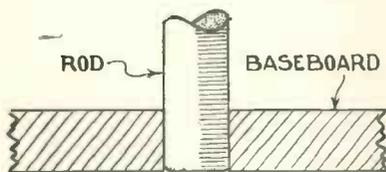
1 in., and a $\frac{1}{2}$ -in. diameter rod $4\frac{1}{2}$ in. long. The winding slots were $\frac{3}{4}$ in. deep, and the windings were:—

Filament-grid section, FG, 35 ft.; and—

Reaction section FR, 5 ft.

Thin flex was used in the coil seen in Fig. 5, but two lengths of ordinary d.s.c. or d.c.c. wire would do equally well.

Coils 5 cover a very useful wavelength range. Detector Coil 5 has a range of 220 to 625 metres. Aerial Coil 5 has a range of 250 to 575 metres. It is possible to use this Aerial Coil 5 on wavelengths as low



BASEBOARD FITTING
Fig. 6b.—Foot of rod fitting in $\frac{1}{2}$ -in. hole in baseboard

as 230 metres by making use of the aerial-series condenser.

Using these two Coils 5, over fifty stations have been received at loud-speaker strength after dark on a summer evening. This number will no doubt be exceeded now that good winter conditions are back again.

Aerial Coil 4 was wound on a holder made from a piece of plywood $3\frac{1}{2}$ in. by 1 in., and a piece of rod $4\frac{1}{2}$ in. long. The winding slots were $1\frac{1}{4}$ in. deep, and the wire was 14 ft. of No. 22 d.c.c. Detector Coil 4 was wound on a coil holder of similar size, but with winding slots 1 in. deep. The windings were:—

Filament-grid, FG section, 14 ft; and—

Reaction section, FR, 4 ft.

Belfast and Nurnberg are received on Coils 4 with high readings of the two tuning condensers. The tuning curves for Coils 4 have not yet been completed, but their theoretical tuning range is 100 to 245 metres.

Except at the top of this range stations are difficult to obtain on the loud-speaker and identify, but ten stations have been heard at good loud-speaker strength on these coils in addition to Belfast and Nurnberg.

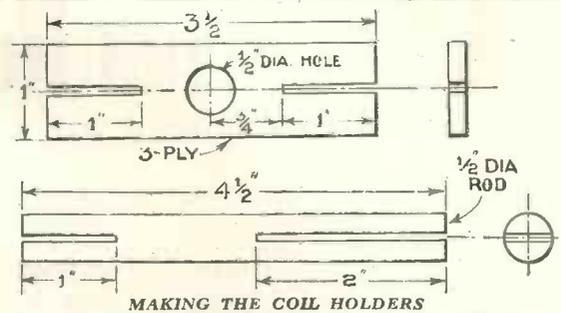
Aerial Coil 3 consisted of 5 ft. of No. 20 d.s.c. wire wound on a holder made from a $3\frac{1}{2}$ in. by 1 in. piece of plywood and a rod $4\frac{1}{2}$ in. long. The winding slots were $\frac{3}{4}$ in. deep. Detector Coil 3 was wound on a holder made from a piece of plywood $2\frac{1}{2}$ in. by 1 in. and a rod $3\frac{1}{2}$ in. long.

In this holder the slots were cut to a depth of $\frac{1}{4}$ in., so as to make one turn of the winding a square of $1\frac{3}{4}$ in. side, a complete turn being of 7 in. length. The grid section was 5 ft. long and the reaction section 3 ft., the wires being No. 26 and No. 24 gauge respectively.

It ought to be stated, perhaps, that there is nothing significant in the choice of wires for the coils. Any near gauge will do, thicker wires being chosen, if possible, for the smaller coils.

Coils 3 have a tuning range of 45 to 110 metres. Vatican City on 50.26 metres and Moscow on 50 metres are received at about 20 and 10 on the aerial-tuning and detector-tuning condensers respectively. Several Dutch amateur stations, including the station with the bugle call sign, and one English amateur station have been received on Coils 3.

Aerial Coil 2 was wound on a holder made from a piece of plywood 3 in. by 1 in., and a rod 4 in. long. The winding slots were 1 in. deep, and they were cut so as to take No. 18 wire tightly. The winding was made



MAKING THE COIL HOLDERS
Fig. 6a.—Details of the coil holders, which are made from three-ply wood and $\frac{1}{2}$ -in. rod

of 30 in. of No. 18 d.c.c. wire, which was bent in the slots to take the form of a spiral of five spaced turns. Aerial Coil 1 was of similar construction and form, the spiral being 18 in. in length.

Detector Coil 2 was wound on a holder so constructed as to give an 18-in. winding turn in the form of a square of 2 in. sides. Both wires were No. 22 d.c.c., the grid section being 24 in. long, and the reaction section 38 in. long.

Detector Coil 1 was wound on a similar holder giving square winding turns of 7 in. per turn. The grid winding was 14 in. long and the reaction winding 28 in., both wires being No. 22 d.c.c.

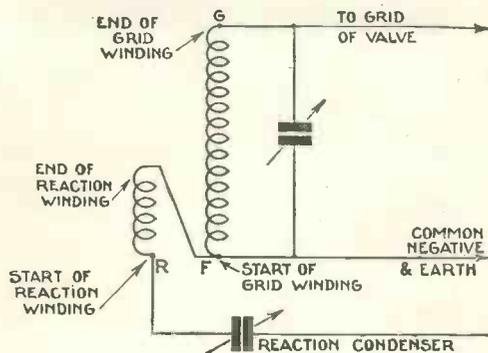
Short-wave Coils

Coils 2 give a wavelength range of 31 to 55 metres. The Vatican City, Moscow and several unidentified telephony stations have been heard on these coils.

Coils 1 have a wavelength range of 23 to 35 metres. This range is restricted because it is impossible to get oscillation over more than half the scale of the grid-tuning condenser.

When we consider that there are no special short-wave components in the set, and that the set covers wavelengths from 23 to 1,950 metres, we cannot look upon Coils 1 as unsatisfactory, especially as Radio Colonial, Romé, Chelmsford, Madrid, Zeesen and Schenectady have been heard.

The work of reconstruction, which has extended over some months, has been well worth while, particularly so since the new set promises many hours of delight during the winter season.



NEW COIL CONNECTIONS
Fig. 7.—Note that the end of the reaction winding is connected to the start of the grid winding

What Readers Are Doing

Here are reports from seventeen enthusiastic readers who are getting good results from their "W.M." sets. When sending your report remember that half a guinea is paid for every photograph of a home-built "W.M." set reproduced in these pages

A-P-A AND RADIO UNIT (March, 1932)

Sheffield (Yorks).—I have completed the A-P-A and Radio Unit and am satisfied with the results. It has been built exactly to specification and I really must congratulate P. K. Turner on having created a milestone in the radio world. Of all the radio sets I have heard, this one stands far above others for its marvellous quality.

DOUBLE BAND-PASS THREE (November, 1931)

Northwood (Middlesex).—The results obtained with this set are excellent. So near to Brookman's Park, the selectivity is astounding. When both the London transmitters are working I can log thirty-five to forty stations any dark night. I am using a P240 power valve and an Epoch moving-coil loud-speaker. Altogether a splendid set. Thank you!

EVERYBODY'S RADIOGRAM (October, 1931)

Hendon (London, N.W.4).—I should like to say that it is the finest three-valve A.C. set I have heard. Together with an R. & A. type 100 permanent-magnet moving-coil loud-speaker, the tone is superb and the foreign stations simply roar in, even in daylight. I have been interested in wireless for over three years now and have always built your sets. One can always rely on them.

Sheffield (Yorks).—I have added a push-pull output stage to this set and for tonal quality, both on radio and gramophone, it would be hard to beat. On the radio side it brings in a large number of stations, English and foreign, all at really tip-top quality. I have built many "W.M." sets during the last few years and hope to build many more in the future for we are progressing

always. I find your magazine to be the most go-ahead of any.

IDEAL HOME SUPER

(April, 1932)

Twickenham (Middlesex).—I am writing to say how pleased I am with the Ideal Home Super. I have logged about fifty stations all at full loud-speaker strength. I am very proud of the set.

PERCY HARRIS RADIOGRAM (August, 1932)

West Bridgford (Notts).—After making up the Percy Harris in console form and using it for the past month may I just say that the quality of reproduction is all you

to receive Radio Normandie (Fécamp), Poste Parisien, and Brussels No. 2 at full loud-speaker strength at any time. Other stations to be heard in daylight include Hilversum, Mühlacker and Langenberg. With its remarkable sensitivity and wonderful selectivity and reproduction, Mr. James will do well to repeat these features in any set, let alone better them.

SUPER SENIOR

(October, 1931)

Caversham (Berks).—I have never heard a set with such remarkable daylight range on the medium wave-band. Yesterday at mid-day, Paris (Ecole Supérieur) was heard at fair loud-speaker strength. It is possible to receive Radio Normandie (Fécamp), Poste Parisien, and Brussels No. 2 at full loud-speaker strength at any time. Other stations to be heard in daylight include Hilversum, Mühlacker and Langenberg.

With its remarkable sensitivity and wonderful selectivity and reproduction, Mr. James will do well to repeat these features in any set, let alone better them.

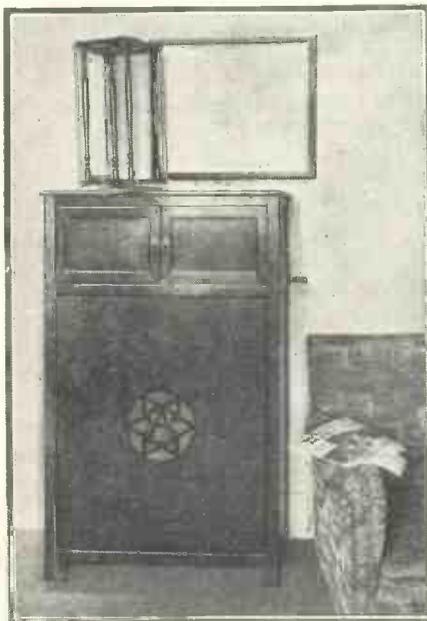
SUPER 60

(March, 1931)

Romsey (Hants).—Although eighteen months old, the Super 60 more than holds its own with most other sets. The cabinet I made several years ago and it has never housed any but W. James' sets, including the Brookman's Three, Binowave Four, and Lodestone. By the way, the loud-speaker I am using is the famous Lodestone model. The performance of the Super 60 is so well known that I cannot add anything that

has not been said already except, perhaps, that I would not change mine for any set other than a later model super.

I have made one slight alteration which might interest some of your readers who happen to have an old pentode by them. I am using the pentode as a first detector, the centre-tap on the frame aerial is discarded, the grid of the oscillator valve is connected to the side terminal of the



STILL GOING STRONG
This is a Romsey reader's version of the famous Super 60. He has fitted a push-pull output stage and says that he would not change it except for a later "super"

claim for it—truly remarkable. Thanks indeed very much for a particularly good set.

QUADRADYNE

(February, 1932)

New Cross (S.E.).—I built this set as soon as it was published and the results are all you claim for it. I have added a push-pull output stage in place of the specified pentode; the quality could not be better. Selec-

With Their "W.M." Sets

pentode and one end of the frame aerial is connected to low-tension —. The pentode only takes .5 milli-ampere. The results are much better as various squeaks and howls are entirely eliminated.

Stepney (London, E.4).—I am using W. James' Super 60. Up to last week I have received about ninety stations on the loud-speaker.

Woorloo (Western Australia).—I am a trifle late in mentioning the satisfactory tests I have made on the Super 60. I think I have tuned in nearly every Australian station that can be got as well as some amateurs. I have heard at least thirty Australian stations which can be tuned in at loud-speaker strength.

1932 SUPER 60

(January, 1932)

Chard (Somerset).—I have been a constant reader of "W.M." for the past three years but without sufficient means to enable me to join the enthusiastic band of constructor-readers. I feel bound at last to say a few words in appreciation of the value of your efforts to keep your readers informed of the most up-to-date theory and practice of the greatest hobby of all times. I have followed the development of the Super 60 from its infant stages to its present 1932 form, which I have constructed. I offer my congratulations for a "super" in word and deed. I have replaced the small power valve with a Cossor 220PA which gives slightly better quality with greater volume. The results are superb. I have no trouble with separating any stations.

Norwich (Norfolk).—When you brought out the 1932 Super 60, I liked the look of the set and made it. I am more than pleased with its performance; stations just roll in. I find the gramophone side excellent.

Salford (Lancs.)—I find that the selectiv-

ity is A1, although I am not using ganged condensers. It enables me to separate Langenberg and Prague from North Regional, which is only twenty miles from here. The set is a very fine one and I am very pleased with it.

Somerset.—I have a W.B. PM1 moving-coil loud-speaker and with

60's and two 1932 Super 60's for my friends.

Walthamstow (E.17).—I built this set last March and it surpasses any set I have had before. Prior to this, I had a four-valve set, which I thought was the last word, but I was not satisfied as it only had one tuning dial, which, to my idea, is all wrong.

READERS ARE REMINDED

that "Wireless Magazine" is the only radio paper in the world that offers a half-price blueprint service to its readers.

Each month a special coupon is to be found on the last page of the issue; this entitles any reader to a full-size blueprint of a set constructionally described in the same issue for half price, that is 6d., post free, for a blueprint of a set with not more than three valves, and 9d. for a blueprint of a set with more than three valves.

Remember, if you are a set constructor, that the special coupon saves you 6d. or 9d.

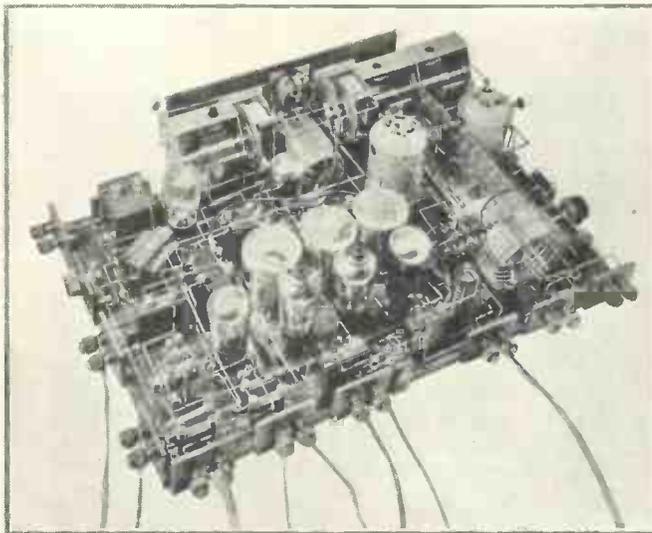
a Mazda Pentode and wet high-tension I must say that the set is the best I have had. The quality is so pure and all stations are tuned in and out on one degree of the dial. On the long waveband Berlin is clear of Daventry and Radio Paris. I receive so many stations on the medium waveband that it is far too difficult to count them. I get Poste Parisien in the daytime at great strength. I have built three Super

It would be ridiculous to give a list of all the stations I have logged on the 1932 Super 60. I do not think any station worth listening to would be left out. The unusual selectivity of the set is most striking. Although only a few miles from Brookman's Park, Mühlacker was received quite clear of London Regional. It has, in fact, been a real eye-opener to the kind of goods "Wireless Magazine" delivers.

FROM CEYLON

Deltota (Ceylon).—Since I came to Ceylon five years ago, I have constructed several three- and four-valve sets, including the Five-point Three and Four, and the Super 60, all of which have given excellent results.

But in the current issue of your Magazine I am very impressed by your description of the Gold Coaster. In Ceylon, as in the Gold Coast, we are troubled by atmospheric for the best part of the year so we rely mainly on short waves.



A FINE EXAMPLE OF HOME CONSTRUCTION

A Colchester reader intends taking this set to India shortly. It is the Super Senior with choke-output circuit, tone control, gramo-radio switching and fitted for use on wavelengths from 19 to 2,000 metres

Currents that Cure!

Radio Frequencies in Medicine

THE application of heat is the oldest and, perhaps, the most effective way of relieving pain known to the family doctor. Warmth stimulates the circulation of the blood and so assists Nature to effect her own cure.

Deep-seated Organs

When the source of pain is on or near the surface of the body, it is easy to apply poultices, or fomentation by hot-water stupes, but where the trouble lies in some deep-seated organ the problem is not so simple. Electricity, however, provides a way wherever the pain is situated.

The passage of a current through any conductor generates heat by a kind of molecular "friction" as seen, for instance, in the ordinary electric lamp or heating stove.

Now, the human body is a conductor of sorts, though its resistance is high. If, therefore, an electric current is applied so that its path includes the seat of pain, it will raise the normal temperature of that point and so bring relief.

Remarkable Success

Treatment by diathermy, as this is called, has been used by the medical profession for many years, and with remarkable success in certain classes of disease.

There is, however, a limit to the amount of ordinary electricity which can be taken by the patient without discomfort. The usual procedure is to place a pair of metal electrodes across the afflicted part and to apply Faradic or galvanic current.

But the bare skin is very sensitive, and too large a current is liable to produce a painful shock and even a burn, as anyone who has touched a "live" electric-light wire is only too well aware.

Modern wireless is based upon the use of high-frequency electricity, which is similar in some respects to the alternating current

By L. S. KAYSIE

supplied for electric lighting. It is similar because it vibrates to and fro in rapid succession, instead of always flowing in the same direction.

But whilst the alternating current supplied from the electric-light mains never reverses more rapidly than 50 times a second, radio-frequency current does so at least 50,000 times a second.

When electricity "alternates" at this speed, it acquires certain peculiar properties, which are due to the fact that the current is no longer rigidly confined to the conductor, but tends to spread outwards in all directions. And the higher the frequency, the more this spreading effect comes into play.

In the limit it becomes the source of the wireless waves which carry broadcast programmes through space.

In modern medical practice currents which alternate or reverse at the rate of one and a half million times a second are sometimes used for curative purposes. The extraordinary thing is that they can be safely used at voltages which would instantly prove fatal if applied in the form of ordinary direct or alternating current.

For instance, a pressure of 2,000 volts is used to electrocute American criminals, whilst 50,000 volts at radio frequency is common in diathermy. At this frequency the currents spread easily through the body and the patient experiences all the warmth and healing properties of the electric treatment without the slightest trace of discomfort.

Thermionic Value

Quite recently currents generated by means of the thermionic valve, and having a frequency of over ten million cycles a second, have been used in the treatment of certain forms of disease.

The "cure" consists in creating an artificial "fever," an exposure of one hour being sufficient to raise the body temperature up to 104 degrees, and even 105 degrees, producing beneficial results without causing any secondary or harmful symptoms.

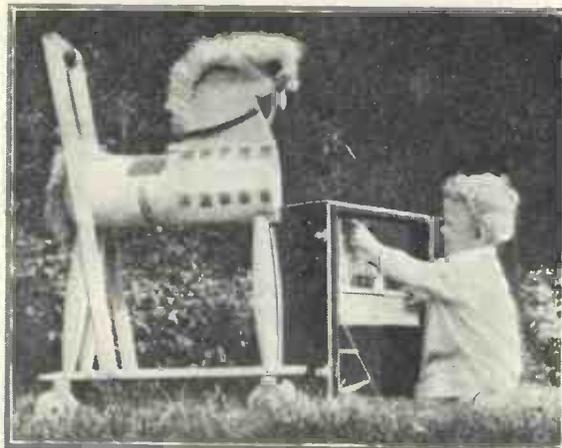
Use of X-rays

X-rays are, of course, another form of ultra short-wave radiation, having a frequency of several billions a second. They are produced by applying immensely high voltages to an evacuated tube somewhat similar to a large thermionic valve.

In the latest type of X-ray apparatus for treating cancer no less than 900,000 volts are used, producing a stream of X-rays equivalent to the effect of £5,000,000 worth of radium.

Another development of special interest is the radio "knife," which cuts through flesh and bone by the mere application of high-frequency current. Owing to the heat generated, the radio knife cauterises as it cuts, and so makes "bloodless" surgery possible.

These "currents that cure" are likely to play a large and ever increasing part in medical practice. It is impossible to forecast what may be the ultimate results in this new field.



NO FEARS OF RADIO!

This youngster has no fears of radio sets and is very intrigued by this Marconiphone model

RADIO MEDLEY

A Radio Fan's
Causerie
By BM/PRESS

Our Tenth Radio Christmas

WELL, here we are fast approaching our tenth radio Christmas—and the fifth million licence has been issued. I wonder how many listeners there will be in another ten years time; shall we all be “lookers” as well as listeners by then?

I was talking to the Editor of “Wireless Magazine” the other day and he made a remark that intrigued me greatly. We had been discussing scientific development, and he said: “Have you realised that the intensive research put in by modern laboratories in a few months is equal to hundreds of years of development of the old kind?”

I had not thought of the achievements of modern science in that way before. In view of that, who dare prophesy what we shall see in another ten years time? Certainly not I.

Every reader of “Wireless Magazine” should make a point this Christmas of inducing a new listener to build or buy his first set. The more of us there are the quicker will development take place, and we shall get more and better entertainment from radio.

Here's a Happy Christmas and a Prosperous New Year to all listeners, old and new!

Whitaker-Wilson's Play

When I ran into Mr. Whitaker-Wilson the other day he was full of excitement about his play on Sir Christopher Wren, which was broadcast twice in October.

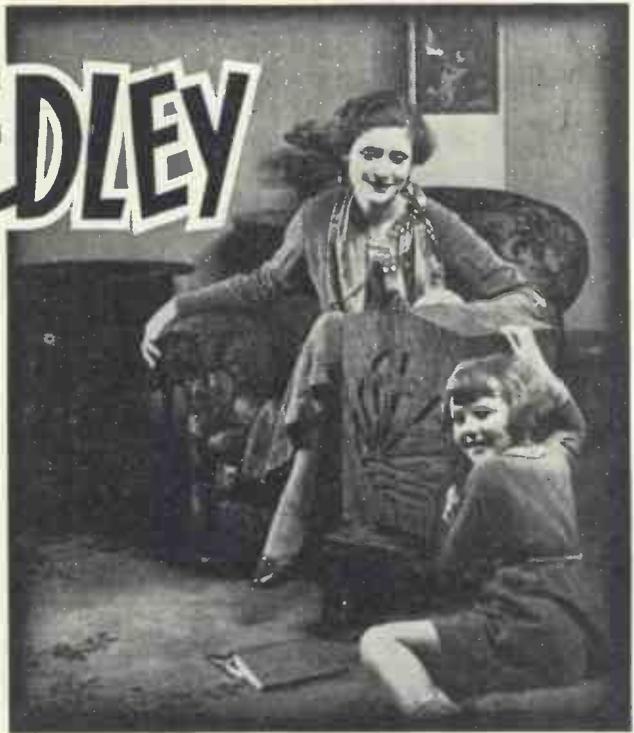
For a first effort I must say I thought it was remarkably good, although the noise department did not seem to come up to scratch with the gunpowder explosion and the sound of the battering ram.

“Who played the Epilogue?” I asked. “I would have sworn that it was you chanting.” “Yes, it was,” he replied. “I arranged to do it at the very last minute.”

Soon you may have a chance to hear Whitaker-Wilson again. I understand he is writing a series of plays based on the lives of the great musicians, and he is himself hoping to take the part—no, not of Bach, but of Mozart. But unless the B.B.C. stops him I am afraid that we shall have Bach sooner or later!

Name-calibrated Dials

What is your opinion of dials marked with the actual names of broadcasting stations? You know the kind I mean; there are no divisions marked in degrees or



THE BEST ENTERTAINER

However you look at it, radio is the best home entertainment that has yet been invented; this Pye set represents the modern designer's high standard

wavelengths, but the names of stations are printed round the periphery.

In theory the scheme is ideal, for it saves a lot of trouble in tuning. The snag is, though, that stations never keep to the same wavelengths for many months at a time, and it would not be long before such a set would need recalibrating to keep up to the times.

Personally I would rather not have such an unreliable guide. I should be most annoyed to think that for months I had been listening to Madrid, for instance, only to find some weeks afterwards that it had changed its wavelength, and that I had really been hearing some other station.

What we need, of course, is some such dial so arranged that the names of the stations can be easily shifted round as the wavelengths are altered. Perhaps some genius can solve the problem for us?

An Old Broadcaster

Listeners of several years standing will remember how popular were the broadcasts of J. H. Squire's Celeste Octet in the early days. I had forgotten all about them until I motored down to Westgate a few days ago. Then, looking out for some place to have tea on the way back, I came across a road house called the Celeste Octet.

And that is where Mr. J. H. Squire is now to be found. I cannot tell you the name of the particular place where the Celeste Octet is located, but it must be about three miles out of Canterbury on the Canterbury-Maidstone road. If you are ever down that way I can recommend you to take tea there; there are fine fireplaces properly used.

The place is called also “The House of 749 Cocktails,” but I was too early to go into that!

RADIO MEDLEY—Continued

Ferranti's Book

Some time ago I referred to a very useful book on radio published by Ferranti's under the title "The True Road to Radio." Now I have just received a copy of the third edition. It has been corrected in a number of places and certain revised illustrations have been included. Several pages have been added dealing with automatic grid bias.

Many people will wish that it had been possible



A VOICE FROM AUSTRALIA

A patient in the Oxted and Limpsfield War Memorial Hospital listening to her nephew broadcasting in Australia. The receiver is a McMichael Colonial super-het

for Ferranti's to have said something about super-hets in this new edition. They tell me, however: "It has not been found possible to include matter on the super-het—in fact, quite candidly, we have been far too busy on the actual production of that set to write books about it."

The book is notable for its very complete information on band-pass tuners, and should be on every keen amateur's bookshelf. At 5s. it would make an inexpensive yet timely Christmas gift for many constructors.

Adventure on the Short Waves

If you read your newspaper thoroughly you must have come across the name of Mr. C. G. Allen, of McMichael's. He must be the keenest short-wave man in the country, and he has many ambitious exploits to his credit.

His latest achievement was to take a McMichael Colonial short-wave super-het to the Oxted and Limpsfield War Memorial Hospital on a Sunday afternoon and pick up the broadcast of a boy soprano singing in Australia. In this way a hospital patient was actually able to hear her nephew singing 10,000 miles away.

Just another instance of the romance of radio and the importance of the short waves for covering great distances!

Modern Valve Magic

A week ago I spent a most interesting two hours at the Cossor valve works at Highbury. It is several years since I was last there, and I was astonished at the way the factory has grown. I am not at liberty to tell you how many battery and mains valves can be turned out every day, but the number is very large.

What most impressed me was the great trouble taken to make sure that none of the valves go "soft" in use. In some cases the metal electrodes for the valves, that is the grids and the anodes, are baked in an atmosphere of hydrogen in a special oven. This gets rid of most of the gases that are occluded in the metal, and which might otherwise be given off inside the bulb when the finished valve is in use.

With some types of valves all the electrodes are heated by means of a high-frequency coil before being "gettered." This heating by high-frequency currents is most fascinating. You see a coil, something like a short-wave tuning coil in appearance, placed round the bulb of the valve, and in a few seconds all the metal parts inside are heated to a dull red.

I was surprised to see that although some of the valves had the magnesium getter in position it did not fire during this preliminary heating. I asked the explanation, which happens to be a very simple one. Unless the getter is actually in plane with the axis of the coil the heat generated is not sufficient to fire it.

Incidentally, the frequency used for one batch of heating coils I saw was that of London National on 261 metres—quite a coincidence, I was assured.

Cathode Rays

From the valve department I was taken to part of the research laboratory where intensive work is being done on cathode-ray oscillographs. These have many interesting applications in radio work; some people believe that they will be the ultimate solution of the television problem.

In brief, the cathode-ray oscillograph is a kind of valve with a filament and a cylindrical anode. Electrons are emitted from the filament and pass right through the centre of the cylinder, impinging eventually on an



A BROADCASTER LISTENS-IN

Bertini, the conductor at the Tower Ballroom, Blackpool, enjoys a change from broadcasting by listening with Mrs. Bertini to his new Ferranti super-het

A RADIO FAN'S CAUSERIE

opaque surface. By various means it is possible to make the rays of electrons move, and they then trace out all kinds of interesting patterns on the screen. The colour of the beam is bright green.

When Shall We See Some Television?

Several months ago there appeared in these pages a description of the new Baird mirror-drum television receiver, and the B.B.C. has been putting out regular transmissions again since August. I should like to know who gets the benefit of them.

Until a few weeks ago the B.B.C. had only one televisor, and that was installed in the control room and worked off the line amplifier. I believe that they now have a second machine actually picking up signals by radio.

But when are televisors of the new type going to be available to the general public? The Baird people say that negotiations are still going on with manufacturers for licences to produce televisors. If something practical is not done very soon we shall be forced to conclude that television is still a scientist's dream, and not a really practical proposition for the man in the street.

Good Service from Lotus

For a year now I have had in constant use for ordinary listening a Lotus three-valve set for D.C. mains, and I cannot refrain from saying what good service it has given. Apart from some preliminary trouble due to a faulty screen-grid valve, for which Lotus could not be held responsible, the set has never given a moment's trouble, and it has been used almost every day.

It will, when required, bring in quite a number of foreign stations, but normally I confine my listening to London Regional and National. Of course, I do not listen to British stations on Sundays.

By the way, have you noticed how sometimes dozens of foreign stations seem to be sending out talks all at the same time? About six o'clock last Sunday evening I tried to get some music, but station after station was putting a talk out. I had to wait nearly half an hour before I could find any music worth listening to.

New Use for Records

On a recent Saturday afternoon I had taken my wife to meet some friends who were going to a matinee at the Golders Green Theatre, when I ran into Mr. Richard Arbib, the genial press manager of H.M.V.

"Ah," he greeted me, "you are just in time for a good story. We have a van here to make records of the whole show. Metro-Goldwyn-Mayer of America phoned across last night and asked us to do it. They are making



"RHYME AND RHYTHM" WITH RADIO
Phyllis Monkman and Laddie Cliff of "Rhyme and Rhythm" try a little radio rhyme and rhythm with a Marconiphone portable

a film of the show and want a complete set of records so that they can time the laughs. It will cost them about £300."

The show was Ivor Novello's *Party*, so when the film is released you will take special interest in it. I have learnt since that no fewer than thirty-four records were made and dispatched to America.

A Success

From what I hear the Calibrator—the four-valve set with wavelength-calibrated dial of which details were published in the October "Wireless Magazine"—has aroused considerable interest among constructors. I believe most people will agree that it is a definite step forward as far as ganging is concerned.

In the "Wireless Magazine" laboratory the other day I saw the experimental hook-up of the A.C. version of the Calibrator—

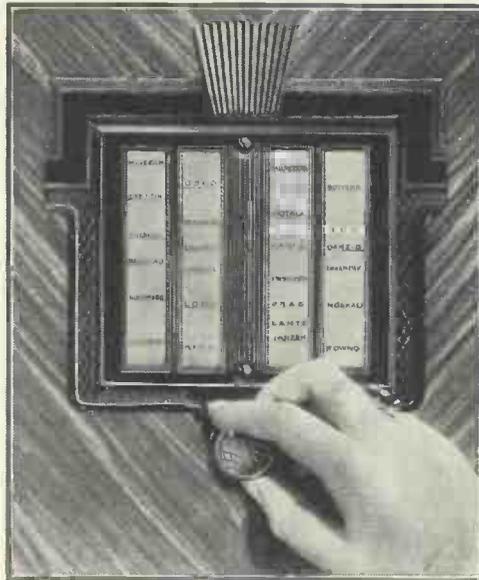
a set that will attract many who prefer "straight" receivers.

Captain Round's "Mike"

Some weeks ago I went to see Captain Round and he showed me a new form of microphone he had developed; he asked me not to say anything about it for the time being. Now, however, I see that the B.B.C. has officially announced that Captain Round is altering some of their microphones, so there is no need to keep the secret any longer. A novel feature of the new instrument is a diaphragm of gold leaf stuck on to a special kind of paper. The results are said to be amazingly good.

London, W.C.1.

BM/PRESS.



THE LATEST IN DIALS

A new type of German tuning dial. As the knob is turned a light strip illuminates the name of the station to which the set is tuned

The Seventy-seven Super



Here are details of an absolutely up-to-the-minute one-knob super-het radio gramophone for A.C. mains operation developed by the "Wireless Magazine" Technical Staff. It comprises seven valves with eight tuned circuits and under normal testing conditions has received over seventy foreign stations at good strength—in short, a set for the connoisseur!

IT is not an easy matter for the "Wireless Magazine" Technical Staff to design a super-het receiver, not because they do not know enough about their job, but because of the previous successes that have appeared in these pages and the necessity for making some real improvements when presenting a new design to the constructor world.

Now, after three months' intensive experimental work, we are able to give details of the Seventy-seven Super, a set that is really the last word in modern technique and which can be recommended to readers with every assurance that it will be a great success in their hands.

Seventy Stations

No extravagant claims are being made for the set. During the course of normal tests it received on the loud-speaker just over seventy identified foreign stations; that accounts for the "seventy" in the title.

The receiver is a seven-valver, with the addition of a valve rectifier, making the total up to eight. All the power needed for running the valves is taken from A.C. mains; beginners specially should note that the set as it stands cannot be operated either

from batteries or D.C. electric mains.

The object behind this design is to achieve a powerful radio-gramophone combination; that is, an outfit that will give a fine selection of radio entertainment as well as being able to reproduce gramophone records with complete purity and at ample volume.

The seven valves are arranged in the following sequence: (1) Screen-grid first detector, (2) oscillator, (3) screen-grid intermediate stage, (4) second screen-grid intermediate, (5) diode second detector, (6) intermediate low-frequency stage, and (7) power pentode. The intermediate screen-grids are of the latest variable-mu type.

In a super-het it is desirable to get as big a signal out of the first detector as is conveniently possible; signals that are not picked up at good strength at the beginning, as it were, will never be made really good by subsequent amplification. Experiments proved that a screen-grid valve in the first-detector position gave the best results.

For the oscillator a cathode mixing circuit is used. This has the advantage of giving very even distribution of oscillation throughout the wave ranges to be covered. There is no

trouble about oscillations being fierce at one part of the scale and weak at another part.

No special comment is needed with regard to the two intermediate-frequency amplifiers, which conform to what is now standard practice.

The use of a diode in the second-detector position will arouse interest. It may be said that the "diode" is not a special kind of valve in this instance; it is simply a three-electrode valve used as a two-electrode device. In this particular circuit only the grid of the valve is utilised, the anode being left free.

Diode Advantages

There are two great advantages in the use of a diode detector. In the first place it gives linear rectification over a wide voltage range; in other words there is no distortion even of strong signals and, therefore, the quality is of the highest possible order. A second advantage is that the damping introduced into the previous circuit is very small and consequently maximum efficiency is obtained.

A disadvantage of the use of a diode detector is that it only detects; it does not amplify like the three-electrode detector. That accounts

Quarter-scale Layout and Wiring Diagram

for the use in this set of an intermediate stage of low-frequency amplification between the detector and the power pentode.

The latter is of a type giving approximately 2.5 watts output and it needs a reasonably large input.

One Tuning Knob

Tests with this valve combination showed that it was capable of giving the desired results both from radio and gramophone records. The next problem was so to simplify the design that there was only one tuning knob.

Here it was necessary to work in close co-operation with the Lewcos designers, for theirs was to be the job of actually getting the coil into production.

In order to avoid the necessity for having a special type of gang condenser with shaped vanes for matching up with the oscillator coil, work was started on the design of an oscillator coil that could match up with a standard gang condenser.

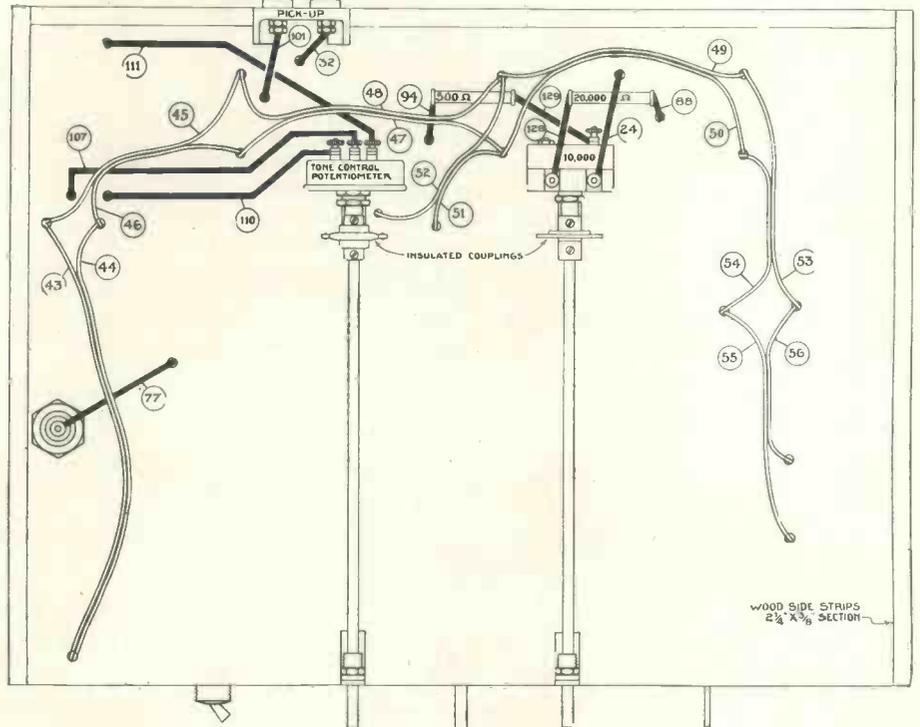
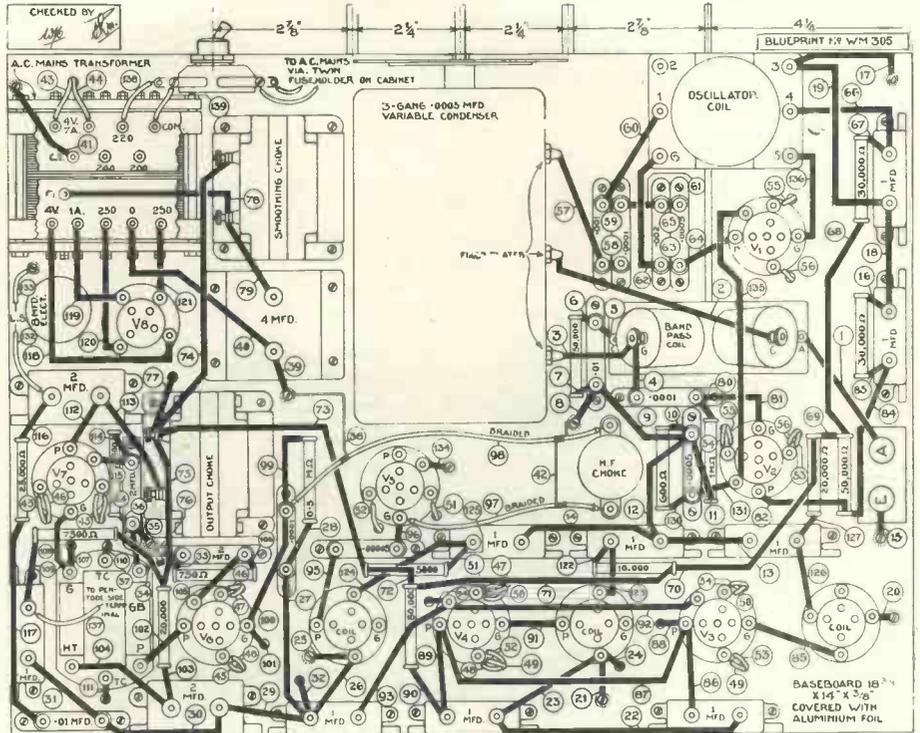
That piece of work literally took months to get just right, uneven sensitivity over the two wavebands being the trouble. At last, however, the object was achieved, as the log of stations on page 627 bears witness.

Band-pass Tuner

The input circuit of the set comprises a band-pass tuner, and this is linked up with the oscillator by means of a three-gang condenser. It will thus be appreciated that the preliminary adjustment of the set is not at all difficult.

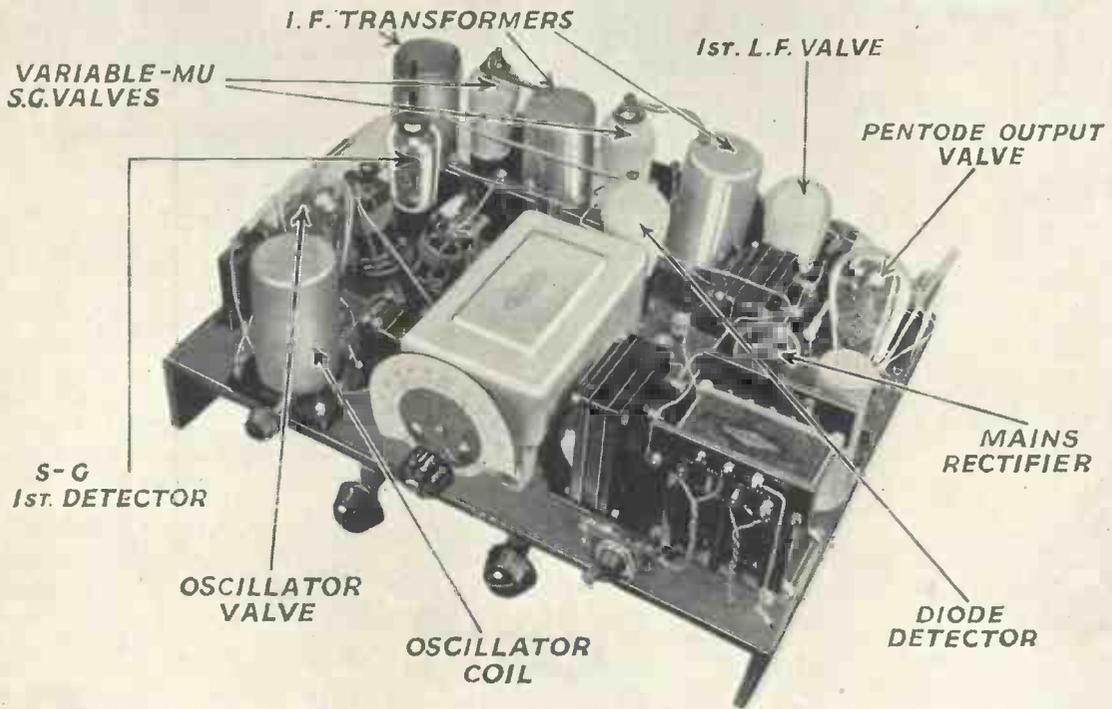
The band-pass coil and the oscillator coil have a common change-over switch on the front of the set to reduce the number of controls.

Apart from the band-pass tuner in the aerial circuit, each intermediate-frequency coupling coil consists of a band-pass arrangement. As there are three of these

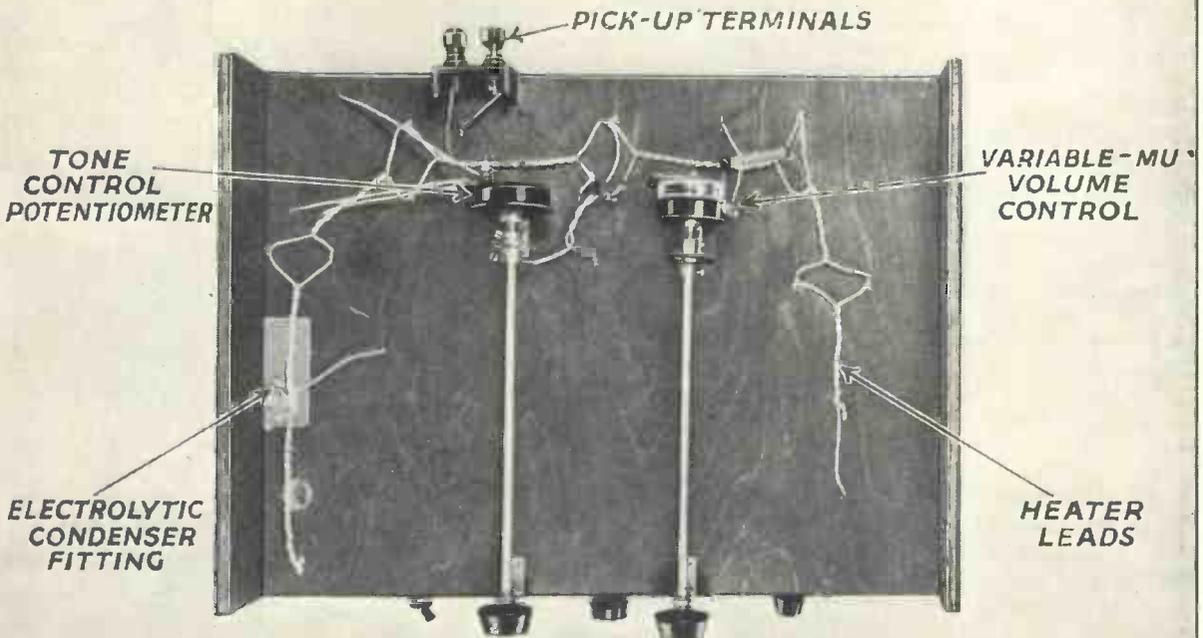


If desired a full-size blueprint can be obtained for half price, that is 9d., post free, if the coupon on the last page of the issue is used by December 31. When ordering ask for blueprint No. WM305. It should be noted that all the connecting wires are numbered separately in the best order of assembly; connect up in the proper numerical sequence and it will be impossible to make a mistake

A RADIO DELIGHT for the CONNOISSEUR!



Here is the completed assembly of the Seventy-seven Super with all the valves and coils in position. The top of the baseboard is covered with metal foil



A view of the under side of the baseboard-chassis showing the potentiometers for radio volume control and for tone control. In this way long leads are avoided

THE SEVENTY-SEVEN SUPER—Continued

COMPONENTS NEEDED FOR THE SEVENTY-SEVEN SUPER

CHOKE, HIGH FREQUENCY

- 1—Lewcos, type MC, 2s. 6d.

CHOKES, LOW FREQUENCY

- 2—Ferranti, type B1, £2 2s. (or Varley, R.I.).

COILS

- 1—Lewcos bandfilter, type BPF/GR, 12s.
- 1—Lewcos oscillator, type TOS/GR, 8s. 6d.
- 3—Lewcos super-het intermediates with pigtails, type IFTP, £1 11s. 6d. (or Wearite).

CONDENSERS, FIXED

- 1—T.C.C. .00005-microfarad, type 34, 1s. 6d.
- 3—T.C.C. .0001-microfarad, type 34, 4s. 6d. (or Dubilier, Telsen).
- 2—T.C.C. .0005-microfarad, type 34, 3s. (or Dubilier, Telsen).
- 1—T.C.C. .001-microfarad, type 34, 1s. 10d. (or Dubilier, Telsen).
- 1—T.C.C. .002-microfarad, type 34, 1s. 10d. (or Dubilier, Telsen).
- 2—T.C.C. .01-microfarad, type 34, 3s. (or Dubilier)
- 9—T.C.C. 1-microfarad, type 50, £1 5s. 6d. (or Dubilier, Telsen).
- 2—T.C.C. 2-microfarad, type 50, 7s. 8d. (or Dubilier, Telsen).
- 2—T.C.C. 2-microfarad, dry electrolytic 200-volt working, type 561, 6s. (or Dubilier).

- 1—T.C.C. 4-microfarad 400-volt D.C. working, 8s. 6d. (or Dubilier, Peak).
- 1—T.C.C. 8-microfarad dry electrolytic, 9s. (or Dubilier).

CONDENSERS, VARIABLE

- 1—British Radiophone .0005-microfarad three-gang with cover and disc drive, type 344C, £1 13s.

HOLDERS, VALVE

- 11—Lissen five-pin, type 593, 13s. 9d. (or W.B., Lotus).

RESISTANCES, FIXED

- 1—Packet of 18 Eric fixed resistors, 1-watt type, values 400, 500, 600, 750, 5,000, 7,500, 10,000, 20,000 (3), 25,000, 30,000 (2), 50,000 (3) ohms, .5 and 1 megohm, 18s. (or Claude Lyons, Dubilier).

RESISTANCES, VARIABLE

- 1—Multitone graded, 3s. 6d.
- 1—Lewcos 10,000-ohm potentiometer, 3s. (or Wearite, Colvern).

SUNDRIES

- Tinned-copper wire for connecting (Lewcos).

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.

- Lengths of oiled-cotton sleeving (Lewcos).
- Lengths of shielded cable, 9d. (Goltone).
- Length of rubber-covered flex.

- 1—Baseboard-chassis assembly with 18 $\frac{3}{4}$ -in. by 14-in. sheet of aluminium foil (Peto-Scott).

- 4—Peto-Scott brackets to specification, 1s.
- 2—Utility 10-in. rods and insulated couplers, 4s.

- 1—Belling-Lee twin fuseholder and fuses, 2s. 6d.

SWITCHES

- 1—Tunewell radlo-gram, 1s. 9d.
- 1—Becker double-pole on-off, type 462, 2s. 3d.

TERMINALS

- 4—Belling-Lee, type B, marked: Aerial, Earth, Pick-up (2), 2s.
- 2—Belling-Lee terminal blocks, 1s. 4d.

TRANSFORMER, LOW-FREQUENCY

- 1—Multitone, 17s. 6d.

TRANSFORMER, MAINS

- 1—Parmeko, type WMD, £2.

ACCESSORIES**CABINET**

- 1—Osborn radio-gramophone, type 234, in mahogany, £6 5s.

LOUD-SPEAKER

- 1—Baker permanent-magnet, standard type, with matched output transformer, £3 10s.

GRAMOPHONE MOTOR

- 1—Garrard No. 201 induction with automatic stop, £4 17s. 6d.

PICK-UP

- 1—B.T.H. minor with volume control, £1 5s.

VALVES**Oscillator**

- 1—Mazda AC/HL metallised, 13s. 6d.

First Detector

- 1—Mazda AC/SG metallised, 19s.

Screen-grid Intermediates

- 2—Cossor MVSG metallised, £1 18s.

Diode Detector

- 1—Cossor 41MHL, metallised, 13s. 6d.

First Low-frequency Stage

- 1—Cossor 41MHL, metallised, 13s. 6d.

Pentode Output

- 1—Cossor MP/Pen, £1.

Mains Rectifier

- 1—Cossor 506BU, 12s. 6d.

operation, will not present any great difficulty. It is best to start with all the trimmers in their half-way positions and then adjust the two outer ones until the best results are obtained from a fairly weak station.

Equal Sensitivity

The object in trimming should be to get the same sensitivity at all wavelengths. The set should, therefore, be ganged at the lower end of the medium waveband and again at the top end.

The grammo-radio switch is mounted on the top of the motor-board alongside the turntable. It should further be noted that as no low-frequency volume control is provided in the set itself the pick-up should incorporate its own volume control.

Valves for the Set

It will be noticed from the list of parts on this page that not all the valves are of the same make. The reason is obvious, of course. Nearly all makes of valves have slightly different characteristics and for the Seventy-seven Super we have chosen just those types that give the best possible results. Only those particular valves listed should be used.

We would also point out that where no alternatives are shown for other components, only the specified parts should be used. There is a good reason for using every part listed on its own.

The form of construction utilised is the now familiar baseboard-chassis method. As far as possible the components have been mounted on the top of the baseboard in positions where they are readily accessible. A few parts have been mounted underneath the chassis in order to avoid long wires which might introduce instability.

Assembly and Wiring

With the aid of the blueprint there will be no difficulty about laying out the set and when it comes to wiring the blueprint will be equally valuable. Each wire is numbered separately in the best order of assembly. For instance, if the constructor starts with connection No. 1 and then works through in numerical order all the leads will automatically be made in the best order.

It should be specially noted that a number of leads are made with metal-braided wire. In these cases it

is most important that the metal braiding should be earthed to the aluminium (or copper) foil that covers the whole of the top of the baseboard.

The connections for the valve heaters should be twisted together as shown; this method of wiring avoids the introduction of mains hum into various parts of the circuit.

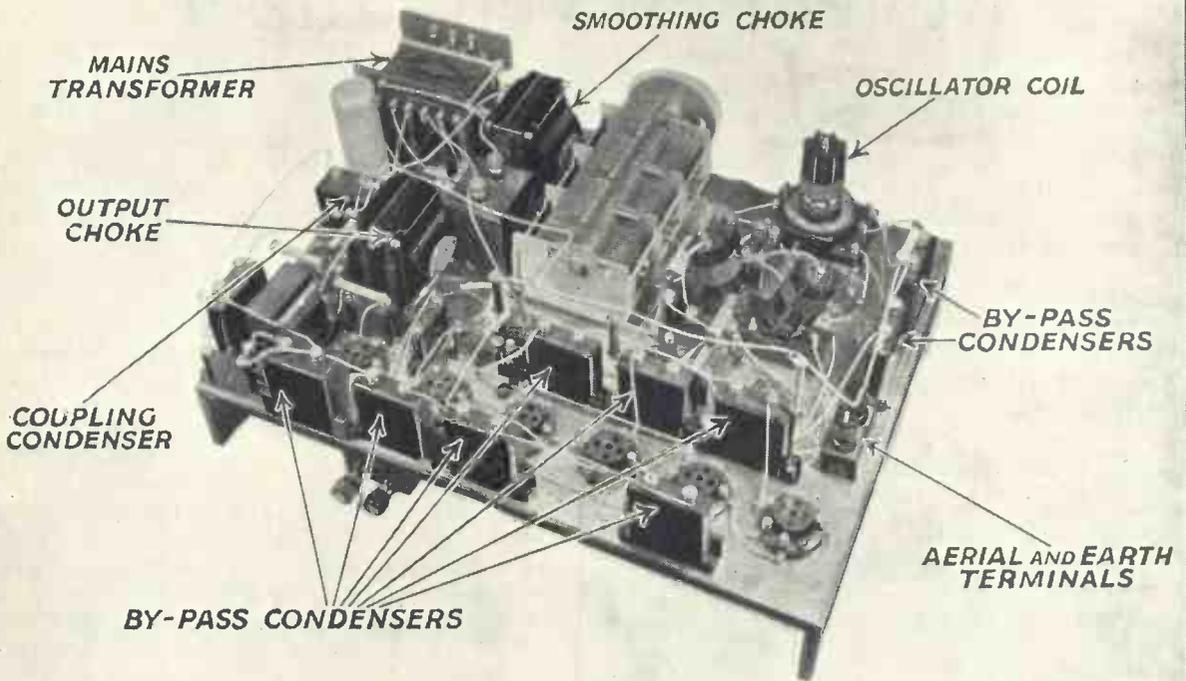
It should also be remembered that these wires carry the full 7 amperes needed for supplying the heaters of the seven valves and they must, therefore, be of adequate current-carrying capacity to avoid voltage drop. Very thick rubber-covered flex or No. 16 gauge wire threaded through oiled-cotton sleeving can be used.

The ganging of the set, once it is ready to put into



The Seventy-seven Super as a complete radio gramophone housed in its Osborn type 234 cabinet

RIGHT UP-TO-THE-MINUTE IN EVERY WAY



A back view of the Seventy-seven Super showing how well laid out the parts are. Although the set looks big there are no snags in the construction



This photographic plan view of the Seventy-seven Super gives a clear indication of the arrangement and disposition of the components. A standard three-gang condenser is used

An Independent Test of the Seventy-seven Super

In reading this independent test report on the capabilities of the Seventy-seven Super, remember that all the stations referred to were heard at full loud-speaker strength and that there is only one knob for tuning.

With this set you have the European ether at your fireside, to roam as and where you like over the Continent!

entertainment. The most noticeable difference between the Seventy-seven Super and other sets is that the percentage of stations with real entertainment value is much greater.

During the time the Seventy-seven Super was on test I heard over seventy stations at full loud-speaker strength. Many of them had slight interference, but really nothing to mention. This is no exaggeration.

At the end of this report the list of stations received numbers seventy-

four, and even this large number, I am sure, by no means exhausts the station-getting capabilities of the set.

The tone control, besides being an innovation, was found to be extremely stations — powerful signals not excepted.

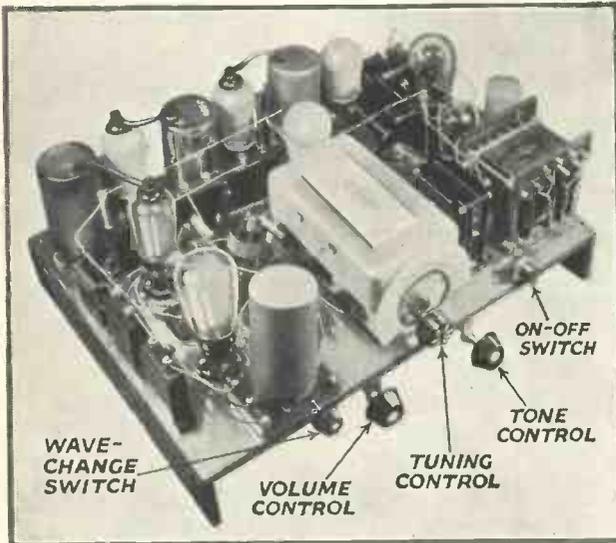
All the controls worked extremely smoothly, the wave-change knob being turned to the right for the medium waves and to the left for the long waves. The set covers an extensive wave range. On the long waveband a range of from 2,000 to below 1,000 metres is covered, so embracing all the important long-wave stations. The medium-wave range covered is from 240 to 565 metres.

A Warning

Listeners in the Aberdeen and Newcastle areas who build this set will, of course, not be able to receive their local station. This is unfortunate, but the other British stations should be easily heard.

There is no second-channel reception. This applies to both wavebands. There was no audible falling off in signal strength at the top or bottom of either waveband, an important point with a set of this type.

The set was first put on test during an afternoon to get an idea of its general behaviour and its capabilities of bringing in foreign stations during daylight. Brussels No. 2, Langenberg, Rome, Hilversum, Trieste, and all the English high-power medium-wave stations came in at full strength. On the long waveband at least half a dozen broadcasters were heard at a strength which fully loaded up the pentode output valve.



HOW THE CONTROLS ARE ARRANGED

This photograph shows clearly how the controls of the Seventy-seven Super are arranged. There is only one knob for tuning

THREE evenings and an afternoon spent turning the one knob—slowly—of this super-het has meant a deal of work and, incidentally, much pleasure, because the "feel" of the set is fascinating.

Station at Every Degree

As the main tuning knob was turned a different signal from the loud-speaker was heard at every degree of the dial. If it was not a station it was a great howl denoting that the set was tuned to a common waveband.

I have tried several sets recently which have brought in twenty or thirty stations, but perhaps only a dozen gave really interference-free

useful. Firstly it enables the listener to choose the degree of quality to suit his own individual tastes—by quality I mean emphasis of either the treble or bass notes.

The effect of cutting off the top notes also reduces those nasty heterodyne whistles which nowadays are a common occurrence on medium-wave



AT THE MIKE

A set like the Seventy-seven Super brings the world's personalities to your fireside. Here is Leni Riefenstahl, director and star of "The Blue Light," at the Hamburg mike

For the reception of the local programmes the volume control was turned down to almost zero.

During the evening tests the log was compiled. Imagine listening to station after station and trying to identify each one! Even the small-power transmitters on the medium waveband were heard at good strength.

This set will please those who still find pleasure in bringing in unusual distant stations and it will please those who only wish for good interference-free reception of the locals and maybe a dozen or so Continental stations.

High-power Stations

The medium waveband is now getting alarmingly full of adjacent high-power stations. For example, London National and Leipzig, Poste Parisien and Breslau, London Regional and Mühlacker, Rome and Stockholm and Prague, North Regional and Langenberg are very close together. Every one of these stations was heard clear of any mutual interference, and heard well.

On the long waves Zeesen was heard free of annoying twitter from Radio Paris and Daventry.

Such small stations as Grenoble at the top of the medium waveband,



STOCKHOLM IS ONE OF THE SEVENTY
With the Seventy-seven Super you will have no difficulty about picking up stations from all over Europe, for example, Stockholm

Rabat in Morocco, and Algiers were heard at reasonable strength. It is rather a feat to pick up Belfast and Cardiff in London, but both were heard at splendid signal strength.

One could go on naming unusual occurrences with this set. In fact, it will do almost anything and get anything you want.

Few nights in the year, given good atmospheric conditions, fail to give several American stations on the medium waveband in the small hours of the morning. If any set will pick them up, I am sure the Seventy-seven Super will. I listened

after midnight on one occasion, but although several bursts of music were heard amidst the atmospherics no speech which might lead to an identification of the transmitter was picked up.

At 11.30 p.m. one evening I heard preliminary tests from the new Leipzig transmitter. With the volume control set almost at zero, the strength was terrific.

The Seventy-seven Super is not cheap to build—I gather this from its appearance—but the results are exceptional and certainly worth the cost.
T. F. Henn.

Log of Stations Received on the Seventy-seven Super

LONG WAVEBAND		Station	Degrees	Station	Degrees
Station	Degrees	Bari.....	12	Scottish Regional.....	46.5
Leningrad.....	10	Turin.....	13	Lvov.....	48
Oslo.....	25	Heilsberg.....	14	Radio Toulouse.....	49
Moscow.....	29	Bratislava.....	15	Frankfurt.....	50
Kalundborg.....	35	Montpellier.....	17	Bucharest.....	51
Not Identified.....	43	Scottish National.....	18	Midland Regional.....	53
Moscow (Trades Union)...	46	Viipuri.....	19	Söttens.....	55
Motala.....	50	Hilversum.....	20	Katowice.....	56
Warsaw.....	55	North National.....	22.5	Dublin.....	57
Eiffel Tower.....	59	Bordeaux-Lafayette.....	24	Rabat.....	58
Daventry National.....	65	Cardiff.....	24.5	Berlin.....	59
Zeesen.....	68	Genoa.....	25	Belgrade.....	61
Radio Paris.....	80	Göteborg.....	29	Stockholm.....	62.5
Lahti.....	86	Breslau.....	30	Rome.....	65
Hilversum.....	90	Poste Parisien.....	31.5	Beromuenster.....	69
		Milan.....	33	Lyon-la-Doua.....	71
		Brussels No. 2.....	35	Langenberg.....	73
		Brno.....	36	North Regional.....	75
		Strasbourg.....	37	Prague.....	77
		Barcelona.....	38	Florence.....	82
		Graz.....	39	Brussels No. 1.....	83
		London Regional.....	40	Vienna.....	86
		Mühlacker.....	41.5	Munich.....	89
		Radio Algiers.....	42	Budapest.....	94
		Radio Paris LL.....	45	Wilno.....	98
		Hamburg.....	46	Grenoble.....	100
MEDIUM WAVEBAND					
Nurnberg.....	1				
Belfast.....	2.5				
Trieste.....	5				
Gleitwitz.....	7				
Hörby.....	7.5				
Leipzig.....	8				
London National.....	9				
Moravska-Ostrava.....	10				

WITHOUT RHYME OR REASON

By FISHGLUE

TAKING a leaf from the notebook of Uncle Eric, Esq., North Regional, Ed. and I have invented a new language, so "Spokeshave everybody, and dickey-boodle," which means, in our language, "Hello, and all the very, very best for Christmas."

Just to cheer things up a bit, they're holding a party down at the "W.M." offices, and in strict confidence I'm able to give you advance details. The eats will be scrumptious—absolutely, and there'll be a lovely Christmas tree, and presents for everybody, even including Mr. Whitaker-Wilson, whom we've forgiven for the play he wrote.

Anyway, here goes! Switch on, right—adjust the screen-wiper and don't touch and—here we are—

There, at the head of the table, sits Ed. Round and about, within throwing distance, sit the staff. On his left sits brother Sisson Relph, on his right friend E. H. Chapman. The former, at the moment, is disgustingly sober.

Further down, trying hard not to be, is BM/PRESS, who at the moment is quite beyond pronouncing his own name. Hang it all, I knew he'd do it!

Brother Chapman has now lost his iron-heel tip in the soup. He's busy trying to locate it with a carefully screened frame aerial and a stage of S.G. amplification.

Over in the corner sits Jay Coote. It is for his express benefit that the jelly has been served in sinusoidal wave form. (They've made sufficient to ensure an "amplitude" for everybody, and what's over they'll "pitch" out.)

Just come back to his seat is our old friend W.-W. He's just been over to the piano, trying to play the French for kippered prawns in cowslip jelly. When he saw it on the menu, he thought it was a bit of Mozart.

I hope he isn't going to take soup in polyphonic form, 'cos the chef who evolved that soup is dead, and in respect to his memory the least that can be done is to drink it in silence.

The waiter is just asking Alan Hunter to have a serviette. He says that if Mr. James can eat one, he can. Mr. James, by the way, is busy illustrating his latest design on Kenneth Ullyett's shirt-front. And what a design!

A 1933 super 5, all screen-grid stages, no-knob tuning—just think of a station and double it, with attachments for a pick-up, a waffle iron, and a cocktail shaker.

They're all jolly good fellows now, it's going with a swing, and they're looking on the wine while it's red—but not wasting too much time in looking.

Now they come to the speech stage. Ed. toasts "The Readers," amid loud cheers. Mr. Whitaker-Wilson

is now getting up to describe the palpitating soul-urge which prompts the ego to self-expression and forces one to write a radio play, or bust.

After formal expressions of sympathy, Ed. gets up again, to read a telegram which has just arrived from Uncle Fishglue, to the effect that he's sorry to disappoint the gathering, but that he is unavoidably prevented from being present by the fact that he isn't invited. More loud cheers!

More speeches, then the distribution of the presents from off the Christmas tree.

Ed. gets a nice spotted fountain pen filled with "cheque" ink. Mr. Chapman gets a little leather-bound volume with gilt edges, entitled "Sines of the Times," or "Don't tan λ , Cos θ pinched the π ."

Mr. Whitaker-Wilson gets a balloon, and two songs specially written for him, entitled respectively "When you're stealin' through the Classics, always go in stockin'd feet" and "Bach to Berlin," by Irvin.

Mr. Alan Hunter gets a presentation copy of Mr. Murphy's classic, "Making Wireless Simple." He'll like that! For Mr. James there is an illuminated address saying "What about the Barnyard 5?" This is enclosed with a bunch of don't-you-forget-its, and included 1s. 9d. advance royalties.

Now, this is where something exciting is going to happen. Mr. Reyner is just getting up to sing "I know I'm a wireless wonder, but I'm screening an aching heart"—hang it! the doings has just exploded, and we can't see a thing now till the smoke clears.

In the meanwhile, let's leave them, and *retournon à nos moutons*.

Encouraged by the Educational Broadcasting Committee, Madam Montessori (a lady who has decided that what is correct for half-witted children in Rome is the right and proper thing for normal children in England) has decided to introduce wireless into her play-way in Education, and the Wireless Project method is now in full swing.

Allow me, then, with or without her kind permission, just as she prefers, to quote from her new book, "What Wireless has done for little Willie":

This infant is learning his *ABac*, see?
This one is *damping* his dummy.
This one debating *capacity*
Of his eyes, a propos his tummy.
The one near the door has tried *jamming*
His finger and finds that it *Hertz*.
(Another is *jamming* his *dial*, as with
jampot and ladle he flirts.)
This bright *spark* has been *interrupted*,
As he played with his *tonic train*:
His *output* in yells is umpteen *decibels*.
'Cos they won't let him have it again.

See that little chap on the cycle?
 His frequency's time controlled,
 (Only two times around the back garden,
 Now its Alfie's turn, do as you're told.)
 So each Tiny Tot's bound to pick-up a lot,
 They're potential Marconi's—ahem!
 When they're older, you'll see,
 They'll write eyewash, like me,
 And send it to "W.M."

Further along, from a chapter on Etiquette, I cull the following:—

Little children all agree,
 The finest way to make whoopee,
 Is shouting loud with Ed. and me
 KA over 4πd.
 Never say that rude word "——"
 Just murmur low "magnetic shell"
 A nice boy stops, before he swears,
 To add the roots of means of squares.
 No ultra mothers send their daughters,
 To Bath or Buxton for the waters:
 Crystal control will cure their faults,
 So they go to Rochelle to twist the salts.
 (Very subtle.—Ed.)

Oh, by the way, I've written a new Radio Play, myself. It's a gift! (or a disease!). Ed. has promised to print it here, and he is offering a prize of a bag of nuts for the most scathing criticism, but Mr. Whitaker-Wilson is not to be allowed to compete.

Take a deep breath, and then go ahead—here it is:—

A Domestic Tragedy in One Act

Written by Fishglue.
 Produced by Fishglue.
 Dialogue by Fishglue.
 Swearing by Fishglue.
 Noises-off by Fishglue.
 Lighting by Fishglue.

Scene I.

This takes place in the drawing-room of a suburban six-roomed house (two up, two down, and two in the agreement, hot, cold, and dirty). Wife sits in easy-chair listening to Mr. James' latest five-valver.

Enter husband from prompt ride and golf.

Husband.—What's that confounded chatter?

Wife.—Hush! dearest, that's Mr. Whitaker-Wilson's new radio play, "Sir Christopher Wren."

Husband.—Christopher Columbus! Switch it off. D'y'e hear?

Wife.—No! Really darling—

Husband (kicking cat).—Damn!!! * * * !!

(Draws revolver and shoots wife dead. Enter maid—screams.)

Husband.—Shut up!

(*Throws wireless set at maid, shoots himself, and slams the door and walks out to strains of "Red Hot Mama"*)
 Curtain and applause.

In my official capacity I called at the Radio Exhibition last month [they had no empties, but I dallied a little while, and before being thrown out was struck, amongst other things, by one or two little things that I offer for your consideration].

In the first place, I was depressed by the complete and devastating "sameness," a wholehearted lack of originality displayed by the designers of sets.

They (the sets) all had knobs on (in more senses than one). They all used valves—overhead screen-grids and camshaft pentodes predominating. All of them would receive wireless signals.

What a delight it would be to get one guaranteed not to!

Then again, I don't like modern sets, they're all far too simple.

There's nothing to do with one's teeth, and they never think of giving us anything to do with our feet.

Now, when Uncle Fishglue was a lad—[Here, that's enough of that—I've heard you on that strain before.—Ed.]

I don't like this "ganging" business. I suppose it accounts for half the racket we hear.

P.S.—I'll take back what I said about valves. I suppose I ought to be grateful that we don't have "toobs." Hook-ups, ticklers, antennæ, grounds, fones and A batteries were noticeably absent, thank goodness! though I did hear a man at a battery stand complaining about one of their B batteries.

Oh, by the way, there are one or two items of correspondence to deal with, since my last outburst:—

Lithe and Lovely—(S.) *Veldt*—writes:—

"Dear Fishglue, I just loved your last article, and hope you'll write again soon. There was something about it that almost made me want to smile."

[Must show that one to Ed. !]

Six little French girls—*Montmartre*—write:—

"A bas Veetaker
 His music, c'est trop dull
 A la lanterne
 Avec knobs on,
 Trois bags full."

On the other hand, I read from Miss Olga Pushmugski:—

"The insidious voluptuousness of the music of Mr. Whitaker-Wilson's divine Beethoven, the transcendental glory of its achievement, the enormity of its conception, and its tiddly-bits, all lift my soul on breathless wings, and make me want to be a better girl."

Well! well! *Chacun a son gout*. A lady who shall be nameless wants to know why we can't have more of Ambrose, and surely all those nice boys of his aren't story tellers, and, if they are, they're surely not indelicate enough to be "blue."

Oscar K. Sass and Leo. Q. Bonheimbunger, the eminent German composers of French Tangos for British orchestras, send me an advance copy of their latest foxtrot, which is well up to the standard required by our singing dance bands. Rather illuminating, isn't it? This is sure gonna be a swell hit, sez me, so gerra load of it sister! :—

To-day I've found my black bird,
 I'll say it ain't no blue bird,
 It might have been a red bird,
 Flying backwards inside out.

Chorus in German, sung tenderly at 273° C. by the prize-morning horror:—

To-day ich bin so traurig
 So traurig
 So traurig
 Ich verstehe nicht why I'm traurig
 Auf eidlweiss to you.

Personally, I thought only anthems and male voice choirs did that sort of thing. Still—

With regard to the people who sing in dance bands, I'm inclined to agree with the man who said that he was sure that they must sing by ear, 'cos they couldn't possibly do it with their throats.

Just before I go to the grotto, one more item for your wireless glossary:—

Triode.—A triode is a poem for "W.M." If they won't have it, try somewhere else.

Sorry, must leave you now. I hear the gurgle of the bath water calling me to come and slide on the soap. With all the best, and lots of nuts,

Seasonably yours,

FISHGLUE.



Adventuring on the Short Waves!

By

J. GODCHAUX

ABRAHAMS

AN INTERVIEW BY SHORT WAVES

Dr. Kurt Rathke interviewing an ocean flyer 10,000 miles away in Batavia. The short-wave station at Bandoeng did the transmitting from the East Indies and Nauen from Germany

AT this period of the year the owner of a short-wave set truly comes into his own as, taken all round, the reception of transmissions on channels below 100 metres is easier to achieve during the winter months than at other periods of the year.

At the same time, as conditions vary from day to day, we must not expect to secure the same results on every night; the actual state of the atmosphere due to changing weather conditions, electrical and other disturbances, will inevitably either favour or mar reception.

Transmissions on short waves are more affected by such influences than those of lower frequency but, fortunately, these varying conditions do not affect the different wavebands either in the same degree or during the same period.

Logging with Ease

On a night when you find that the capture of broadcasts on channels between 25 and 35 metres is almost impossible you may be permitted to log with ease broadcasts which emanate from stations working in the 40-metre band.

In the same way it frequently happens that on the occasions when atmospheric conditions are prevalent on the medium waves, signals on higher frequencies (lower waves) may be heard in a perfectly silent background.

Luckily for us, there are to-day so many stations working on the shorter wavelengths that it is almost impossible to strike one evening, whatever the conditions may be, on which something of interest cannot be culled from the ether.

Many Advantages

The owner of a short-wave receiver reaps many advantages, one of which alone may be stated. Many of the European stations simultaneously broadcast their programmes on medium and short wavelengths; as examples, take Berlin, Copenhagen, Rome, Paris, Moscow, etc.

I have often noticed that when the reception of such programmes was fitful when tuned in with my ordinary set the stations were most satisfactorily received through the short-wave channels.

The capture of such stations as those I have mentioned on their lower wavelengths is easy and may be accomplished by the most modest type of receiver; when you have regularly added these broadcasters to your log, you will wish to search farther afield to hear transmissions probably not so frequently logged by the ordinary listener.

During the past year the development of radio telephony has been so intense that there are literally dozens of broadcasts to be picked up almost throughout the day and night.

In this article I shall deal with a number of stations and new services from which transmissions may be heard. Among those detailed I have included many which cannot be classed as *broadcasters* inasmuch as they are not equipped for the radiation of actual entertainment.

Some of these, as you will notice, operate public telephony services, but although "privacy" apparatus is switched in for conversations between subscribers, it is possible occasionally to overhear two-way messages between the station operators.

You will soon realise that the reception of such transmissions is of great assistance in calibrating a short-wave set.

Starting a Search

By far the best way to institute a search is to take a small portion of the waveband and jot down, from the "World's Broadcast Wavelengths" and "Guide to the World's Broadcasters," published monthly in "Wireless Magazine," names of a certain number of stations comprised in that band, taking into consideration the times at which they transmit.

Failing this, much disappointment may be caused by aimlessly twirling the condenser dials and seeking a station which, in view of its time schedule, may not be working. It must also be remembered that some

stations utilise both "day" and "night" waves, which are used at their appropriate hours; this applies to many American broadcasters and other transmitters.

As a rule you may take it that reception conditions during the present period, namely December to March, will be favourable for transmissions from certain parts of the world at the times indicated.

On 30 to 50 metres

On 30 to 50 metres, from midnight until 6 a.m., G.M.T., from the United States (Eastern and Mid-West), Mexico, etc., and from 6 a.m. to 9 a.m. from the stations situated on the western seaboard of America. From 9 a.m. to mid-day from the greater part of Europe; from mid-day until 5 p.m. from the Far East (or from North America on wavelengths between 19 and 25 metres); and from 8 p.m. until midnight on 30 to 50 metres from both the North and South American continents. (Notice that these are rough limits and not *exact* wavelengths.)

During the past year a more or less regular interchange of programmes has been carried out between the United States and Great Britain, Germany, Spain, Switzerland, Holland, not to mention other European countries.

Short-wave Relays

To effect these relays, in many instances, short-wave stations not officially destined to that work, but more closely connected with public service telephony, have been brought into operation.

Such New World transmitters are LSY, Buenos Aires, 14.47 metres; PPU, Rio de Janeiro (Brazil), 15.576 metres; WAJ, Rocky Point (N.Y.), 16.66 metres and 22.25 metres; WQV, Rocky Point, 20.27 metres; WKJ, Rocky Point, N.J., 20.7 metres; WMA, Lawrenceville (N.J.), 22.25 metres; and so on.

On the European side, we may mention EAQ, Madrid, 30.4 metres; GBU, Rugby, 24.41 metres; Radio Colonial (Paris), 25.63 metres; DIQ, Königswusterhausen, 29.16 metres; DHC, Nauen, 29.47 metres; DGN, Nauen, 31.08 metres; CTIAA, Lisbon, 31.25 metres; Radio Nations (Prangins), 31.31 metres,

38.476 metres, and 40.3 metres; GBS, Rugby, 33.25 metres; and so on.

Obviously, as these relays of transmissions do not occur on fixed dates, it is impossible to give the times at which the short-wave stations are working for this purpose.

For linking up the Continental transmitters on evenings when an international broadcast is carried out resort is made to the specially pupinised landlines that have been laid down for this particular work and consequently for such transmission the "short-wavers" are not brought into action.

For the radiation, however, of programmes to listeners overseas such means cannot be used, and on these occasions the broadcasts are made either by special stations or by the official transmitters usually utilised for public telephony and other services. In many instances certain channels are reserved for this purpose.

Almost every Sunday the Columbia Broadcasting Company of America relays from Europe towards 6 p.m. G.M.T. a talk by some eminent authority on political or social matters; or by a famous author, journalist, university professor, or painter—in fact, anybody of note who may prove of interest to listeners in the United States.

For these transmissions Transatlantic telephony wavelengths may be used. If emanating from Great Britain, the broadcast may go out through one of the Rugby (Hillmorton) channels, say GBS, 33.25 metres, or GBU, 24.41 metres; if from Holland, via Kootwijk; from Germany through Zeesen or Nauen; and from Switzerland via Prangins.

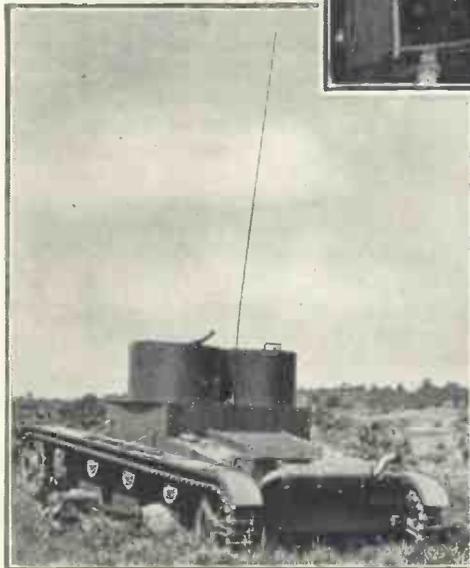
From the Other Side

It happens frequently that you may pick up such broadcasts from the other side of the Atlantic Ocean and a search for W8XK or for W2XAD or W2XAF (Schenectady) on their respective wavelengths usually brings about a pleasant surprise.

On the other hand, the Columbia network transmissions destined to Europe usually come through WAJ or WMA, Rocky Point, N.J., on either 16.66 metres or 22.25 metres. In reference to these broadcasts I have sometimes heard the operator of WEL, Rocky Point, exchanging



TESTING THE GEAR
Marconi apparatus fitted in a Vickers-Armstrong tank. The wavelength used is between 7 and 8 metres



AN AERIAL FOR 7 METRES
Note the 12-ft. rod aerial mounted on top of the tank for reception on 7 to 8 metres

views with his opposite number on this side of the Herring Pond; the wavelength was 33.52 metres.

If scouring the ether for anything to pick up is your aim, I repeat that the best way is to institute a careful search and sift small sections of the waveband.

In the region of 13 metres you may come across PLZ, Malabar (Java), in communication with Holland, Great Britain or Australia; on 14.47 metres LSY, Hurlingham (Buenos Aires)—particularly distinguishable by its interval signal (three oscillating notes)—may be heard working with Rugby, Madrid or New York; or

ADVENTURING ON SHORT WAVES!—Cont.

below that channel, namely on 14.27 metres, LSL, of the same locality, in two-way communication with GAA, London.

From South America

Then again, PPU, Rio de Janeiro, on either 15.576 metres or 31.7 metres, may also at times be caught calling Berlin or Ste. Assise (Paris). PPQ, another Rio de Janeiro transmitter (25.7 metres), has been used for the transmission of broadcast programmes to Spain via EAQ, Aranjuez-Madrid, but such relays now seem to be of rarer occurrence.

Whilst on the subject of Madrid, you may be interested to know that its new short-wave station on 30.4 metres, in addition to the usual Saturday evening 6 p.m. G.M.T. broadcast to Europe, also regularly transmits special entertainments nightly on that wavelength (and at times on 15.198 metres) destined to South American states and elsewhere.

On different dates you may listen to concerts transmitted to Mexico, Colombia, Ceylon, Brazil, Porto Rico, Costa Rica, Argentine Republic, the United States, etc.

Although up to the present Belgium has not yet developed to any extent, it has a link with the Belgian Congo. You may pick up ORG, Ruysselede (near Bruges) on 15.625 metres (at night on 29.04 metres) as it connects up with Elizabethville, Boma, and Leopoldville, but in these instances, although tests are sometimes made with gramophone records, you may only be eavesdropping on private conversations mainly dealing with commercial matters.

League of Nations

Take also—and in particular on Sundays—the broadcasts put out by the League of Nations through Prangins. These are carried out on three separate wavelengths, 31.31, 38.476, and 40.3 metres. They may not all be used simultaneously, it is true, but as a rule you will be given two wavelengths to choose from and doubtless one of them will be the better channel for your reception.

Germany is anxious that its *kultur* should penetrate beyond the boundaries of the country and, consequently, at frequent intervals it transmits items which may interest its nationals resident overseas.

For this purpose other channels than the well-known DJA on 31.38 metres are adopted; you should try for DJB on 19.737 metres until about 5 p.m. G.M.T., DIQ, Königswusterhausen, on 29.16 metres or DHC and DGN, Nauen, on 29.47 and 31.08 metres.

It is usually the custom when such relays are attempted to reserve a special control or check channel for an interchange of messages

stations as VE9DR, Drummondville (Quebec) on 49.96 metres.

Finally, bear in mind that by the time these lines are in print it is more than likely that the B.B.C will have started up its Empire broadcasting service through Daventry.

Five World Zones

Here some little explanation is necessary. For the purpose of providing the Colonies and Dominions with wireless programmes and news bulletins at such times which will be convenient to listeners in these distant lands, the world has been divided into five zones, and for broadcasting to these zones special wavelengths and time schedules have been allotted. They are:—

(1) Australasia, including Australia, New Zealand, British North Borneo, and the Pacific Islands, GSD, 25.532 metres (11,750 kilocycles) (G.M.T. 9.30 to 11.30 a.m.)

(2) Indian Zone, including British India, Burma, Malay States, Ceylon, Straits Settlements, GSG, 16.88 metres (17,770 kilocycles); GSB, 31.545 metres (9,510 kilocycles); and, as a reserve channel, GSD, 25.532 metres (G.M.T. 2.30 to 4.30 p.m.).

(3) African Zone, covering South and East Africa, Aden, islands in the Indian Ocean, and also Malta, Cyprus, and Palestine; GSH, 13.97 metres (21,470 kilocycles), during daylight hours and GSC, 31.297 metres (9,585 kilocycles), at night (G.M.T. 6 to 8 p.m.)

(4) West African Zone, comprising West Africa, Ascension Island, The Falklands, and St. Helena, GSB, 31.545 metres (9,510 kilocycles), and GSA, 49.586 metres (6,050 kilocycles) (G.M.T. 8.30 to 10.30 p.m.).

(5) For a zone which includes Canada, Newfoundland, the West Indies, British Guiana and British Honduras, one or even two of three wavelengths may be used, i.e., GSF, 19.815 metres (15,140 kilocycles); GSB, 31.545 metres (9,510 kilocycles); and GSA, 49.586 metres (6,050 kilocycles) (G.M.T. 1 to 3 a.m.).

The time schedules at present are purely experimental ones.



SHIP-TO-SHORE TELEPHONY

Adjusting the Marconi short-wave telephone receiver used for ship-to-shore working on the White Star liner "Homeric"

between the engineers on both sides. Occasionally, therefore, through, say, WJK—WES, on 20.49 or 20.7 metres, you may overhear the American operator's opinion in regard to the way the broadcast is coming over.

The Paris and Geneva (or Berne, Zurich and Basle) programmes respectively transmitted through Radio Colonial (Pontoise) and Prangins stations are picked up, if destined to the United States, by WKJ, Rocky Point, on 31.7 metres, or through WQV on 20.27 metres.

On other nights, when conditions are favourable, your log may be swelled by the inclusion of such

News of the Short Waves

WELL, the new Empire short-wavers are now nearly ready and many new Colonial listeners will get their first taste of B.B.C. programmes. Given good atmospheric reception conditions during the first few weeks of operation, these stations should have a good send-off.

Best Time to Start

The B.B.C. has at least chosen the correct time for opening this new service for at what time of the year other than Christmas does the feeling of goodwill between the nations of the world run so high?

Although these transmitters have already been christened "Empire" transmitters there is at least one other place in the world outside the Empire where they will be listened to very frequently. American interest in transmissions from England runs very high and many relays of programmes from over here are given by the big networks.

Big Ben

It is a pity that Big Ben cannot proceed to cash in, for his name has been used time after time by American manufacturers of short-wave sets in their advertisements!

Of course, the beam stations at Rugby and elsewhere are available for relaying purposes and it is safe to presume that these stations will continue to be quite as satisfactory as the new B.B.C. transmitters, if not even more so, only their work is highly specialised and they are usually engaged on commercial matters.

The ordinary listener in the colonies will score heavily because he won't have to rely on local relays. After all, the new service is the most serious attempt made so far, anywhere in the world, to provide a short-wave service which shall be as useful as possible.

Incidentally, according to the lists of wavelengths which are to be used, quite good reception of some of these transmissions should be obtained in the British Isles.

G5SW can only be heard very weakly in the majority of places in these islands, but on rare occasions, when conditions are abnormal, he can be heard at good strength, with a quality nobody could grumble about.

However, it isn't our object to receive this station here, nor was it ever intended to be so.

It is to be hoped that the new transmitters will not pursue an absolutely pro-English policy and that some announcements, at least, will be given in foreign languages.

With their new wavelengths and directional aerial systems, these transmitters will have an absolutely world-wide range and will be prominent landmarks on the dials of short-wave receivers in many foreign countries.

If you ever happen to have the task of designing or building a really powerful short-wave receiver incorporating perhaps six or seven valves, it would be just as well to consider the possibility of including some automatic volume control device. I am speaking of this not so much with a view to maintaining a constant level of volume on actual short-wave broadcasting stations, but rather as a kind of safety device.

This is in connection with some

of the ear-splitting code stations which jump out from a powerful short-wave receiver at every few degrees.

Compared with the volume of an average short-wave broadcasting station, the strength of some of these code stations is absolutely shattering.

Short-wave Adaptors

Short-wave adaptors and converters have, of course, in their time received the usual amount of criticism and, despite their tremendous usefulness, it is not to be denied that they have their drawbacks, when compared with a complete short-wave receiver or even an all-wave receiver.

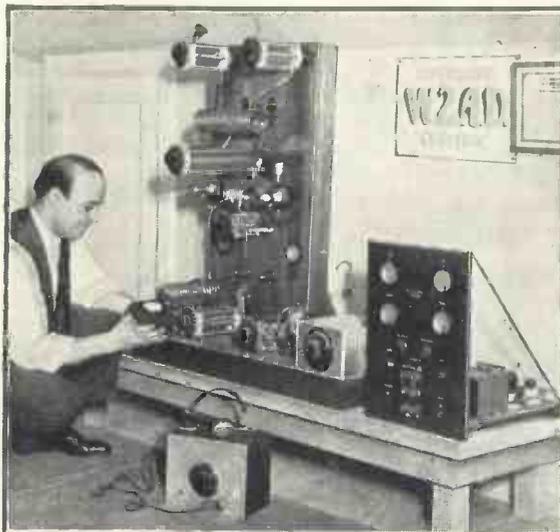
The latest complaint is that it is just a big nuisance having to connect or disconnect the adaptor up every time the short waves are required, or *vice versa*. There is, however, no reason why an adaptor or converter should not be permanently fixed to the ordinary receiver—a simple switch being used to cut it in and out.

Switching Arrangements

In the case of a super-het converter, all that is necessary is a switch that will cut off the converter filament supply and change over the aerial from converter to receiver. A simple double-pole double-throw switch of the panel-mounting type will do this.

In the case of an adaptor of the tuner type, the same type of switch will do, but it will be required to turn off the filament current and change the detector anode lead in the receiver to either the output from the receiver detector valve or from the short-wave detector valve in the adaptor.

In this case the switch should preferably be mounted somewhere on the receiver itself, whereas in the former case the switch would be better mounted on the adaptor. *Mander Barnett.*



AN AMATEUR ENTHUSIAST
Typical amateur experimental short-wave transmitting and receiving gear owned by an American enthusiast. Such stations frequently attain enormous ranges



CANADIAN BROADCASTING STATION

A broadcasting station owned and operated by the Canadian Pacific Railway is situated on top of the Royal York Hotel, Toronto—the largest hotel in the Empire

RADIO IN CANADA

By Capt. E. F. BRAYHAM

is usually sponsored by a cereal or jam manufacturer to remind you of his particular branded goods.

About the time when you are slamming your front door to rush to your train, the domestic science class begins and for an hour or more your wife would be listening-in to recipes, or interior decorators, or face cream and powder manufacturers.

If you should be one of those who returns home for luncheon, then you may hear the mid-day news broadcast, which includes stock and commodity markets reports, usually followed by an address relayed from a public engagement at which a well-known or visiting personage is being banqueted.

The afternoon may be devoted to classical music or pianoforte lessons, children's hour, weather reports, and with closing market quotations.

From 7 p.m. onwards the real entertainment begins for sketches, dialogues, songs, well-known orchestras, operas, and musical comedies may be heard—all sponsored by national advertisers who pay dearly for talent, time and publicity.

Once you turn your set on in the morning, you need never bother to turn it off until midnight, for every minute of your time can be taken up, and every fourteen minutes you would hear the cheery (or otherwise) announcer identify the station and bring the correct time to you.

One could almost set a chronometer by the different programmes, for accuracy is the watchword; even split seconds have to be watched, as if you are a second out you are

likely to upset the succeeding programme.

As a commentator upon world events three times a week, I used to broadcast from a Toronto station for fifteen minutes on each occasion. I timed my first programme for exactly fifteen minutes, only to find that I was one minute too long.

Announcer's Remarks

This was due to the fact that I omitted to take into consideration the thirty seconds taken by the announcer's opening and closing remarks introducing me to the public. Thenceforth I timed my broadcasts for fourteen minutes and at the end of each sentence I notated the time taken to reach that point, and so on until the end.

In fact, if I faltered for a few seconds to take a longer than normal breath then I was obliged to omit a line or two in order to make up for lost time. Each of my manuscripts was marginally notated with the time, which I constantly tallied with the chronometer lying on the table at which I sat beside the suspended microphone.

Abuse of Advertising

While a fairly high standard is maintained at some Canadian radio stations, I must say that latterly the privilege accorded advertisers was grossly abused for, instead of the every fourteen-minute "gentleman's agreement" interval for station identification and advertising dope, announcers were polluting the air every five minutes. Things became so bad that numerous complaints were registered in the press and official steps were taken to remedy this.

The Royal Commission which was appointed to investigate upon radio broadcasting in Canada gave as their view that, while private enterprise was to be commended, governmental interest should be procured and a joint ownership system be inaugurated.

HAVING spent a number of years on the North American continent, I must say that I find broadcasting conditions somewhat strange, or perhaps I should say soothing, in this country.

The entire principle is different in Canada, for not only is broadcasting a private enterprise there, but advertising is general and the nature of programmes is, therefore, varied and made to fall in with the ideas of the advertiser.

Early in the Morning

In the average Canadian home, for instance, it is quite a usual thing to turn on the radio at about 7 a.m. in order to listen in to the physical exercise classes. This goes on for an hour with one minute's interval every fourteen minutes in order to allow for station identification and the name of the sponsor of the programmes being broadcast.

You can imagine to yourself the bank clerk or company director or the labourer in his country cottage switching on his set to his daily dozen each morning (excepting Sundays) and then proceeding to his bath.

For his breakfast, he has the morning melodies programme, which

Under this plan a number of the smaller stations in the different cities would necessarily be closed down and more powerful ones erected at strategical points across the Dominion. The latter would serve a dual objective, for at present American stations simply swamp the Canadian broadcasting field because of powerful relaying stations erected at the cities bordering upon the international line.

In fact the two principal systems in the United States—the National and the Columbia systems—have arrangements with Canadian stations in the principal cities to relay their programmes, for it is an accepted fact that, among those advertisers who broadcast, coverage for Canada is included in the rates!

Americanisation

Just prior to my departure from Canada recently, when Canadian advertisers were scarce owing to the depressed state of industry, the main Toronto and Montreal stations, which were linked to the American National and Columbia systems, had almost 75 per cent. of their programmes originating in the United States. That Canadians were being fast Americanised goes without saying, for apart from advertising matter which one had to endure for the sake of entertainment one had also to listen to American sentiments being interjected "to educate the masses."

I must admit that I more often than not used to tune in New York in order to hear the better programmes obtainable, for the American stations spare no expense

in obtaining the best available talent.

A word or two with regard to the method adopted in the selection of programmes may prove of interest. Suppose, for instance, that you wished to occupy a quarter of an hour during the evening period, it would be necessary to give an idea of the nature of entertainment you are in favour of, and the limit you are prepared to go for the talent.

Station Manager's Job

Having indicated these points, the onus of the broadcast devolves upon the shoulders of the radio station manager, who obtains the prescribed talent within the means allowed.

Often a station or chain of stations may be sponsors of a certain programme in order to fit in with the series. It is a usual thing to vary each half-hour's broadcast; this is done by having musical programmes followed by a dialogue or an address.

That there is good variety goes without saying, for within the day's broadcast you are certain to have at least one programme of particular interest to you.

Moreover, since mains sets are within the reach of all, the radius of your pick-up is naturally wide, so if Canadian programmes do not suit you, American, Mexican, Cuban, and Hawaiian stations are yours by the mere turning of your dial.

During the past year or so Canadian listeners have been entertained by programmes relayed by New York and picked up by Transatlantic cable from Europe. London, Berlin, Paris and the Vatican City were often heard.

The Canadian Commission

THE Canadian Government has created a new body, known as the Canadian Radio Commission, to conduct the business of broadcasting in the Dominion. The functioning of the board became effective on October 31.

"Loaned" by the B.B.C.

Associated with the Commission is Major Gladstone Murray, who has been loaned to Canada by the B.B.C.

The establishment of the Commission was authorised by legislation passed at the session of the Canadian Parliament last spring, following the

receipt of a report on broadcasting in the Dominion by the Government Committee, headed by Sir John Aird, which was appointed to make a survey of conditions.

The Commission will operate a chain of national stations which will specialise in Canadian programmes. The cost of operation will be maintained by commercial advertising on a restricted basis and by the revenue from licences issued to radio owners at \$2 per year.

The number of licensed receiving sets by the end of the fiscal year next March is expected to be 700,000. W. M. G.

Stories of the Operas

LA BOHÈME

CHARACTERS

RUDOLPH, a Poet Tenor
MARCEL, a Painter Baritone
COLLINE, a Philosopher Bass
SCHAUNARD, a Musician Baritone
(The Four Bohemians)
BENOIT, a Landlord Bass
ALCINDORO, a Councillor Bass
Parpignol, a Toy Vendor Tenor
CUSTOM-HOUR SERGEANT Bass
MUSSETTA Soprano
MIMI Soprano
Time : 1830. Place : Latin Quarter, Paris.

ACT I

A garret in which the first four men live. They are cold and have no money for fire. Rudolph will sacrifice the first act of his tragedy for fuel. Colline has been trying to pawn books. Two boys enter bringing provisions and fuel. Schaunard enters, tossing money on the table. It is Christmas Eve. Schaunard suggests a meat at a tavern. The landlord enters, demanding rent. They give him wine and eventually eject him. All go but Rudolph who will follow.

A knock. A woman (Mimi) asks for a light for her candle. Rudolph obliges her but the wind extinguishes the candle.

ACT II

A square with shops. A Christmas Eve crowd. Rudolph and Mimi enter a hat-shop and later join the others. Musetta creates admiration. She and Marcel have loved, quarrelled and parted. Musetta sings the famous "As through the streets I wander" directly at Marcel by which means she tells him she still loves him and at the same time does not arouse the suspicions of her somewhat aged "attachment," Alcindoro. Feigning that her shoe hurts her she removes it and sends Alcindoro with it to a cobbler in order to be with Marcel.

ACT III

A gate to the city of Paris on the Orleans road, with a toll house. Dawn on a cold February morning. Custom-house officers asleep before a roadside fire. People waiting to get to Paris. Mimi enters. She looks very fragile and has a hacking cough. Marcel comes out of a tavern. Rudolph seeks Marcel.

Mimi hides behind a tree and hears her lover tell his friend he wants to give her up because of their frequent quarrels. Her coughing reveals her presence. They decide to part. Meanwhile Marcel has found Musetta in the tavern flirting with a stranger. This begins a quarrel.

ACT IV

The attic of the four Bohemians again. Rudolph longs for Mimi and Marcel for Musetta. However, Schaunard brings some champagne and the four become very animated. Musetta enters and announces that Mimi is dying and has asked to be brought back to the attic where she has been so happy with Rudolph.

WHITAKER-WILSON.

Acts III and IV of the opera will be broadcast on December 10



One of the scenes from the New Era film, "The Voice of the World," which is now being shown at many cinemas. The interior scenes of the film were taken in the H.M.V. factory at Hayes

By
T. F. HENN

Brighter Radio Music

Advance details of some "brighter broadcasts" to which you should listen.

THE programmes seem really to be getting more entertaining at last. During the past month vaudeville, it is true, has been lacking in original ideas and good artists, but it is never too late to mend, and the advance programmes for the next month look very attractive.

Non-stop vaudeville, which has only lately been introduced on the ether, is a great success, probably because of that gay, laughter-infested atmosphere in the studio which the microphone so admirably conveys to the listener.

Henry Hall's band is to be congratulated on the splendid show it gave in the first concert. It is at its best in this type of work.

There are more non-stop shows to come.

Another experiment in new vaudeville ideas will be broadcast on November 29, when an all-Scotch variety concert will be relayed in the National programme from Edinburgh. Real Scotch humour is always appreciated.

John Watt is doing his share in brightening the lighter side of broadcast entertainment by his new series of "Songs from the Shows."

His presentation of favourite excerpts from a particular London theatre in one performance is first-class entertainment. Another of these "sparklers" will be heard on December 5.

Probably the reason for the frequent broadcasts of famous stage dance bands is to make up for the deficiencies in the B.B.C.'s own dance orchestra. Henry Hall has had a difficult time in bringing his broadcasts up to the standard demanded by listeners generally.

Even now, at periodical intervals, critics take delight in jumping down

Hall's throat and "exposing" his "angelic" strings or bad "crooning."

Several changes in personnel have and are still being made in the band. The official explanation is that the changes are being made in the ordinary course of things. A greater part of the criticism has been directed against the singing in the vocal choruses and the lack of "pep."

Now Val Rosing, the singer, has left the band to take up serious training for the concert platform and stage. Val's father, Gladimir Rosing was a fine singer.

The new vocalist, who was announced to start work on November 14 (the B.B.C.'s tenth birthday), is a Canadian hailing from Toronto. I have been told that he sings and whispers. By the time these notes have been read, we shall have passed judgment on his vocal efforts.

Harry Robbins, who came from Hylton's band; Richard Mathews, the boy oboist; and a tenor saxophone have also left. Mathews has not been replaced, but another second trumpet player, A. Williams, has been added.

These changes should do much to brighten or,



Derrickson and Brown, two excellent variety entertainers, have been heard in lively vaudeville programmes lately. They are well-known for their gramophone recordings

if you prefer it, "hot up" the band. I hope that in the process of "hotting up" Hall will still allow us to listen to his violins. The violins are very prominent in Hall's orchestrations, and are one of the best points in the band's playing.

Hylton will be heard again shortly (the date is not fixed) and Billy Cotton's band—older listeners will remember his fine broadcasts from *Ciro's Club*—is broadcasting on December 8.

Gilbert and Sullivan

Steps in the direction of brighter radio music are not confined to dance numbers and vaudeville. During the Gilbert and Sullivan opera season at the Savoy Theatre several excerpts will be relayed. On December 3 the second act of *The Mikado* will be relayed by the National transmitters and on December 9 the first act of *The Gondoliers* will be heard on the Regional wave-lengths.

Other excerpts are to be heard later. I have been told that a whole opera will be relayed just before Christmas. It will be an event of great moment when this happens. A complete Gilbert and Sullivan opera has never yet been broadcast.

The selections from these operas

are terribly hackneyed, and are doing much to destroy appreciation of the works. I wish the B.B.C. would forbid these selections for at least a couple of years.

At the beginning of November Charles Webber conducted an hour of popular excerpts from the grand operas. This is a new departure for the programme department, one which they should follow up. The concert was broadcast on two evenings, a Friday and Saturday. The alternative programme on Friday was a pianoforte recital and a short play; on Saturday it was Jack Payne and his Boys.

I mention this because it is one of the best examples of the alternative programme arrangements I have yet



A singer of "Two Lovely Black Eyes," Charles Coburn was heard in the B.B.C. birthday week programmes.



A splendid violinist who has been heard frequently in recitals and orchestral concerts, Orea Pernel



The man with the commas and colons, Stainless Stephen has been doing his share in brightening the concerts



One of the earliest of broadcasters, Isabel Gray, pianist, is still a popular favourite with listeners

noticed. Popular operatic excerpts appeal to a huge section of listeners and, with one or other of the alternatives, neither the highbrows nor the lowbrows can complain of lack of attention to their needs.

Hills, near Worcester.

His works did not meet with any degree of enthusiasm in his earlier years. It was not until the performance of the *Dream of Gerontius* in Germany in 1901 that any enthusiasm for his compositions was felt in this country.

To the man in the street Elgar is known for his "Land of Hope and Glory" and "Pomp and Circumstance" marches; to the musician for his symphonies, chamber music, and orchestral suites.

Three Rare Occasions

Elgar is conducting three of his own works at these concerts—three rare occasions. He is not a good conductor; his works sound more brilliant when handled by such men as Sir Henry Wood and Sir Landon Ronald, who is recognised as a leading authority on Elgar.

The concert on November 30 opens with the most popular of his

At the Queen's Hall on Wednesdays, November 30, December 7 and 14, there are three Elgar celebration concerts which will be broadcast. The second concert will be relayed to Hungary.

The concerts are to celebrate the seventy-fifth birthday of Sir Edward Elgar, Bt., O.M., K.C.V.O., Master of the King's Musik. Such a tribute to the creative powers of a modern English composer was never so deserving.

BRIGHTER RADIO MUSIC—Continued



A world-famous violinist who has been heard in studio recitals and at the Queen's Hall, Mischa Elman. He has travelled all over the world and has always been met with great enthusiasm

three overtures, "Cockaigne." It is a sprightly work giving an impression of London with its street boys, its bands and a holiday atmosphere.

In the same programme we shall hear one of his greatest compositions, "Symphony No. 1 in A Flat," a work which met with tremendous enthusiasm when it was produced by Hans Richter and the London Symphony Orchestra on December 7, 1908. An idea of its great reception can be gauged by the fact that the symphony was played a hundred times within a year from its first performance.

Its general idea and impressions are a little beyond the ordinary music lover but, as Sir Edward Elgar is conducting this work, we shall have the composer's own ideas accurately portrayed.

Another Work

Sir Landon Ronald will be conducting the other work in this concert, "Concerto in B minor for Violin and Orchestra," with Albert Sammons as soloist. Sammons, another self-taught British artist, is recognised as a leading Elgar exponent.

The violin concerto is an ambitious work modelled more on the lines of a symphony for violin and orchestra. It gives

plenty of scope for the violinist to show his artistic skill. This work stands alone for its sheer musical beauty.

The famous "Variations on an Original Theme" will be conducted at the second concert by Dr. Adrian Boult. There are fourteen variations each of which bears the initials or pseudonym of one of Elgar's friends. Elgar has never disclosed their

names. This is one of his greatest and most frequently played compositions.

Sir Edward will conduct his "Symphony No. 2 in E Flat" at this concert. The last concert consists of a performance of his sacred oratorio, *The Kingdom*. The soloists will be Elsie Suddaby, Muriel Brunskill, Walter Widdop, and Arthur Cranmer, with the B.B.C. Chorus and Orchestra.



Sir Edward Elgar, Bt., O.M., K.C.V.O., the great English composer, recently celebrated his seventy-fifth birthday. Several concerts and recitals of his works are to be given next month

This work is really a sequel to an earlier oratorio, *The Apostles*. Musicians have argued, and will argue, the merits of this work. The main objection—in brief—is that the music and words do not match. You, as a listener, will have an opportunity of deciding for yourself.

An Organ Work

In addition to these concerts, an example of Elgar's genius in another sphere will be broadcast on December 5. G. D. Cunningham, who is well known as a fine concert organist, will play the "Sonata in G for Organ." Not only is this Elgar's only big organ work, but its complexity demands a player with a technique second to none. The sonata was originally composed for the occasion of a visit of some American musicians to Worcester Cathedral in 1898. Cunningham's recital begins at 8.30 p.m.

These celebration performances of Elgar's works will give listeners the opportunity of a lifetime to hear a representative selection of the greatest modern English composer's works.

Work has now begun with the installation of the organ in the concert-hall studio at Broadcasting House. When I was there recently

I noticed small holes in the wall and new small steel girders in the space behind the grille.

The organ will be one of the largest of its kind in the country. The instrument will have 2,362 pipes, 150 stops, and will cost round about £10,000.

There is one constructional point which is rather puzzling me at the moment. With the organ boxed away in the small space behind the grille, I do not think its full tonal beauty will be heard in the hall. I imagine much better results would be obtained if the grille were taken away. After all, I am of the opinion that nicely gilded rows of pipes would not be too unsightly in this ultra-modern hall. The organ builders, however, know best.

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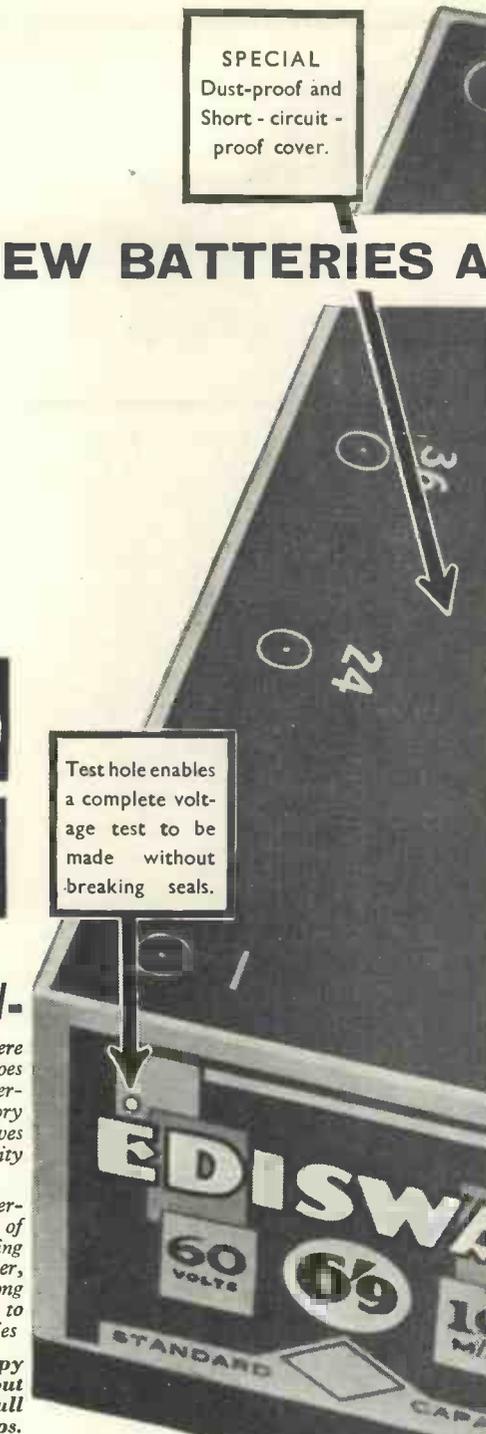
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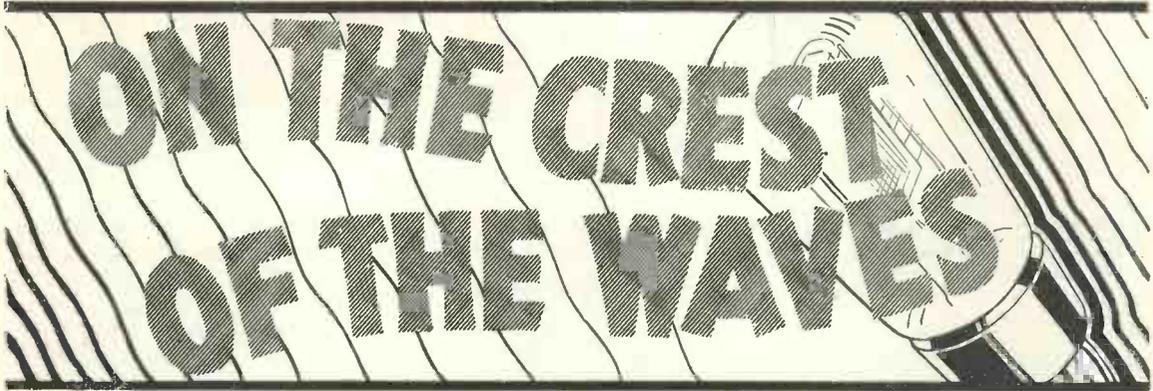
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Radio News from All the World :: By Jay Coote

ARGENTINE REPUBLIC

ALTHOUGH there are only about 500,000 listeners in the Argentine Republic, there are forty-three transmitters, of which some seventeen are situated in the capital. With the exception of Radio Municipal, which is state owned, all of them are run by private concerns. Microphone publicity plays an important part in the programmes as this is the only source of revenue available to defray programme expenses. In order to give service to the mixed population residing in Buenos Aires, special wireless entertainments are broadcast in French, English, German, Danish, and even in Hebrew.

CHINA

The 75-kilowatt transmitter erected by the Telefunken Company at Nankin, at the headquarters of the Chinese National party, will shortly be brought into daily operation. The station is to be used for both telegraphy and telephony and news bulletins in Chinese and English will be transmitted daily on 440 metres.

CZECHOSLOVAKIA

Owing to the number of complaints lodged by listeners with the broadcasting authorities in regard to interference by local oscillators, the Czech government has taken special steps to deal with the trouble. In addition to punishment by a heavy fine, listeners have been told that conviction under this heading will carry with it automatically the cutting off of electric lighting supply!

FRANCE

Although the new broadcasting bill has not yet been passed, the next French budget is expected to

include the long-threatened tax on radio receivers. It is foreseen that a charge of 15 French francs (about 3s. 4d.) will be made annually on crystal sets, and that a tax of 50 francs (roughly 11s.) will be levied on all valve receivers. According to the French press listeners are likely to protest against any charge being made until the system has been completely reorganised.

In the meantime, however, the authorities have declared their intention to start without delay on the construction of four high-power transmitters. A station of 60 kilowatts will be installed in the neighbourhood of Nice; one of 90 kilowatts to replace the existing transmitter at Lyons; a super-power station (120 kilowatts) for Toulouse, PTT, and one of the same power for Ecole Supérieure, Paris. As the contracts to the individual firms have already been given out it is hoped that these four new stations may be brought into operation within the next twelve months.

GERMANY

With a view to finding work for unemployed musicians many cities in Germany have formed special orchestras of which the concerts are broadcast at regular intervals. In addition, a new feature now appears in the Heilsberg programmes; twice weekly, in conjunction with the Königsberg and Danzig labour exchanges, lists of "situations vacant" are transmitted by microphone to listeners. It is stated that this innovation has already met with success.

Up to the present the 7-metre

transmitter installed on the Funkturm (Witzleben) has been used solely for television transmissions. In future, relays of the Berlin studio programmes on this low wavelength are also to be carried out daily between 11.30 and 1 p.m. G.M.T., and twice weekly from 8 to 9 p.m. and from 11 p.m. until midnight.

With the exception of Munich and its relays, all private broadcasting organisations have now been merged under state control, and more relays are now carried out by the provincial transmitters of Berlin programmes. When simultaneous broadcasts are made of official announcements listeners will only hear the call "Hier der Deutscher Rundfunk," indicating that the broadcast message emanates from the capital.

HOLLAND

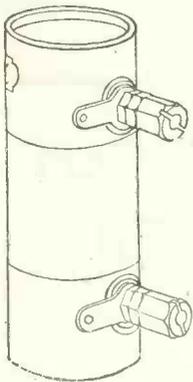
As listeners to the Hilversum programmes were not satisfied with the time signals broadcast by the studio the A.V.R.O. Association inaugurated a new system by which exact Amsterdam time is transmitted at 8.15 a.m., 3.15, 7.15, and 11.15 p.m., corresponding to 7.55 a.m., 2.55, 6.55, and 10.55 p.m. G.M.T. The signal consists of a series of V's in morse (...—) and four T's (—) followed by five dots, the final one indicating the last second of the fifty-fifth minute of the hour.

In view of the fact that in the event of successful prosecution by the authorities, unlicensed transmitters are only condemned to pay a fine of less than £2, Holland, at present, possesses a number of pirates. At Gouda a few enthusiastic

(Continued on page 644)

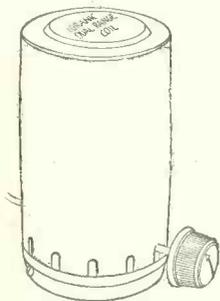
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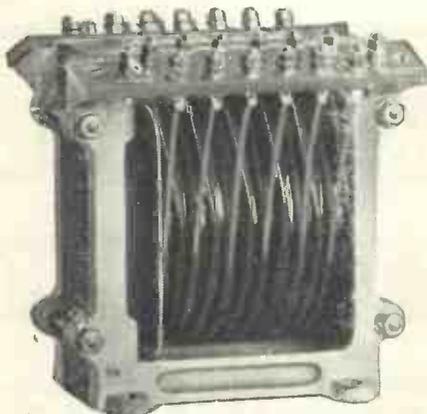
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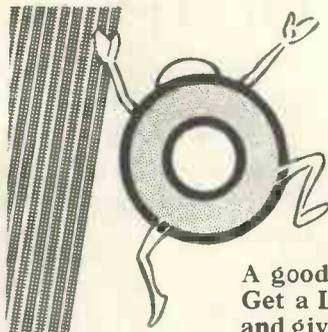
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ON THE CREST OF THE WAVES—Cont. from page 640

radio amateurs recently amalgamated their finances for the purpose of installing a 1.5-kilowatt station which has been working almost nightly on a wavelength varying between 284 to 296 metres. At intervals, in defiance of the authorities, a call has been broadcast between items in the programme. It is "Hier de heimelijke Zender Gouda" ("This is the clandestine Gouda transmitter"), and the local police officers are still searching!

HUNGARY

The Ministry of Commerce has applied to the Union Internationale de Radiodiffusion at Geneva for the allotment of an extra wavelength.

nights the performance is relayed to all Italian transmitters.

LATVIA

To act as relays of the Riga programmes, stations are being erected at Goldingen (Courland) and at Kalzenau. The previous decision to put up a transmitter at Modon has been cancelled. Considerable development has taken place in broadcasting and the Riga station now possesses five studios.

NORTH AFRICA

A wireless link has now been established between Algiers and Paris through the Radio Colonial (Pontoise) short-wave transmitter.

country, a 20-kilowatt transmitter is to be installed at Bergen.

RUSSIA

In order to symbolise the industrial characteristics of the Five Year Plan the Soviet government has decreed that all broadcasting studios in the country must use the same opening and interval signal, namely, the sound of a hammer striking an anvil. Curiously enough, between items in the programme, a somewhat similar signal may also be heard from Katowice (Poland); but it is slightly different in tone.

Tests are now being carried out by the new Moscow-Noghinsk transmitter (500 kilowatts) on 1,481 metres. Broadcasts of the old Komintern station have been recently carried out on 1,000 metres, and a new position in the waveband is to be found for Leningrad. Work on the construction of the Moscow Radio Palace has started; it is to possess forty-six studios, including two theatres and a large concert hall. Special rooms will be set aside for television transmissions.

SPAIN

Political antagonism has already wrecked four attempts made by the state to take over control of the broadcasting system, but the Spanish government will shortly make a fifth effort to pass a new bill to this effect through the Cortes. In order to defray the expenses of operating the stations, the scheme provides for a special tax on all radio receivers and components. This levy would be made at the source, by the affixing of postage stamps to the invoice when sales are effected to their customers by radio dealers. The authorities also propose to introduce a listening tax based on a sliding scale according to the class of instrument used.

A Modern Fairy Godmother

*A sweet Princess was born, and day by day
Her fairy godmothers arrived with gifts:
"I bring a lute," the first was heard to say,
"For music soothes, enlivens, and uplifts."*

*"I bring you books, my child," the second cried,
"That you may read of lands beyond the sea,
Of learned discourse, which may be your guide,
Poems of beauty, wit, and revelry."*

*The third exclaimed: "I'll butt in, if you've done;
I'm busy, kid, and couldn't stop to get
A lot of presents, lumped 'em all in one,"
And gave the lucky babe a super-het!*

LESLIE M. OYLER.

In the meantime the Magyarovar 1-kilowatt relay station is taking over the 210-metre channel hitherto used by Budapest (II), the latter having raised its wavelength to 840 metres.

ITALY

Pietro Mascagni, the well-known composer and general musical director of the Italian broadcasting stations, has officially notified the authorities that in future any operas he may write will be submitted by radio to the listening public before being publicly presented on the stage. *Amica*, one of his latest works, was recently broadcast from Turin, the opera house having been taken over as a studio. On such

In future Radio Alger will re-broadcast performances relayed by the Ecole Supérieure from the Paris Grand Opera House. In exchange, through the same channel, French listeners from time to time will be treated to oriental concerts from the North African coast.

NORWAY

Some 1½ millions of kronen have been voted by the Norwegian parliament for expenditure by the Ministry of Posts and Telegraphs on the construction of new broadcasting stations during 1933-4. According to plan, a complete reorganisation of the system is to be carried out. In addition to a number of relay stations in various parts of the

A special New Year number of "Wireless Magazine" will be published on Wednesday, December 21. Make certain of getting a copy as soon as it is published so that you have something interesting to read when the Christmas festivities begin to pall! It will contain many special features you cannot afford to miss!

TRANSFORMER RESPONSE CURVES

and what they SHOULD mean

Once again it is left for Ferranti to draw attention to a practice which many will find misleading.

It is a matter of radio history that, from the first, Ferranti have stressed the importance of response curves as an indication of transformer performance.

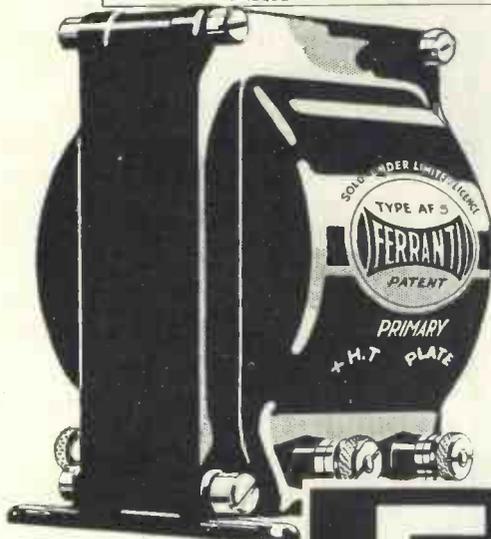
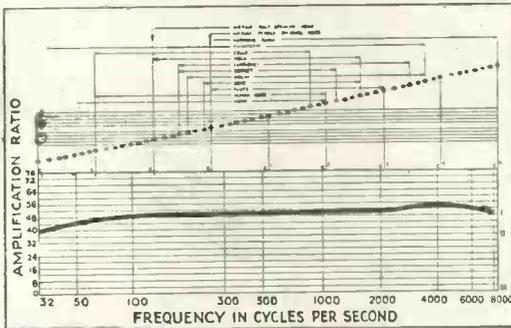
To be of any practical value the curve should be simple, clear, and above all, accurate.

There is, however, a tendency to prepare such curves on the basis of the decibel—which is used properly to indicate power ratios. Applied to transformers this method makes the curve of even the poorest transformer approximate to an even, horizontal line, and is likely to prove entirely misleading to the uninitiated.

The Audio Frequency transformer is a voltage-amplifying device, and the object in plotting its curve is to demonstrate the transformer's amplification in relation to frequency. All experience proves that the clearest way in which this can be done is on a vertical linear scale.

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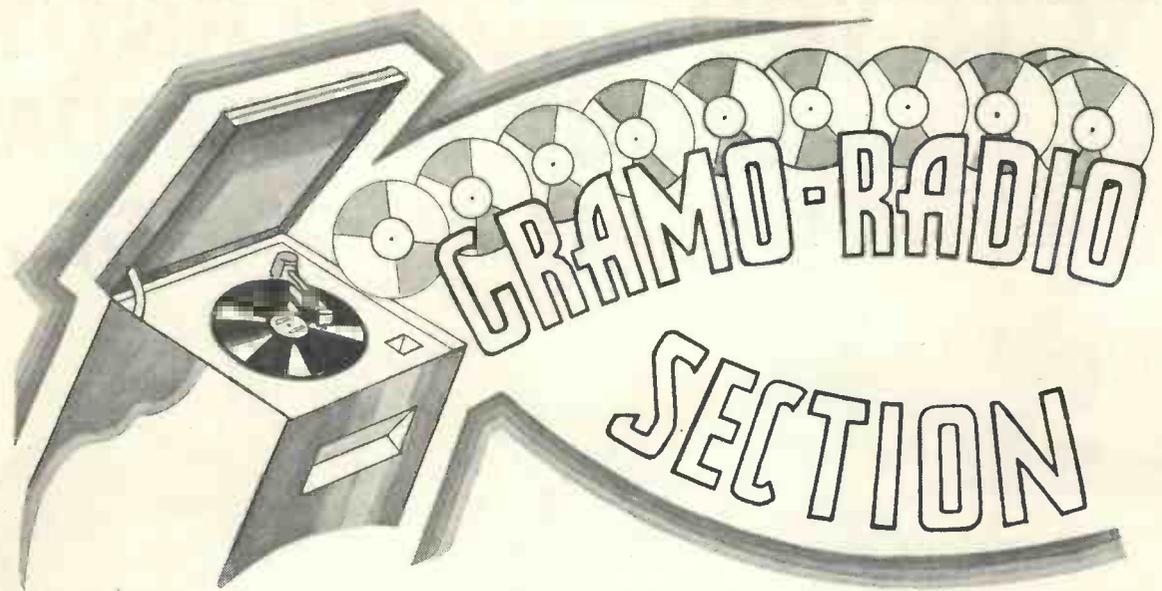
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V.165

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A Special Section for Those Interested in Electrical Record Reproduction

Radio Gramophones of To-day

WITH so many inexpensive radio gramophones now on the market, many listeners who previously had to put up with a straight radio set with external pick-up accessories are considering the purchase of one of the latest self-contained models.

These new radio gramophones are not entirely self-contained, but usually they need only an aerial and an earth to complete the installation. Good machines can now be purchased at prices ranging from about £25 to £100 or more.

Automatic Changers

New ideas abound in the latest instruments for radio and record reproduction. Probably the most important step forward from the gramophile's point of view is the simplification of the automatic-changing device.

In the latest products we find that all the minor weaknesses of automatic changes have been eliminated.

It used to be an oft-repeated complaint that radio gramophones were all gramophone and very little radio. By which was meant that, although the low-frequency amplifier was adequate for the full loud-speaker reproduction of records

through the pick-up, the high-frequency amplification was too meagre to give equally good results on the radio side.

Now there can be no complaint on this score. We find quite inexpensive radio gramophones equipped with powerful super-het circuits, giving as much high-frequency amplification as other conditions will allow.

To-day it is true to say that the radio gramophone is just as efficient in its high-frequency amplification as the corresponding straight type of set, and in many of the more expensive models there is an enormous reserve of power and range.

Where the radio gramophone of to-day does definitely score over the table radio set is in the larger baffle area offered to the loud-speaker. The result is a very noticeable improvement in the bass-note reproduction.

Arising out of this we have the latest idea—the use of twin loud-speakers—incorporated in more than one make of radio gramophone. It is an idea likely to spread considerably. It is especially valuable in a radio gramophone, where the only limitation to first-class record reproduction is the level of scratch.

What we mean is that, while the radio set must, under present other conditions, be limited in frequency response owing to the necessity of eliminating heterodyne and other inter-station interference, the gramophone side can afford to develop along the lines of a greater frequency response.

This is what the new dual loud-speakers will do. They will, by a suitable choice of pairs of units, give an overall response of from 30 to 8,000 cycles, which means very much greater realism than is normally achieved at the present time with the single loud-speaker sets.

Table Radiograms

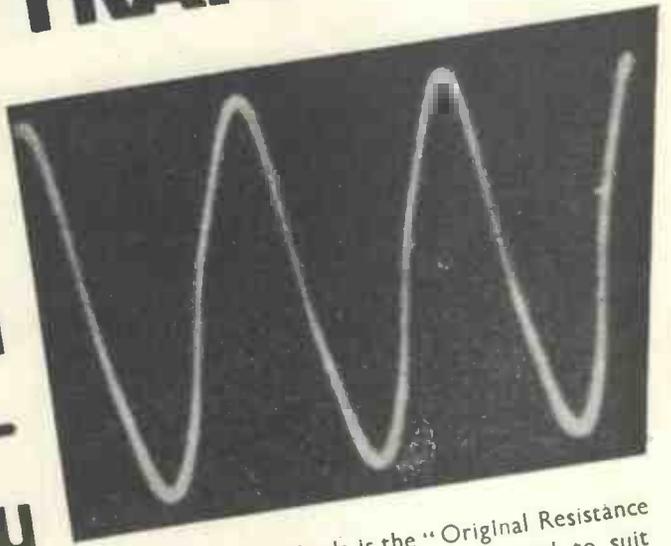
The table radio gramophone would seem to fly in the face of all the previous arguments in favour of the large pedestal cabinets, but we think there is a logical place for such instruments. Not everyone has room for a large cabinet.

Then again, many people are in the habit of moving from one room to another from time to time, and here the table model has obvious advantages in easy transport.

Another point is that the table model can, of course, be more cheaply produced.

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If your dealer is out of stock may we send you a copy of Leaflet W 1292 telling you all about the Transfeeda and showing circuits in which it can be used?

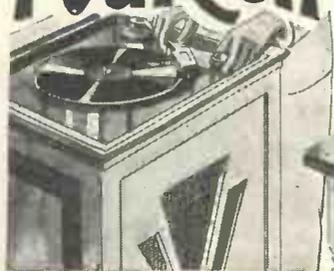
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YOUR CHOICE OF NEW RECORDS



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

Sacred Songs (d.s.), Isobel Baillie, Catherine Stewart, Heddle Nash, and Norman Allin, 4s. **COL DX373**
 When you get people like Isobel Baillie, Catherine Stewart, Heddle Nash, and Norman Allin singing sacred songs, even if you don't want sacred songs particularly, you may be inclined to buy the record. I think a medley of sacred songs is hardly in the best taste, but I cannot quarrel with the choral effects these four admirable singers produce.

OPERATIC SELECTION

★ **Rigoletto (d.s.),** Heddle Nash with orch., 2s. 6d. **COL DB932**
 Heddle Nash is always worth hearing. You will like him in the immortal "La Donna e Mobile." He is fine! Buy this.

CLASSICAL ORCHESTRAL MUSIC

Concerto in B Minor, Op. 61 (Elgar) (d.s.), Yehudi Menuhin and the London Symphony Orch., 6s. each. **H.M.V. DB1751-1756**
 You should know what you are in for here. Please understand that Menuhin is a first-rate violinist, that the orchestra is the L.S.O., and that Sir Edward Elgar is the conductor. I have not been through all of it, but what I did hear impressed me very much. It is at least authoritative.

★ **Funeral March (Chopin) (d.s.),** B.B.C. Symphony Orch., 6s. **H.M.V. DB1722**
 The B.B.C. Symphony Orchestra, conducted by Adrian Boult, so you can expect something for your money. It is easily the best record of the "Chopin Funeral March" I have ever heard.



ADRIAN BOULT

★ **Magic Flute Overture (Mozart) (d.s.),** Berlin State Opera Orch., 4s. **DECCA CA8106**

"Mozart's Magic Flute Overture," played by the Berlin Orchestra and conducted by Strauss, is surely enough recommendation! Buy it; you will get much pleasure out of it. I did!

★ **Polovitzian Dances (d.s.),** New State Symphony Orch., 2s. 6d. **DECCA K643**

I have always liked Borodin's music. I do not seem to know this orchestra, but I do not mind how many more of its records I hear if they are up to the standard of this one. *Very good!*

LIGHT ORCHESTRAL MUSIC

(a) **Amoretten Tanz (Gungl), (b) Bien Aimes (Waldteufel),** Albert Sandler and His Orch., 2s. 6d. **COL DB910**
 Two pleasant waltzes of the non-dancing variety, though you could dance to them if necessary. I look upon them as delightful pieces of instrumental music.

★ **Daughter of the Regiment (Donizetti) (d.s.),** Berlin Philharmonic Orch., 3s. 6d. **DECCA-POL 6301**

Some very good playing is to be heard in this excellent orchestral record. The work is light in character and the disc will make a good test piece for your gramophone, because the effects are genuinely orchestral and so varied. I enjoyed it immensely!

Good-day, Vienna (d.s.), Edith Lorand and Her Viennese Orch., 2s. 6d. **PARLO R1292-1293**

Very pleasant lunch-time sort of music, with nothing very special to recommend it, except the recording, which is remarkably good. This is not a negative



EDITH LORAND

review at all; I mean that it is an "idle-hour" record and as such should have a ready sale. There are two discs of it.

Miniature Suite (Eric Coates) (d.s.), Light Symphony Orch., 4s. **COL DX380**

Written by Eric Coates and arranged by Fletcher. This is delightful light orchestral music—well worth getting. I think it will appeal to a good many people.

(a) **Perfection, (b) Waltz Viennese, Commodore Grand Orch.,** 1s. 6d. **WIN 5514**

The first rather attracted me. It is a trumpet solo and very well played. The orchestra is very well known, so I need not comment on it.

a) **Sailor's Adventure, (b) Wedding of the Rose, Commodore Grand Orch.,** 1s. 6d. **WIN 5513**

This orchestra is well worth recording. I always like its broadcast transmissions. These two works are light intermezzi and quite pleasant to listen to.

Stroll in the Vienna Woods (d.s.), Great Symphony Orch., 3s. 6d. **DECCA LY6043**

This is quite a pleasant medley of the tunes of Johann Strauss. I do not generally recommend medleys, especially of the "stealing through the classics" sort. This, however, is quite worth hearing.

LIGHT SONGS AND BALLADS

(a) **Because (d'Hardelot), (b) Until (Sanderson),** Alfred Piccaver, ten., 2s. 6d. **DECCA M426**

"Because" and "Until" have long since ceased to interest me,

but I like this man's singing of them. If you like these old favourites, you cannot do better than have this version of them.

(a) **Dark-haired Marie, (b) You Brought My Heart the Sunshine, Titterton, ten.,** 2s. **DECCA F3210**

Both songs are composed by a Mr. Lozanne, who accompanies Titterton here. Both are sung in Titterton's faultless style. Make a point of hearing them.

★ (a) **El Abanico, (b) Sons of the Brave, Peter Dawson, bass-bar.,** 2s. 6d. **H.M.V. B4267**

It is some time since I have



PETER DAWSON

heard Peter Dawson. The experience has agreed with me. He is splendid and I like the male chorus in this record. I think you will like this.

(a) **Gentlemen, the Prince, (b) Knights of the King, Raymond Newell and Chorus,** 2s. 6d. **COL DB931**

This is worth having. His voice is splendid, especially if

(Continued on page 652)

ABBREVIATIONS USED IN THESE PAGES

bar .. baritone
 BRUNS.. BRUNSWICK
 COL .. COLUMBIA
 com. .. comedian
 con. contralto
 DECCA-POL
 DECCA-POLYDOR
 d.s. ... double-sided
 f. fox-trot

H.M.V. HIS MASTER'S VOICE
 orch. orchestra
 PANA .. PANACHORD
 PARLO .. PARLOPHONE
 sop. soprano
 ten. tenor
 w. waltz
 WIN EDISON BELL
 ZONO .. ZONOPHONE

(a) and (b) indicate the titles of each side of a record.

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YOUR CHOICE OF RECORDS—Continued from page 650

you have an electric machine. The orchestra is good also; the brass is really noble. A good record.

★(a) *Gipsy Moon*, (b) *Just to Linger in Your Arms*, Richard Crooks, ten., 4s. H.M.V. DA1283

Quite an outstanding record. Rather a high price for love songs, but the production certainly justifies it. A very good record, in my opinion.

John Watt's "Songs from the Shows" (d.s.), with Olive Groves and George Baker, 2s. 6d. DECCA K683



GEORGE BAKER

This will go without pushing, I imagine. It is excellent. Olive Groves and George Baker are the soloists and John Watt announces for them. A very good selection, too.

(a) *'Leven Pounds of Heaven*, (b) *Speak to Me of Love*, Layton and Johnstone, 2s. 6d. COL DB937

This is sung by Layton, of Layton and Johnstone. Very well worth hearing. His is a charming voice.



RICHARD TAUBER

(a) *Little Yvonne*, (b) *You Loving Me*, John McKenna, rs. 6d. WIN 5519

A waltz song is not necessarily good for dancing. These are not. You will like them if you care for sentiment. There is plenty of that!

★(a) *Marta*, (b) *You Loving Me*, Titterton with orch. acc., rs. 6d. DECCA F3150

I cannot imagine a Titterton record missing the mark—his diction alone sees to that. Here he is at his best, singing at the top of his form. Strongly to be recommended!

★(a) *Mexican Serenade*, (b) *Silver Hair and Heart of Gold*, Richard Tauber, 4s. PARLO RO20198

Parlophone evidently has an eye for a tenor. Tauber is one of the best recording tenors in the world probably. The recording is—well, it is Parlophone at its best. Parlophone, please send me some more records of this standard. They make my work as critic a pleasure. Buy this, everybody!

★(a) *Tell Me To-night*, (b) *La Danza*, Jan Kiepora with orch. acc., conducted by Dr. Weismann, 4s. PARLO RO20201

Both sides are from the film, *Tell Me To-night*. You must get it. This tenor is worth hearing. On a good electric machine he will fill your house with song. Take my word for it!

★(a) *There's a Man Goin' Roun' Takin' Names*, (b) *Water Boy*, Jules Bledsoe, rs. 6d. DECCA F3113

This man is a real bass, with good quality in his middle and top registers. The voice is so pleasant that I recommend the disc on that account alone. The

songs are quite acceptable, but it is the voice in this instance that has attracted me. You can buy it safely; you will not be disappointed.

(a) *Wine and Water*, (b) *Why Shouldn't I?* Harry Dearth, 2s. 6d. COL DB913

Harry Dearth generally manages to make a good record. You will like "Wine and Water." He sings it with a delicate suggestion of preferring the former to the latter. I enjoyed both songs.

MILITARY BAND MUSIC

(a) *Abide with Me*, (b) *Andante in G*, massed bands, 4s. H.M.V. C2471

I recommend the title to your attention. It is "Abide With Me," and the bands are massed.

Aldershot Command Searchlight Tattoo, 1932 (d.s.), massed bands of the Aldershot Command, 2s. 6d. H.M.V. B4256

The title tells you what it is. I can't tell you much about it. It is good of its kind. (I hate tattoos, so perhaps I am prejudiced!)

(a) *Dot and Carrie*, (b) *Whistling Mose*, Black Dyke Mills Band, rs. 6d. WIN 5522

This is one of the best recorded military bands in my opinion. They are in their top form here. It is really a top-hole record!

(a) *Hallelujah Chorus*, (b) *Praise My Soul* (Goss), and *Edwinstone*, massed bands, 4s. H.M.V. C2470

(a) seems like Punch and Judy without Punch. They play it splendidly, but there ain't no Alleluia, so to speak. Why?

Passing of the Regiments March: Potpourri (d.s.), B.B.C. Wireless Military Band, 2s. 6d. COL DB908

Here you have nearly everything you have ever heard on a military band. So if you like military-band records, you must certainly buy this. The playing is pretty nearly perfect and the recording above reproach. Also a snappy bit of echo will cheer you. Yes—buy it!

★*Passing of the Regiment* (d.s.), band of H.M. Coldstream Guards, 2s. 6d. H.M.V. B4275

A military-band record of considerable value in the musical sense. I never heard the Coldstreams play better, and that's a fact!

CORNET SOLO

(a) *Post Horn Polka*, (b) *The Warrior*, Harry Mortimer, with Foden's Motor Works Band, rs. 6d. ZONO 6198

I am not very keen on this—rather a rowdy record. That is the polka side. The warrior side did not interest me at all. Sorry, but I have nothing to say for it. It is simply uninteresting.

NOVELTY RECORDS

(a) *Moon Has Raised Her Lamp Above*, (b) *Watchman, What of the Night?* Forty Stars, 2s. 6d. COL DB933

A very good male chorus and

splendid recording. If you like male voices you will enjoy this.

Old Brigade (d.s.), Debroy Somers Band, with Norman Allin and chorus, 4s. COL DX379

Well, it is Norman Allin and



NORMAN ALLIN

that is, of course, a recommendation. All the same, the spoken matter is "tripe" for the most part.

Woodland Idyll (d.s.), Alec Shaw, the Scottish "Bird Man," 2s. 6d. COL DB936

Alec Shaw is "The Scottish Bird Man." He is splendid. These imitations are well worth hearing. Obviously Mr. Shaw is an ornithologist! A very good record.

(a) *'Appy 'Ampstead*, (b) *Let's All Sing Like the Birdies*, Sing, George Buck and the Roysterers, rs. 6d. WIN 5521

He is always good. (b) is quite good. I think it is funny, but you may not, so I suggest you hear it. Give it a trial!

★(a) *Breakfast in Bed*, (b) *I Wonder if You're Missing Me*, Harry Lauder, 6s. H.M.V. DB4014

It is pleasant to hear him again. He seems a link with the past. He is as good as ever in this rather expensive record. The best record of him I have ever heard, *bar none!*

★*Grock in His Music-hall Sketches* (d.s.), Grock and Partner, 2s. 6d. PARLO R1307-1303

This is simply perfect. Those of you who remember Grock in the old days at the Coliseum will just revel in this. A pity we cannot see him slide down from the piano stool on the front "fall" of the instrument, or balance himself on the back of a chair, but we cannot expect all that, even on a Parlophone record. You had better buy these two discs before they are all gone. There will be a great demand for them if I am not very much mistaken.

(a) *I'm the Landlord of the Inn in Aberfoyle*, (b) *He's Been on the Bottle Since a Baby*, Will Fyffe, com., 4s. COL DX381

He is always good. I like "He's Been on the Bottle Since a Baby." Will Fyffe is one of our best comedians. You can safely invest in this.

New M.P. (d.s.), Flanagan and Allen, 2s. 6d. COL DB923

Quite good. Some really good humour. It is a little patchy, but, on the whole, it can be commended.

(Continued on page 656)

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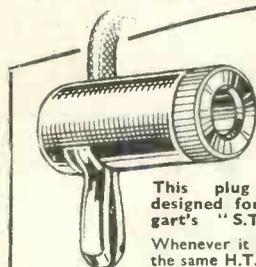
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There is news in the "Wireless Magazine" advertisements

YOUR CHOICE OF RECORDS—Continued from page 652

ADDITIONAL RECORDS REVIEWED by CHOPSTICK

LIGHT SONGS

- (a) Love is the Sweetest Thing,
(b) I'll Do My Best To Make
You Happy, Al Bowlly,
1s. 6d. **DECCA F3194**

Both songs are from the film, *Say It With Music*, which features Jack Payne and his band. Al Bowlly, late vocalist of Roy Fox's Monseigneur Band, and perhaps of Roy's new Café Anglaise Band, has an inimitable style which is extremely popular. I am not too keen, but if you are a Bowlly fan, you will enjoy it.

- ★(a) My Girl's Fine and Dandy
(b) H'lo Baby, Max and
Harry Nesbit, 1s. 6d.

ZONO 6199

An excellent record for a Christmas party. Max and Harry Nesbit put some "pep" into their songs; there is none of this "lu-u-uv" business. One of them is an excellent guitar—or is it a ukulele?—player. I thoroughly enjoyed their "doob-a-boob-doob" efforts. You should certainly get this.

- (a) We Just Couldn't Say
Goodbye, (b) Moonlight on
the River, Sam Browne,
1s. 6d. **ZONO 6192**

Sam Browne needs no introduction; his activities as vocalist in Ambrose's Mayfair Hotel



SAM BROWNE

Band are widely known. This is one of his best efforts at "crooners." Delicate orchestral and piano accompaniment is one of this record's strong points; in fact (b) is half light orchestral music.

- (a) You're My Everything, (b)
We Just Couldn't Say Good-
bye, Elsie Carlisle, 1s. 6d.
DECCA F3193

Two very light songs sung in a cute manner. Elsie Carlisle is accompanied by an instrumental trio. Her style is too well known to need any comment. These are both rather old numbers, but Elsie Carlisle manages to infuse fresh interest by her "confidential" style of singing.

INSTRUMENTAL SOLOS

- (a) Moon, (b) Ooh that Kiss,
Len Fillis, 1s. 6d.

DECCA F3201

If you like guitar solos, Len Fillis is your man. (a) is one of those dreamy numbers; the piano accompaniment is almost as good as the solo playing. Edgar Jackson and his dance band accompany Fillis on (b). This is also a dreamy arrangement, which appears to be a misfit between tune and arrangement. However, quite entertaining.

- ★(a) Oodles of Noodles, saxo-
phone solo by Jimmy Dor-
sey, (b) Down Among the
Sheltering Palms, piano solo
by Earl Hines, 2s. 6d.

BRUNS 1361

Jimmy Dorsey plays a very complicated "sax" solo at amazing speed with wonderful precision on (a), Earl Hines, the famous American rhythmic pianist—syncopated is used for any Tom, Dick or Harry, and Hines deserves an exclusive title—gives a wonderful show. Students should get this record because (b) is undoubtedly an object lesson. Hines' technique is rather difficult to follow at first. (b) has to be heard several times before one is sure about Hines' ideas; they are rather complicated to the uninitiated.

DANCE SELECTION

- Hits of the Day (d.s.), The
B.B.C. Dance Orchestra
directed by Henry Hall, 4s.

COL DX378

Henry Hall's first 12-in. disc gives a summary of all the styles and variations of his band. It is very pleasant light music and, I suppose, entertaining. The hits include "Lullaby of the Leaves," "Let's Have Another Cup of Coffee"—one of Hall's best numbers—"Crazy People," and "Soft Lights and Sweet Music."

COMEDY NUMBERS

- ★(a) John Willie's Farm, (b)
Underneath the Arches,
Gracie Fields, 2s. 6d.

H.M.V. B4277

After I had been listening to (a) for a minute or so, I took the record off to make certain that it was one of Gracie's. Really she is a clever impersonator. The style and sound of her voice was so different from what I expect from her. But she gives herself away on (b) with her extra high top notes. (a) is a schoolroom sketch which is very amusing and clever. Make a point of hearing her version of (b); I am sure you will like it.

- ★There's Another Trumpet in
the Sky (f.) (d.s.), Ray Noble
and His New Mayfair Dance
Orch., with John Henry,
2s. 6d. **H.M.V. 6241**

This is a comedy fox-trot, but I can hardly recommend it for dancing. It is hard to imagine John Henry, with his peculiar form of humour, and a dance band working together. Anyway it has been done, with the result that here we have a suitable absurdity for Christmas



JOHN HENRY

parties. Noble's queer noises are very amusing. If you get this you will have one of the best half a crown's worth of fun available.

CINEMA ORGAN RECORDS

- Musical Comedy Medley (d.s.),
Sydney Gustard, 4s.

H.M.V. C2469

A 12-in. medley containing a selection of popular musical comedy excerpts, including "Song of the Vagabond" (*The Vagabond King*), *Chocolate Soldier* waltz, "If You Were the Only Girl in the World," and waltzes from *Gipsy Love, Count of Luxembourg*, and *The Love Nest*. The selection concludes with the waltz and finale from *The Merry Widow*. There is no need for further details. Gustard is a good organist, who knows how to produce pleasant effects from a Wurlitzer.

- ★Storm Fantasie (d.s.), Quen-
tin Maclean, 2s. 6d.

COL DB909

Quentin Maclean's past records have shown that he is a musician, but here he has turned up, apparently, in the role of a conjuror as well. How it is possible for two hands and two feet to work together and produce a big storm effect with a background of hymn tunes is more than I can guess. The



QUENTIN MACLEAN

fantasia is cleverly arranged, especially the way in which "snatches" from Wagner's "Flying Dutchman" and Mendelssohn's "Fingal's Cave" overtures are worked in to the musical impression.

- (a) Song of the Islands, (b)
Aloha Oe, Eddie Dunsted-
ter, 2s. 6d. **BRUNS 1360**

A cinema-organ record really worth getting. Dunstedter makes artistic use of the tremolo with a peculiar background of piano-tone bass. Both tunes are traditional airs, which lend themselves to this fancy treat-

ment. The deep bass notes are well recorded.

- ★(a) Sylvia, (b) On the Road
to Mandalay, Jesse Craw-
ford, 2s. 6d. **H.M.V. B4249**

I have thoroughly enjoyed listening to this disc. America's leading cinema organist can give our people over here a lesson in style. On (a) there is a remarkable likeness to a piano which rather baffles me. I am not certain that the noise did not emanate from such an instrument. Perhaps you can identify the noise.

- (a) Underneath the Arches,
(b) Wandering by an Old
Cathedral Garden, Alex
Taylor, 1s. 6d.

DECCA F3211

The "world's mightiest Wurlitzer" organ is played by Alex Taylor at the Granada Cinema, Tooting. Tooting is fortunate in having one of the umpteenth wonders of this world. There is little style about Taylor's (a) except for the vocal chorus, which is quite well sung. (b) is a descriptive piece, with bells, imitation of a cathedral organ playing, and a spot of singing, but no birds. I thought every Wurlitzer had a bird stop!

- (a) Watch the Navy, (b) When
the Band Goes Marching
Home, Reginald Dixon,
1s. 6d. **ZONO 6189**

This is the first record by Reginald Dixon, the popular Wurlitzer organist at the Tower Ballroom, Blackpool, for Zonophone. I thoroughly enjoyed it, because both tunes are lively and because Dixon plays softly and makes rather impressive use of the extreme top and bottom notes on his instrument.

DANCE MUSIC

- ★(a) A Bungalow, a Piccolo
and You (f.), (b) Under-
neath the Arches (f.), Jack
Hylton and His Orch.,
1s. 6d. **DECCA F3070**

Another successful Hylton record. Some fine solo work and



JACK HYLTON

that "just right" time for dancing are outstanding features. (b), composed by Flanagan, of the famous Flanagan and Allen combination, needs no comment. This is the best version yet.

- ★(a) Crazy People (f.), (b)
How'm I Doin' (f.),
Harry Roy and His
Rkolians, 2s. 6d.

PARLO R1312

There is plenty of "pep" on both sides of this good record, which is ideal for the

(Continued on page 660)

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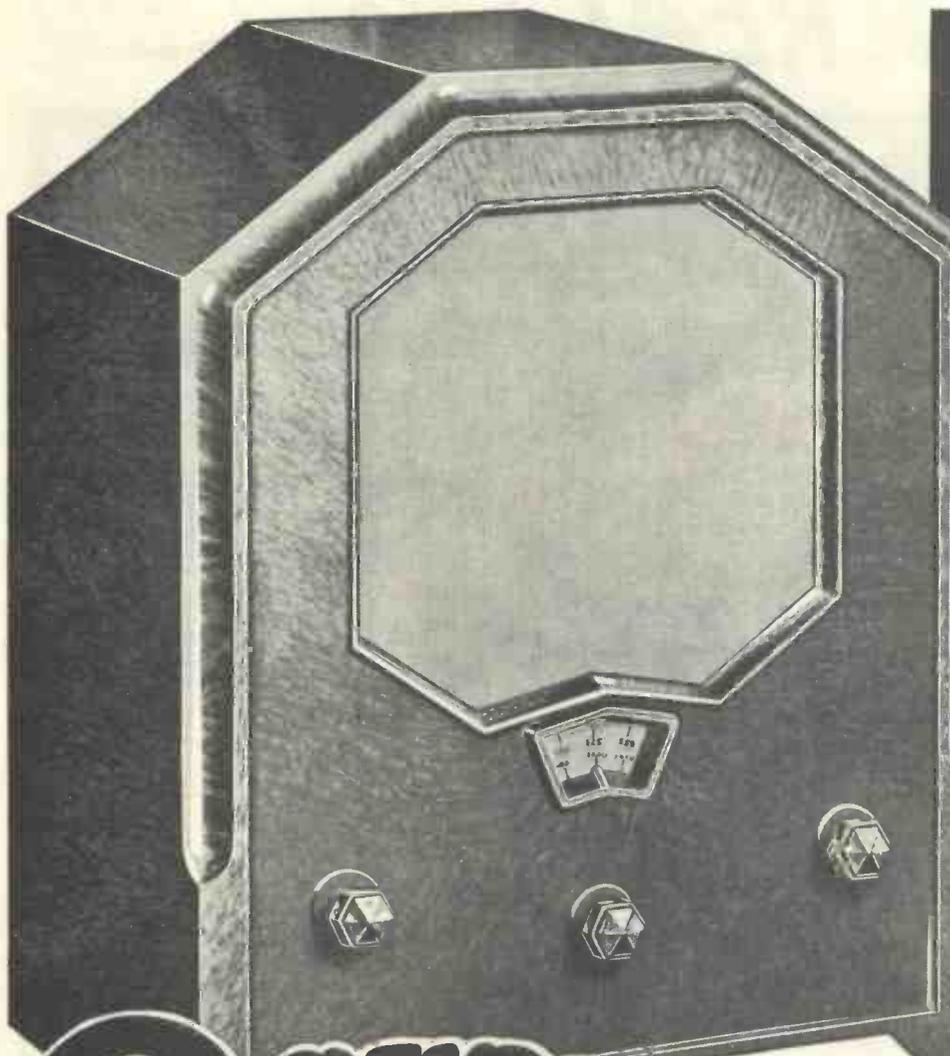
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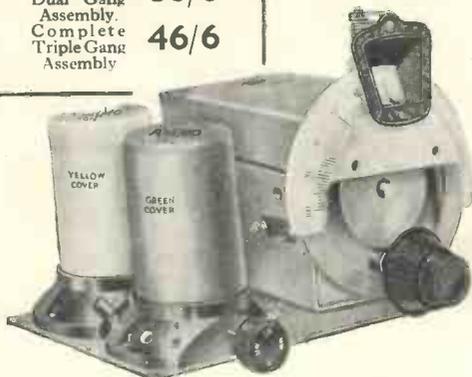
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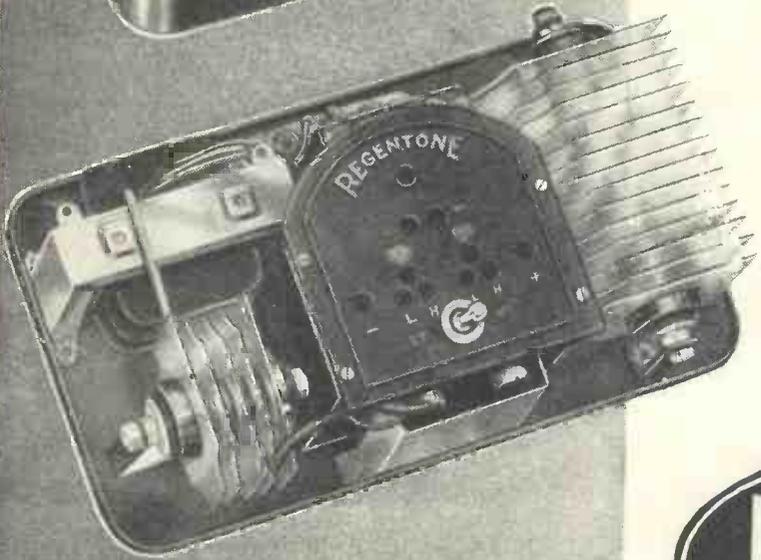
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YOUR CHOICE OF RECORDS—Continued from page 656

coming parties. The style is typically modern and noisy. I know you will enjoy it. The recording is free from the slightest trace of scratch and there is no cutting off of high notes.

- ★(a) How'm I Doin'? (f.), (b) Moon (slow f.), Roy Fox and His Band, 1s. 6d. **DECCA F3198**

This is the goods! One of Roy Fox's best records. (a) is modern, with a snappy vocal by



ROY FOX

Nat Gonella accompanied by other members of the band. The drummer shows how drums should be drummed. (b) is one of Fox's quiet, dignified slow fox-trots, which are ideal for dancing. By the way, Decca tells me that Roy Fox and his new Café Anglais Band are to record for Decca records.

- ★(a) Hungarian Song (f.), (b) She Shall Have Music (f.), Jack Bund and His Bravour Dance Band, 2s. 6d. **PARLO R1300**

This band is different to all others I have heard. Jack Bund is the pianist—a clever one, too—and he believes in making himself heard. Furthermore, it is clearly evident that melody is his main object. Throughout both tunes the piano is the main instrument; in fact one might call it a concerto for dance orchestra and piano. Every dance band fan should get Bund record, because it is unique. Recording fine.

- (a) If You Were Only Mine (slow f.), (b) Call It a Day (slow f.), Roy Fox and His Band, 1s. 6d. **DECCA F3151**

Both numbers are typical of the Roy Fox slow fox-trot treatment, dreamy, quiet arrangements—perhaps a shade too fast—with Al Bowly's "appealing" style vocals. It is a pity that Roy has parted company with his boys. He is forming a new band, which will be playing at the Café Anglais.

- (a) I'll Do My Best to Make You Happy (f.), (b) Love is the Sweetest Thing (slow f.), Ray Noble and His New Mayfair Orch., 2s. 6d. **H.M.V. B6245**

Both numbers are written by Ray Noble and are from the film *Say It With Music*. Like all Noble's compositions, there is a pleasant melody. You will not have forgotten his *Good Night, Sweetheart*. I believe that the tenuous effect he gets is due to very careful use of the piano as a top-note background. Both have vocal choruses, fairly well sung.

- ★(a) I'm in Good Form Today (f.), (b) And Then? Jack Bund and His Bravour Dance Orch., 2s. 6d. **PARLO R1276**

I have taken a great fancy to Jack Bund's wonderful piano playing. It is clever. (b) is one of his own compositions, which I have thoroughly enjoyed. See the other Jack Bund record review in these columns.

- (a) I'm So In Love (tango), Harry Hiller's Dance Orch. (b) Two Eyes (tango), Paul Godwin's Dance Orch., 2s. 6d. **DEC-POL P05050**

Both German bands, of course. The vocal choruses on both sides are sung in German, but in spite of this disadvantage, the record is well worth hearing. There is no getting away from the fact that Continental orchestras are good at this type of work. On this disc pianos and accordions, in fact all the solo instrumental work, is of a high standard.

- (a) In a Shanty in Old Shanty Town (w.), (b) Same Old Moon (f.), Joe Green's Ambassadors, 1s. 6d. **PANA 25260**

A good dance record. I am not too impressed with its style, which appears to be rather coarse. The guitars, piano, and marimba make a unique group in the fox-trot on (b).

- ★(a) La Flor Del Camino (tango), (b) Caminito (tango), Spaventa Con La Orquesta Tipica De Don Alberto, 2s. 6d. **BRUNS 1342**

An excellent record. The time, which is the most important factor in a tango record, is correct. The drowsy atmosphere that is associated with a tango is realised here. Probably the reason is that Don Alberto's band is a real tango band and not a modern rhythmic combination. Strongly recommended.

- (a) Listen to the German Band (f.), (b) How Are You? (f.), Jack Hylton and His Orch., 1s. 6d. **DECCA F3204**

This is the best version of (a) I have heard, but even so I cannot raise any great enthusiasm for the tune. Anyway (b) makes up for all the deficiencies in (a). This is a real Hylton "rouser." It is a fine, lively quick-step, which will be ideal for the Christmas festivities. The plucked instruments—banjos, guitars, etc.—are excellently recorded on (b). It is an unusual record in this respect.

- (a) Listen to the German Band (q.s.), (b) Drink Up (six-eight one-step) Debroy Somers Band, 2s. 6d. **COL CB508**

Debroy Somers and his band have a distinctive style of their own. You can recommend their records with safety to any listener because they have little modern rhythmic style. They are merely a pleasant band which excel particularly at numbers like (a) and (b). Both are noisy enough for Christmas festivities.

- ★(a) Lola (tango), (b) Rose of Seville (tango), Gerardo's Gaucho Tango Orch., 2s. 6d. **COL CB494**

A delightful record! Both tunes have rather an unusual

style; a deal of solo work is done by the pianist and string players. (b) has a vocal chorus, in which Gerardo's vocalist sings, not "croons," an unusual feature for a dance record.

- (a) Marta (slow f.), (b) A Great Big Bunch of You (f.), Sid Lipton and His Grosvenor House Band, 1s. 6d. **ZONO 6181**

I have heard so many "Martas" lately that I am really at a loss to pass comment. This version, however, is one of the best; even the vocal chorus is well sung. On (b) there is a duet with a lady singer. Delicate orchestration is one of the best points of Syd Lipton's band.

- (a) Masquerade (w.), (b) Wrap Your Arms Around Me (f.), Jack Hylton and His Orch., 1s. 6d. **DECCA F3161**

In (a) Hylton begins with his usual flourish, followed by a much-too-fast version. The time is almost quick enough for an old-fashioned waltz. Record companies as a whole would do well to make their waltz releases fit for modern dances. (b) is splendidly done, with some brilliant saxophone work. The string bass is exceptionally well recorded.

- (a) Masquerade (w.), (b) Happy-go-lucky You, Broken-hearted Me (slow f.), Sid Lipton and His Grosvenor House Band, 1s. 6d. **ZONO 6185**

(a) is the most delightful waltz tune at the moment. Syd Lipton's version is good, except for a too-long vocal chorus. This constant singing—or crooning—of vocal choruses is not an essential ingredient of a good dance record. (b) is quite well done, the brass instruments, especially, do their "stuff," but it is too fast for a real slow fox-trot.

- (a) My silent Love (f.), (b) I Wanna Be Loved (f.), Savoy Hotel Orpheans, 2s. 6d. **COL CB504**

Delightfully rendered with fine saxophone and piano playing as the main recommendations. The Savoy Orpheans do not appear to favour the modern rhythmic style, but simple, well-arranged "sweet" music. Both of these tunes will please anyone, no matter whether they are "hot" fiends or not. The style is irresistible.

- ★(a) Oh, How I Love My Darling (quickstep), (b) Sweet Little You (quickstep), Edgar Jackson and His Dance Band, 1s. 6d. **DECCA F3156**

Edgar Jackson, the dance-music critic, shows his own ideas in practice. His band plays at the Spider's Web, Bushey, a road house just outside London. Both numbers are old favourites in modern style; at least, that is on the label. I rather like the original rhythmic background; still four beats in a bar, but all at well-pronounced and equal strength. You should certainly hear this record, particularly if you remember the original tunes.

- ★(a) She Was Only Somebody's Daughter (f.), (b) Marching Along Together,

Jack Hylton and His Orch., 1s. 6d. **DECCA F3148**

Jack Hylton is in one of his boisterous moods here. (a) is one of those "catchy-line" numbers—I expect you have heard this one—this time about an orphan child. Hylton manages to find a line the others haven't got. (b) is a march—rather well done—with vocal chorus sung either by a lady or one of the Scottish lads Hylton recently discovered—I cannot tell which. This is the type of record for a boisterous party at Christmas.

- She Was Only Somebody's Daughter (quickstep) (d.s.) The Masqueraders, 2s. 6d. **COL CB509**

If you think this number is worth half a crown for two sides, then get it. Funny noises and so-called funny rhymes are all here, but I have heard better.

- (a) The Clouds Will Soon Roll By (slow f.), (b) Marta (slow f.), (b), B.B.C. Dance Orch., 2s. 6d. **COL CB487**

Both are popular tunes just now. Henry Hall broadcasts them very often. I can only suggest that if you like his style, you will find this record quite enjoyable.

- ★Tiger Rag (f.), (d.s.), Duke Ellington and His Orch., 2s. 6d. **BRUNS 1338**

This acknowledged "classic" of rhythmic music is played



DUKE ELLINGTON

remarkably well by one of America's leading dance bands. Brunswick are to be congratulated for their good recording. The listener passes through stages of fascination, amazement, and admiration before the two sides are finished. The time is fine for quick-stepping. Of course, many people would hate it.

- (a) Younger Generation (f.), (b) Mad About the Boy (slow f.), Jack Hylton and His Orch., 1s. 6d. **DECCA F3185**

Both these numbers are from Noel Coward's new show, *Words and Music*, which is now running at the Adelphi Theatre, in London. (a) seems to me to be just an ordinary type of number, rather dull if anything, but (b) is really a fine slow fox-trot, which here is notable for some excellent saxophone playing. The vocal chorus in (b) is sung by a lady with one of those husky voices and admirably fits in with the general tone of the tune.

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KIT "A"

Cash or C.O.D. **£10:15:0**
Carriage Paid

Or 12 monthly payments of 19/8

Valves, £2-12-6. Cabinet, £6-6-0.

BUILD YOUR "SEVENTY-SEVEN" SUPER

into the 1933 WALNUT ADAPTARAM

Trade-Mark

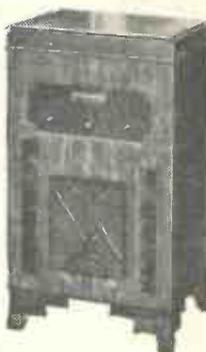
Constructed in Walnut, with Inlaid Walnut Veneers.

MODEL A converts your existing set to a radio-gram. Comes to you with vignette front, as illustrated, and motor board, ready to take your own set, gramophone motor, and pick-up. No skill or expensive tools are required to transform your radio into a combination instrument, presenting the professionally finished appearance of the most luxurious radio gramophone money can buy.

63/-

Carriage and packing 2/6 extra, England & Wales.

MODEL B, with Garrard Double Spring Motor, 12-in. Turntable, Automatic Stop, B.T.H. Tonearm with Pick-up, and Volume Control Complete. Automatic Needle Cup. Cash or C.O.D. **6 N S.** or 12 monthly payments of 12/-.



MODEL C, with Collaro Induction Electric Motor, with Tonearm, Pick-up, and Volume Control in one unit. 12 in. Turntable. Automatic Stop. Automatic Needle Cup. Cash or C.O.D. **7 N S.** or 12 monthly payments of 13/9.

Baffle Board 3/6 extra on all Models
Any speaker fitted for cost of speaker only.

PETO-SCOTT WALNUT CONSOLE

Constructed in Walnut, with Contrasting Inlaid Walnut Veneers.

Comes to you with vignette front, as illustrated, ready to take your own set. No skill or expensive tools are required to transform your radio into a beautiful console instrument, presenting the professional appearance of the most luxurious radio receiver money can buy.

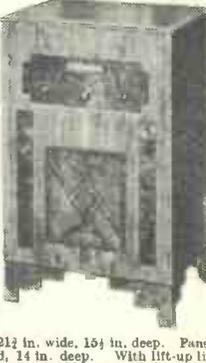
62/-

Or 12 monthly payments of 5/8.

Baffle Board ready drilled 3/6 extra.

Carriage and packing 2/6 extra England & Wales.

Dimensions: 36 in. high 21 1/2 in. wide, 15 1/2 in. deep. Panel 18 in. by 8 in. Baseboard, 14 in. deep. With lift-up lid.



PETO-SCOTT CO. LTD. 77, City Rd., LONDON, E.C.1

West End Showrooms: 62 High Holborn, London, W.C.2. Telephone: CLERKENWELL 9406/7
HOLBORN 3248

Dear Sirs, Please send me CASH/C.O.D./H.P.

for which I enclose £.....s.....d. CASH/H.P. Deposit. Also send your FREE 1933 Radio Catalogue.

NAME

ADDRESS

W.M.12/32

It helps us if you mention "Wireless Magazine"

THE EFFICIENCY
OF THESE SETS IS
GUARANTEED
BY THE NAME
Standard



(above)

Type S.330. 3-valve Band Pass Receiver, for A.C. Mains: 100-250 volts, 40-60 cycles. Mains-energised moving-coil speaker, single-control tuning. Walnut cabinet. Price, £16 16s. or £2 10s. deposit and 11 monthly instalments of 29s. 3d.

(on right)

Type S.322. 2-valve A.C. Mains Receiver: 100-250 volts, 40-60 cycles. Three wavelengths, including ultra-short (25-70 M.). Mains-energised moving-coil loud-speaker. Walnut cabinet. Price, £9 10s., or £1 8s. 6d. deposit and 11 monthly payments of 16s. 6d.



When you buy a *Standard* set, you can assure yourself that behind it are the brains and experience which have made the name *Standard* world-famous in the electrical industry. Below are details of three receivers that fully live up to the *Standard* reputation.

Also, Type S.328. 2-valve Battery-operated Receiver, built-in speaker, automatic grid bias. Oak cabinet. Price, £5 or £1 deposit and 10 monthly payments of 9s. 3d.

Standard Telephones  and Cables Limited

Write for details of Sets, Micromesh Valves, and Loud-speakers to:—

Radio Merchandise Dept.,
St. Chad's Place, 364
Gray's Inn Road, W.C.1.
Telephone: Terminus 6255.

Something Unusual in Gramophone Records

THE majority of even the keenest gramophone enthusiasts are unaware of the tremendous field covered by records. The ordinary catalogues and lists are naturally devoted to records for entertainment, but beyond these exist an enormous quantity which, whilst in many instances retaining the entertainment factor, possess great educational value.

Those who seek from the gramophone something further than mere entertainment will do well to obtain a copy of the educational catalogue published as a result of the fusion of the education departments of the Columbia Graphophone Co., Ltd., and that of the Gramophone Co., Ltd.

Special Series of Lecture Records

One of the most serious and brilliant contributions to present-day culture is the series of lecture records published by the International Educational Society—a non-commercial undertaking whose records are published by the Columbia Graphophone Co., Ltd.

The scope of these records is not less amazing than the lucid and friendly manner of each lecturer. Every lecture is by an expert of international fame; they range from boy-scout training to the stars and an introduction to physics. The random subjects quoted are by Lord Baden-Powell, the late Professor D. H. Turner and Sir Oliver Lodge respectively.

Every lover of music will increase his enjoyment to an immense degree after hearing Dr. Percy Buck's "How to Listen to Music" series. (He elucidates the mystery of harmony and counterpoint in the most fascinating way!)

And so on through the scale of human knowledge these ninety-eight lectures march. Here is a veritable treasure house of epitomised knowledge and culture—the basic principles of every art and science in the world. The opportunity presented is a rare one—everybody should send for full details.

The subjects covered in the catalogue of the educational department of the combined companies are literally astounding. Children are generously remembered—nursery rhymes, children's bands, school marches, children's songs and stories being instances of a few classifications. There is folk-dance music, national songs in our national tongues, shanties, chants, and so on for adults.

Culmination of A Lavish Syllabus

And as a final culmination of a lavish syllabus is that monumental series "The Columbia History of Music" (by ear and eye) and its companion, "Two Thousand Years of Music." Is the ordinary owner of a radio gramophone or gramophone aware of these delightful treasures?

Readers will be well repaid by sending a card to the Central Educational Offices, 98 Clerkenwell Road, London, E.C.1 (mentioning "Wireless Magazine"). They will be tremendously surprised and interested by the catalogue which will be sent them.

INCREASE THE USE OF YOUR RADIO.....



The **AMPLION**
M.C.22
PERMANENT MAGNET
M.C. SPEAKER
Price **39/6**

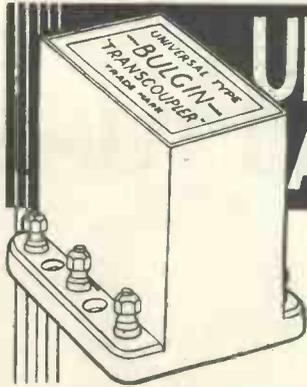
..... by
fitting an additional speaker.....

You obtain real portability and also simultaneous Radio reception in all parts of the house—just the thing for Christmas. The Amplion P.M. speaker is particularly suited to these requirements on account of its Universal Transformer. Connect it to a 2-valve battery set or an all-mains super-het., and the quality will be the same, sweet and pure.

Write to-night for our leaflet W.M.802, which fully describes this speaker.



AMPLION (1932) LTD., 80/82 ROSOMAN ST., LONDON, E.C.1. CLERKENWELL 5440



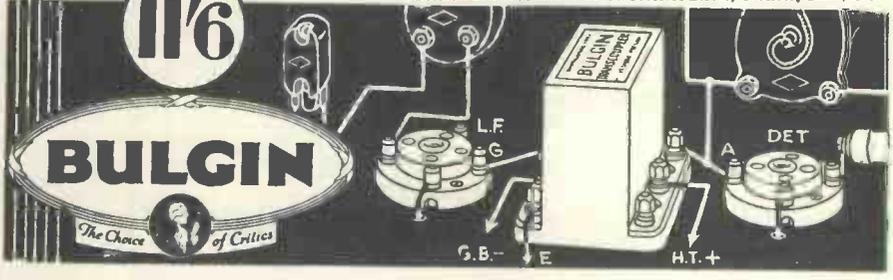
UNIFORM RESPONSE AT EVERY FREQUENCY

A REMARKABLE 'TRANSFORMATION'
Dispense with your transformer and fit the "Transcoupler." The improved quality of tone; conspicuously uniform amplification throughout; and complete absence of distortion will amaze you! It is simplicity itself to fit it in any set after ANY valve.
HOW TO FIT. Connect it in place of your straight connected transformer and add an earth connection. The other wires remain unaltered!

INSIST UPON HAVING THE ORIGINAL "BULGIN" TRANSCOUPLER TRADE MARK

Could anything be more simple?
Full instructions and hints with every "TRANSCOUPLER". SEND FOR NEW 80-pp CATALOGUE "B" AND MANUAL. Enclose 2d. postage.

A. F. BULGIN & CO., LTD., ABBEY RD., BARKING, ESSEX
Telephone Gramwood 3260-3267
London Showrooms: 9-10-11 Cursitor Street, Chancery Lane, E.C.4.



TUNEWELL

have taken the lead in Radio-Grams

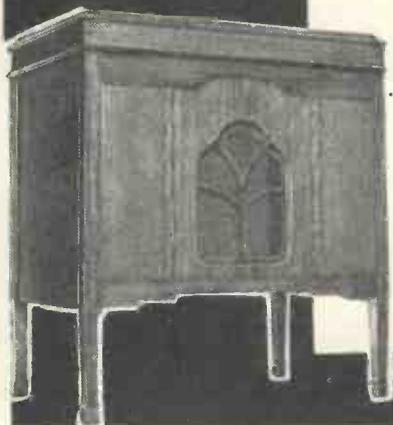
No "mass-produced" instrument can give such beautiful tone as this new TUNEWELL ALL-ELECTRIC RADIO-GRAMOPHONE. It is this exquisite difference—the rich, mellowed quality of tone—which has given Tunewell the lead.

Hear it; compare it with others. A demonstration will prove the superiority of this *individually made* instrument.

Great sensitivity and selectivity. Wide choice of stations. Band-pass tuning, giving constant 10 k.c. band width. Volume control, energised M.C. loud-speaker giving even response up to 10,000 cycles. Undistorted output, 27 watts. Illuminated dial marked in wavelengths.

OAK MODEL 27 GNS. (Plus 25/- Royalties)
For A.C. Mains. 100/120 Volts, 200/230 Volts, 50 Cycles.

DEFERRED PAYMENTS can be arranged
The Tunewell is by far the cheapest good Radio-gramophone obtainable. A demonstration entails no obligation. Send the coupon NOW for name of nearest dealer.



To TUNEWELL RADIO LTD., 54, STATION ROAD, LONDON, N.11.

Please send me illustrated Radio-gramophone Brochure and say where the Tunewell Radio-gramophone would be demonstrated to me.

Name

Address

W.M.5.

Mention of the "Wireless Magazine" will ensure prompt attention



STARTING RADIO

At Christmas time thousands of new listeners want to build their first radio set—and most of them want to do it without going too deep into their pockets. Here the "Wireless Magazine" Technical Staff presents full constructional details of a simple and efficient, yet inexpensive, screen-grid three-valve set which will be found a great success



"HULLO, George, old man, you're the very chap I want to see. What about a little professional advice? You know I got married a few months ago—well, I want to knock up a little wireless set before Christmas. Must be cheap, you know, there are so many expenses to be met at this time of the year; what can you do to help me?"

What the Problem Is

"Congratulations, Henry! I didn't know you were married, as a matter of fact and, as for a radio set, the "W.M." technical people have been talking about the kind of thing you want. Lots of people at this time of year want to start radio and we have been discussing what is the best that can be done for about five guineas. If you can spare a few minutes, I will explain what the problem really is."

"Why, what luck! I was afraid that you wouldn't want to tackle such small meat. I'm glad I ran into you."

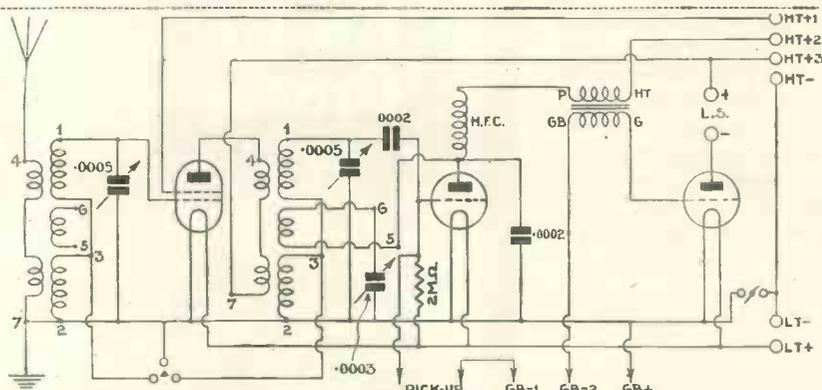
"Give me a piece of paper, Henry, and I will run through the proposition. First of all, we must have a loud-speaker; the cheapest complete one we have come across yet is a Lissen plaque for 8s. 6d.—you know

the kind of thing, a simple cone model finished off with a metal surround and fitted with a support at the back for standing on a table. Next you want a cabinet. That is rather difficult if you want a really good one, but Peto-Scott's can supply quite a neat little job for 10s. 6d.

"Then there are batteries to consider. For a small set, an ordinary-capacity high-tension battery will do; the Ever-Ready Winner is only 11s.

How many will the set have; I suppose you can only go to two valves in a five-guinea set?"

"Oh, I don't know about that, Henry. Let's see if we can't run to three valves—a screen-grid is so useful, for you are always certain of getting a few foreigners then. Let us run through the prices, allowing for the best valves. A screen-grid type costs 16s. 6d., a detector will be 7s., and a small power valve will be



The valve combination consists of a screen-grid detector and a power stage

and you can get a grid-bias battery for 1s. And Oldham's do a 2-watt accumulator for 5s. 6d."

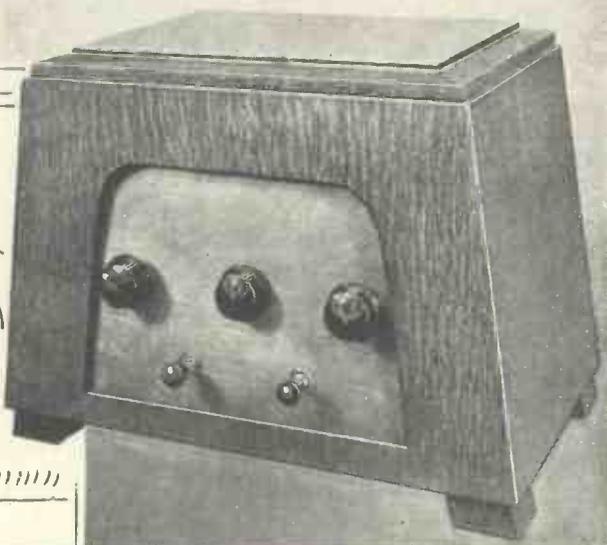
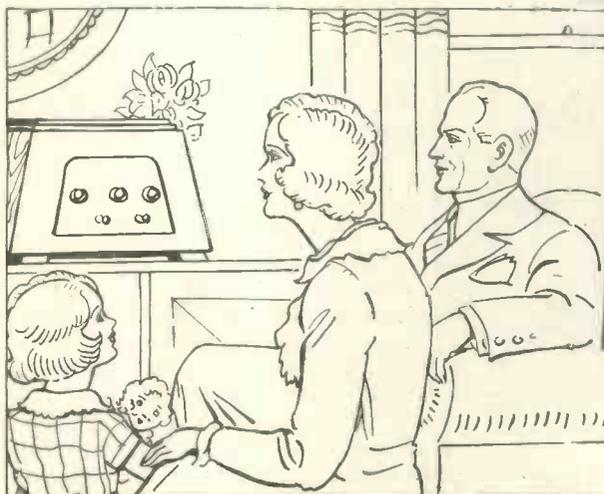
"I see, but what about the valves?"

8s. 9d. You are better at arithmetic than I am, Henry. How much have we spent up to now?"

"Just a minute and I will tot it up

for FIVE GUINEAS!

WITH THE 1933 ECONOMY S.G.3.



Why, that comes to £3 8s. 9d. already—not much chance of getting the rest of the stuff for £1 16s. 3d., is there?"

"I think it might be possible with a little thought. Of course, we shan't be able to afford the very best components, but that does not matter much—even the cheapest parts are excellent nowadays, practically as good as the best were five or six years ago.

"The chief trouble is the tuning gear, but we have just heard of some new dual-range coils that Pressland are putting out; I believe the price is to be only 4s. 6d. each, and the coils are to be screened as well. Then we could use bakelite-dielectric condensers instead of the usual air-spaced type—that will save us a good bit.

"Look here, Henry, I believe we can do it all right. I will go straight

back to the office and look up a few catalogues. It will take us a day or two to get all the parts and knock a set up, but I will meet you here at the same time next week and let you know what we have been able to do. If we can turn out a set for five guineas it will be extremely popular."

"O.K., George, I'll be here next week. My, the wife *will* be bucked if we can have a set. She's been wanting one for months, you know. So long, see you later."

COMPONENTS NEEDED FOR THE 1933 ECONOMY S.G.3

CHOKE, HIGH-FREQUENCY

1—Graham Parish, 2s. (or Lewcos, Telsen).

COILS

2—Pressland dual-range, 9s.

CONDENSERS, FIXED

2—Dubilier .0002-microfarad, type 665, 1s. (or Lissen, Telsen).

CONDENSERS, VARIABLE

2—Telsen .0005-microfarad, type W193, 5s. (or Lissen, Polar).

1—Telsen .0003-microfarad, type W194, 2s. 6d. (or Lissen, Polar).

HOLDERS, VALVE

3—W.B. four-pin, 1s. 6d. (or Lissen, Lotus).

PLUGS AND SOCKETS

7—Ealex wander plugs, marked: H.T.+3, H.T.+2, H.T.+1, H.T.—, G.B.+ , G.B.—1, G.B.—2, 10½d. (or Belling-Lee, Clix).

6—Belling-Lee terminals, type Q, 1s. (or Ealex, Clix).

RESISTANCE, FIXED

1—Claude Lyons 2-megohm grid leak, 10½d. (or Erie, Dubilier).

SUNDRIES

1—Packet Goltone braided cable, 9d.
Lengths of oiled-cotton sleeving (Lewcos).
Tinned-copper wire for connecting (Lewcos).
Length of rubber-covered flex (Lewcos).

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

SWITCHES

1—Sovereign three-point wave-change, 1s. (or Bulgin, W.B.).

1—Sovereign on-off, 7d. (or Bulgin, W.B.).

TRANSFORMER, LOW-FREQUENCY

1—Telsen Ace, ratio 1 to 5, 5s. 6d. (or Lissen Torex, R.I., Dux).

ACCESSORIES

BATTERIES

1—Ever-Ready 120-volt high-tension, Winner type, 11s. (or Lissen, Siemens).

1—Ever-Ready 9-volt grid-bias, Winner type, 1s. (or Lissen, Siemens).

1—Olahams 2-volt accumulator, type 025, 5s. 6d. (or C.A.V., Exide).

CABINET

1—Peto-Scott, 10s. 6d.

1—Peto-Scott wood panel, baseboard and terminal strip, 2s. 3d.

LOUD-SPEAKER

1—Lissen plaque, type LN5077, 8s. 6d.

VALVES

1—Mullard PM12, 16s. 6d. (or Cossor 220SG, Mazda 215SG).

1—Mullard PM1HL, 7s. (or Cossor 210HL, Mazda HL2).

1—Mullard PM2A, 8s. 9d. (or Cossor 220PA, Mazda P220).

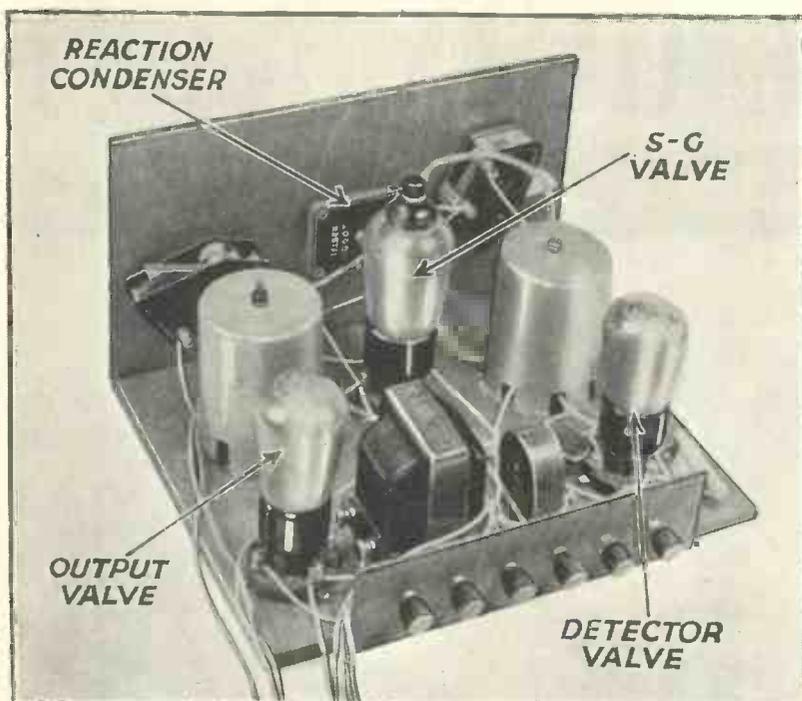
In the "W.M." Offices

Back in the "W.M." offices, George began to get busy with the catalogue file and some sheets of paper to draw out circuits. Much discussion followed and a set was eventually rigged up. Only absolutely essential parts were used; there could be no "trimmings" if the job was to be done for five guineas but, on the other hand, the set must work.

Eventually the set was licked into shape and given a proper test under ordinary listening conditions in South London. The circuit finally adopted is shown opposite.

The secret of success lies in the efficiency of the tuning coils, the cheapest screened coils yet produced

STARTING RADIO for FIVE GUINEAS—Cont.



BUILT IN A FEW HOURS AND GIVES YOU ENTERTAINMENT FOR YEARS!
Only essential parts are used in the construction of the 1933 Economy S.G.3, which is therefore very simple to build

—and efficient into the bargain. So there was to be good news for Henry after all!

“Good afternoon, Henry. Well, we’ve managed to do it and, although I shouldn’t say so, the set is remarkably good; in fact, on the long waves it was one of the best three-valvers we have had working in the laboratory.”

“Fine, George, I’m so glad. Were you able to keep the screen-grid valve in or was that too expensive?”

Retaining the Screen-grid

“No, it wasn’t too expensive, although we had doubts about it at first. The trouble was to keep the set stable. Unless great care is taken, screen-grids are inclined to ‘go up the loop’—you know, whistles and howls when you don’t want them. Actually, our final parts cost only £1 11s. 10d.—that leaves 4s. 5d. for sundries like insulating sleeving, a wood panel, terminal strip, wire, and screws.”

“What, do you mean that every other part is included in the total of £1 11s. 10d.?”

“Yes, that is just what I do mean. Hardly credible, is it? But it’s true, nevertheless. Look, here is the list.”

And George showed Henry the list of parts that is printed on page 665.

“And here,” continued George, “are some actual photographs of the finished set. As you can see, it looks

quite snappy. Much better, in fact, than you would think a five-guinea screen-grid set *could* look.”

“I agree, George. It does look good, but how does it work?”

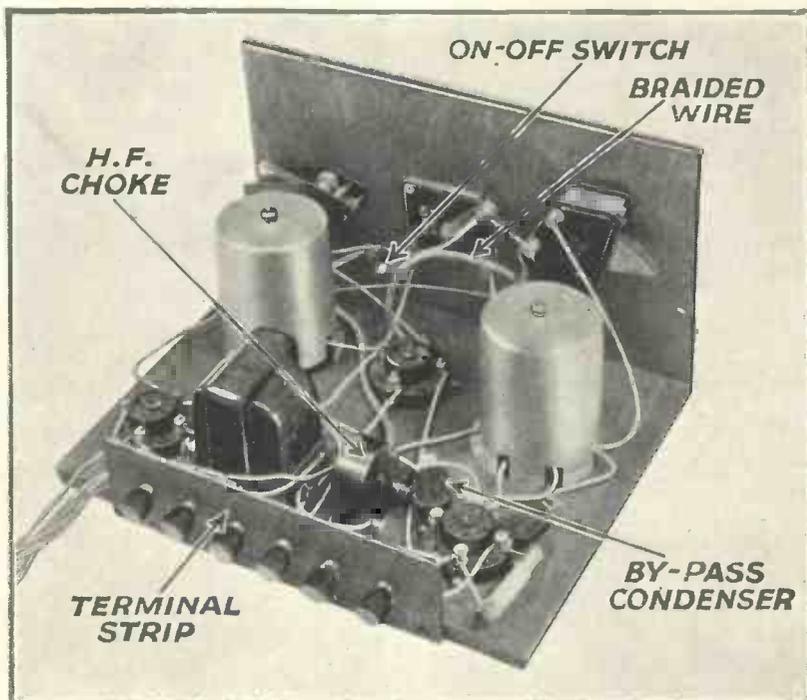
“Ah, it works even better than you would suppose. Look, here’s a log of the stations actually picked up on the loud-speaker. In one evening, one of our fellows got nineteen stations on the medium and seven on the long waves. Not bad going, is it? I’m sure you will find the set just what you want. If you don’t want to listen to the British stations on Sundays—when you do get the set going I expect you’ll find they are not up to much—you will always be able to get a few foreigners.

Good Selectivity

“You will be able to get them on weekdays, as well, of course, the set is quite selective enough for that. I don’t think you will have any great trouble about cutting out the locals when you want to.”

“Thank you very much, George. I don’t want to put you to any more trouble, but how am I going to build the set? I can’t follow your circuit diagram, you know.”

“I guessed that, Henry, so I’ve
(Continued on page 668)



A SET THAT IS IDEAL FOR THE BEGINNER
Another view of the 1933 Economy S.G.3 which can be assembled complete with valves, batteries and loud-speaker for five guineas



A momentous discovery by the "W.B." research engineers

The new (patented) "Mansfield" Magnetic System lifts the whole subject of popular moving-coil speakers on to a higher plane. It makes possible a magnet 30 per cent. more efficient than the best cobalt steel magnet of the same weight and 10 per cent. more efficient than a chrome steel magnet of three times the weight. It enables a steel chassis to be used without magnetic loss. It eliminates the bug-bear of loss of magnetism.

There is nothing like it in the world. A magnet made on this principle comprises two steel alloys so arranged that the magnetic flux is concentrated in the small area where

the work is done instead of being distributed over the whole system. Thus, without extra weight or cost, sensitivity is materially increased and the range of reproduction improved.

This secret, now revealed, accounts for the colossal demand for the new "Mansfield" Permanent-magnet Moving-coil Speakers (Senior and Junior) ever since we introduced them at Olympia. We have had to make repeated large extensions to our works and engage and train hundreds of additional workers—and we can now meet demands for delivery. Write for booklet then

Ask your dealer for demonstration. You will be AMAZED

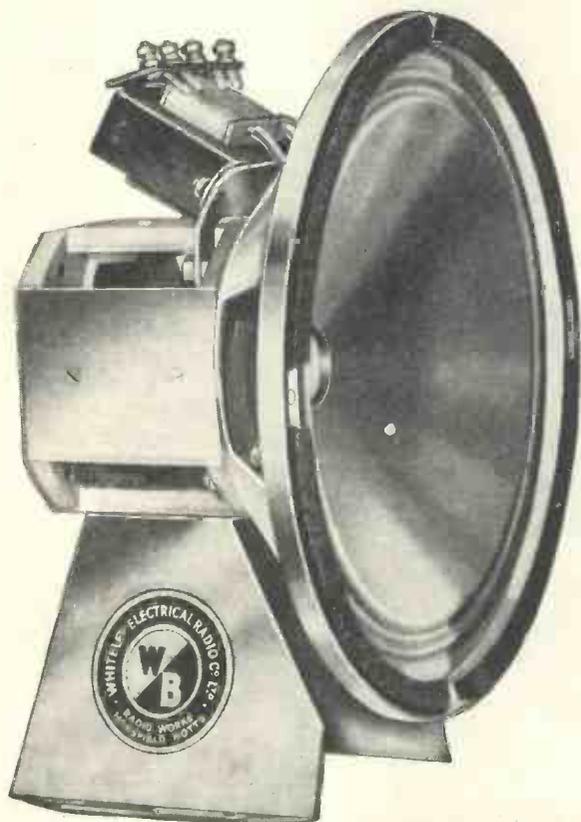
"Mansfield" Senior (Improved P.M.4) incorporates the new "Mansfield" system and gives astonishing results from any 2-, 3-, or multi-valve set.

42/- Complete with 3-ratio Transformer.

"Mansfield" Junior (P.M.5) also incorporates the above.

27/6 Complete with 3-ratio Transformer.

"MANSFIELD"
PERMANENT
MAGNET
 MOVING COIL SPEAKERS

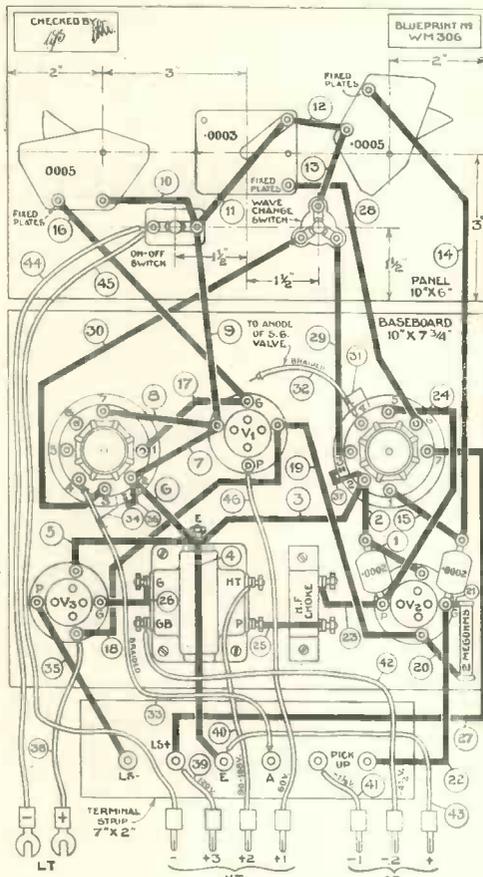


A revolutionary development!

Whiteley Electrical Radio Co., Ltd., Dept. W.M., Radio Works, Mansfield, Notts.

When replying to advertisements, please mention "Wireless Magazine"

STARTING RADIO for FIVE GUINEAS—Continued from page 666



QUARTER-SCALE LAYOUT

A full-size blueprint can be obtained for half price (that is, 6d., post free), if the coupon on the last page of this issue is used by December 31. Ask for No. WM306

as you see, shows the positions of all the components. There is a coupon on the last page of every issue of 'Wireless Magazine.' If that is used by the end of the month, the sender can get a blueprint for half price. For instance, if you send the coupon on the last page of the Christmas number to us by December 31, with a postal order for 6d. and ask for No. WM306, we shall send you a blueprint post free."

"I see; I will tell my friends about that. Just a minute, though, I had better make sure of your proper address. What is it exactly?"

"Tell them to send to 'Wireless Magazine' Blueprint Dept., 58/61 Fetter Lane, London, E.C.4, and a copy will be sent by return of post."

"All right, I've got that down. Now, there are just one or two things more I should like you to explain. For instance, what are all these numbers on the blueprint?"

"Those numbers indicate the best sequence of wiring up the set. There is no need for me to explain to you how to fix the parts. You will have to drill one or two holes in the panel, of course, but all the rest of the work can be done with a screwdriver. If you have any trouble about recognising any of the parts, just have a look at the photographs."

Sequence of Wiring

"But about those numbers. As I said, they show the best sequence of wiring up the set. If you start off with connection No. 1 and then carry on in numerical order, it will be impossible to make a mistake. To make doubly sure you can cross each number through on the blueprint as soon as you have completed the connection."

"The best way of making the connections is to get a piece of what is called oiled-cotton sleeving and cut off a length sufficient to reach easily between the two points you have to connect. Then take a piece of bare

tinned-copper wire and thread it through the sleeving. Before you cut it, though, remember to leave about $\frac{3}{4}$ in. at each end for screwing under the terminals. You will need one or two small nuts and bolts for making connections to parts that are only provided with soldering tags."

"All right, George, I understand that. But how do I connect up the batteries?"

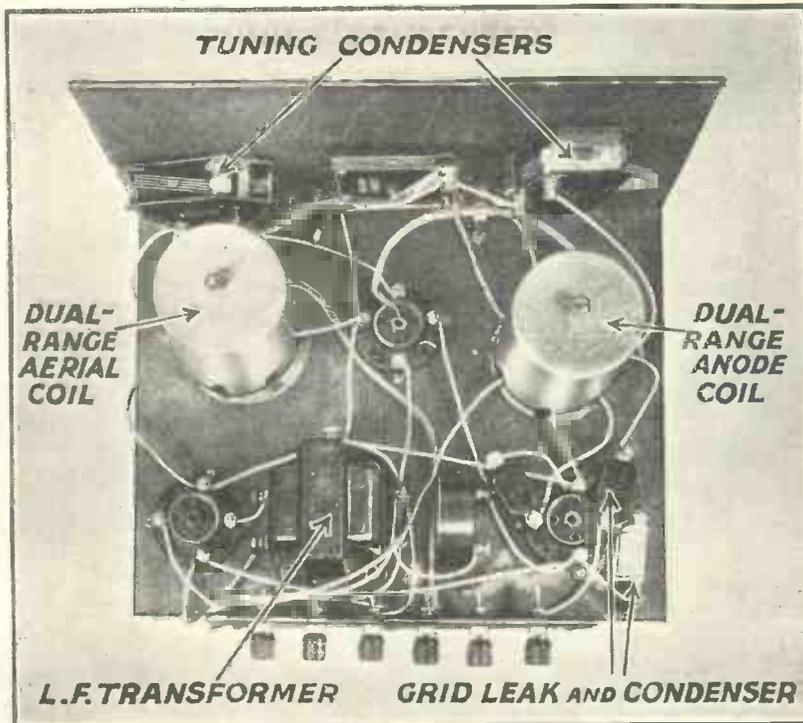
"The voltages are all marked on the blueprint. You will see that there are three high-tension connections; you simply

(Continued on page 670)

brought along for you an advance copy of the blueprint we shall supply for the set. Here it is." (See the quarter-scale reproduction on this page.)

"Good, I ought to be able to follow that all right, especially if you can let me have these photographs as well. You know, several of my pals at the office would like to build up this set; how can they get blueprints, because I shall want to keep the one you have given me?"

"Oh, that's easy enough. For every set we publish we prepare a full-size blueprint, which,



SPECIAL PHOTOGRAPHIC PLAN VIEW
This plan view of the 1933 Economy S.G.3 shows clearly the disposition of the parts on panel and baseboard. Remember that the set can be built complete with valves, batteries, cabinet and loud-speaker for five guineas

**SEE THAT YOUR
A.C. MAINS SET
INCORPORATES
A
WESTINGHOUSE
METAL RECTIFIER**



This trade mark on a rectifier is a guarantee of a constant and lasting high-tension supply.

A frequent cause of inefficiency in A.C. mains apparatus is the rectifier. Certain rectifiers require periodic renewal; and the worn-out part has, more often than not, to be replaced by a similar unit whose life is known to be limited and which will, after a specified time, cause further dissatisfaction.

By buying an A.C. mains receiver incorporating a Westinghouse Metal Rectifier, this source of trouble is entirely eliminated, and a constant and lasting high-tension supply assured.

The "Set Buyers' Guide Supplement" contains full particulars of A.C. mains sets incorporating the Westinghouse Metal Rectifier. Notice how the great majority of the makers of quality A.C. mains receivers standardise Westinghouse. It is their guarantee that the performance of their products will not be impaired by deterioration of the high-tension supply.

If you would like to know more about the performance of this reliable Rectifier, or if you would like details of how to incorporate it in your present receiver, send 3d. in stamps for a copy of "THE ALL-METAL WAY, 1933."

The WESTINGHOUSE BRAKE & SAXBY SIGNAL CO., LTD.
82 YORK RD, KING'S CROSS, LONDON, N.1

COUPON

WESTINGHOUSE PUBLICITY,
82 York Road, King's Cross,
London, N.1.

Please send me "The All-metal Way, 1933," for which I enclose 3d. in stamps.

Name.....

Address.....

..... W.M. 12/32

Please mention "Wireless Magazine" when corresponding with advertisers

STARTING RADIO for FIVE GUINEAS—Continued from page 668

The Economy S.G.3 on Test

A COUPLE of hours knob-twiddling on the 1933 Economy S.G.3 has resulted in the list of stations at the bottom of this page. It was great fun!

The set was tested about twenty miles from Brookman's Park and the aerial used was an outdoor one.

Daylight Reception

After measuring the current consumption—10 milliamperes—I put the set on test; it was daylight. The strength of London Regional was so great that it was necessary to reduce the screen voltage to 36 volts to prevent overloading the power valve. The quality of reproduction from the small loud-speaker was quite pleasant—crisp and clear.

The daylight reception results were indeed satisfactory. On the medium waveband, Brussels No. 1, Langenberg, Leipsig, Hilversum, and Fécamp were heard at reasonable strength in addition to the usual British stations. On the long

waves, Radio Paris, Daventry, Eiffel Tower, and one other which I did not identify, were also received at good strength.

At night the set was well "alive." I heard about twenty or so stations at reasonable strength with very little interference. Prague at the top end of the medium waveband was entirely clear of North Regional and Langenberg was almost clear. The interference was very slight. Rome and Beromuenster were very strong signals.

Hilversum, a station which always seems to give splendid light variety programmes, was received without interference. London National had interference from some station or another, but I find that most listeners are complaining of this fault at the moment. On the long waves I heard a dozen stations, of which I managed to identify seven. Radio Paris was entirely free from Daventry National. Eiffel Tower and Motala were also fine signals.

A. BROCK LEA.

LIST OF STATIONS IDENTIFIED

LONG WAVEBAND			
Kalundborg	Warsaw	Daventry Nat.	Huizen
Motala	Eiffel Tower	Radio Paris	
MEDIUM WAVEBAND			
Fécamp	Breslau	Leipsig	North Reg.
London Nat.	Poste Parisien	Midland Reg.	Prague
Heilsberg	Milan	Stockholm	Brussels, No. 1
Hilversum	London Reg.	Rome	Vienna
North Nat.	Toulouse	Langenberg	

good reception with practically no aerial. And you had better use an earth connection—a wire twisted round a water pipe will do, or you can buy an earth tube and bury it outside the window."

"Well, I'm much obliged to you, George. I'll drop into our local dealer's on the way home to-night and ask him to get all the parts ready for me. That's about all, isn't it?"

Results in Use

"Nearly all, Henry. But as a favour, I should like you to drop me a line to let me know how you get on with the set. We always like to know what sort of show our sets put up—it's so useful in future designing to know what has happened in the past."

"Certainly, I'll let you know. And, what's more, I'll get some of my friends round to hear the set when it is finished."

Original Set on View

"That will be a good idea, Henry, but if there are too many of them send them round to see Selfridge's windows. Every month we send them one of the sets described in the current issue of "Wireless Magazine"; you will find it usually in their Somerset Street windows. Your friends might like to go along and see the original model there."

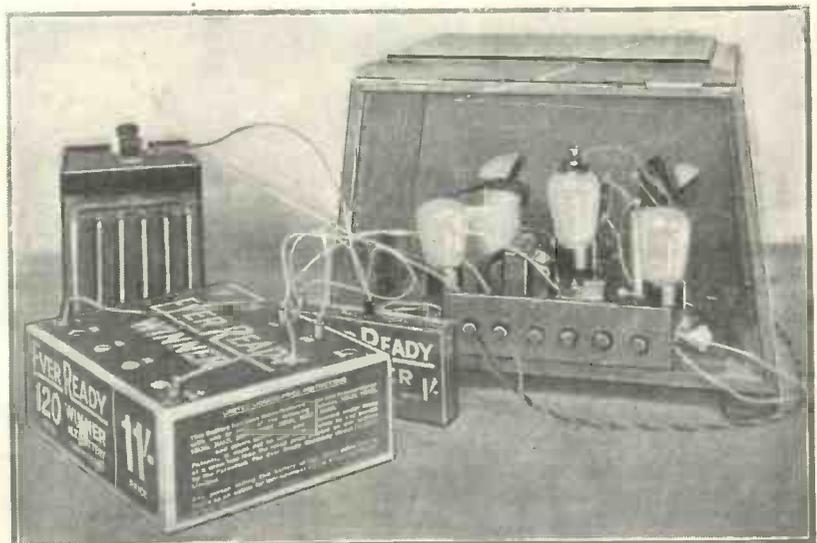
"That's most interesting, I'll remember that. Well, so long, George, thanks very much for all your help!"

plug the wander plugs into the holes on the battery corresponding to the voltages shown on the blueprint. Look up the paper slip inside the box of the power valve to see the exact grid bias the makers recommend; if you don't use enough grid bias you will run the high-tension battery down quickly. Of course, you won't forget to connect up the accumulator and the loud-speaker, as well."

Aerial and Earth

"Shan't I need an aerial with this set, then?"

"Sorry, I had forgotten that this will be your first effort at radio. Of course, you will need some kind of aerial. Sling a wire of about 30 to 50 ft. in length somewhere out in the garden; nowadays you can get pretty



ASSEMBLED AND ALL READY FOR USE

This view of the completed set with its batteries shows how neat it is in appearance

This Christmas



Buckingham

enjoy the Tonal Quality of a Mains Receiver with the Battery Moving Coil

Portadyne

S.G.4

B.M.C. Portable

Music has new delights . . . speech it gives with new life . . . radio takes on new pleasure when you own the Portadyne B.M.C. Portable. Ask your dealer to let you hear it . . . then you will see for yourself how you get the tonal quality of a Mains Receiver from the Battery-operated Portadyne S.G.4 MOVING COIL Portable. Fill in the coupon to-day for full, illustrated details.

14
GNS

Or 12 monthly payments of 28/2d.

Ask your dealer to show you the Portadyne S.G.4 Challenger at £12.17.6 and the wonderful new M.C.2 . . . a battery operated pentode Moving Coil 2-valver at £6.19.6 or 13 5d. down.

To Portadyne Radio (Prop.: Whittingham Smith & Co., Ltd.), Gorst Road, N. Acton, N.W.10.

Details Please!

Name

Address

a B.B.C.

We had to abbreviate to get the title in the heading but B.B.C. stands for better Bakelite Condenser which is the new condenser produced by Utility.

It is made for the man who has to eke out his shillings but the quality is the Utility standard and there is no higher standard.

If your dealer does not stock we will supply you direct and post free.

WILKINS & WRIGHT LIMITED
Utility Works, HOLYHEAD ROAD, BIRMINGHAM
London Agent: E. R. Morton, Ltd., 22 Bartlett's Buildings, Holborn Circus, E.C.4

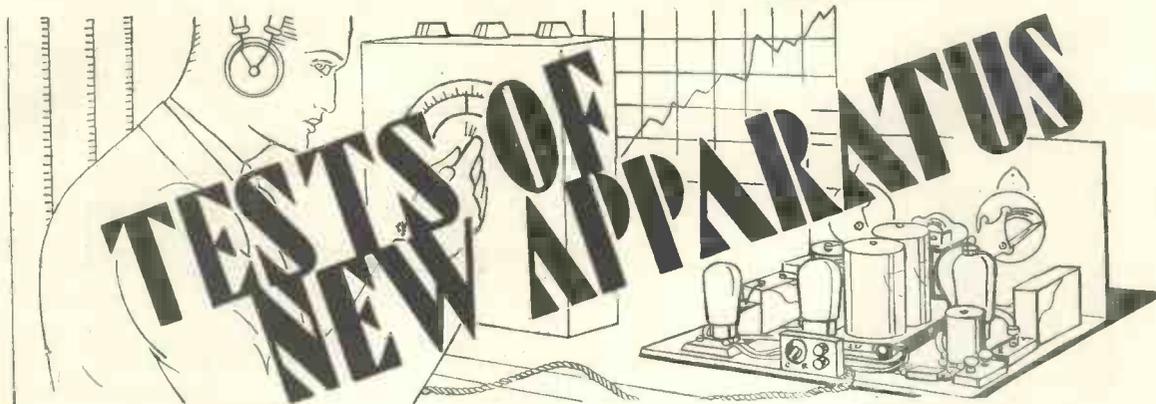
So don't take the risk of using bakelite condensers of inferior make, buy a Utility and buy safety.

PRICE
complete with bracket and illuminated disc dial 4/6
as illustrated - 2/-
Condenser separate - 2/-



BETTER BAKELITE CONDENSERS BY

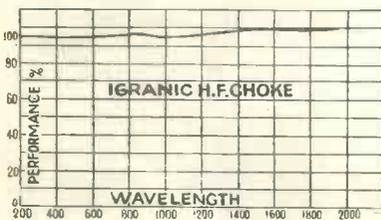
Utility



Igranic High-frequency Choke :: Univolt Radiogram Unit :: Clarion Pick-up
 R. & A. Bantam Loud-speaker :: Wearite Whistle Filter



EFFICIENT H.F. CHOKE
 The latest Igranic binocular high-frequency choke is particularly efficient



PERFORMANCE CURVE
 This shows the by-pass effect of the Igranic choke compared with a .0001-microfarad condenser

IGRANIC HIGH-FREQUENCY CHOKE

APPARATUS: High-frequency choke.
 TYPE: Binocular.
 PRICE: 4s. 6d.
 MAKER: Igranic Electric Co., Ltd.

ONE of the best high-frequency chokes we have tested lately is the new Igranic binocular type. The winding is accommodated on two formers, 1/4 in. in diameter and 2 in. high, mounted side by side. There are four slots on each former, and the windings are connected up in the usual fashion.

The moulding is a light mottled green, while green-enamelled wire is used, giving a distinctive colour scheme.

The inductance was measured to be 160,000 microhenries, with a D.C. resistance of 825 ohms. The relative impedance of the choke compared with a .0001-microfarad by-pass condenser was then determined and the performance factor was found to be well over 95 per cent. over the whole scale.

There was a complete absence of subsidiary resonances and the choke remained effective up to well over 2,000 metres. It may be used with confidence under the most severe conditions.

UNIVOLT RADIOGRAM UNIT

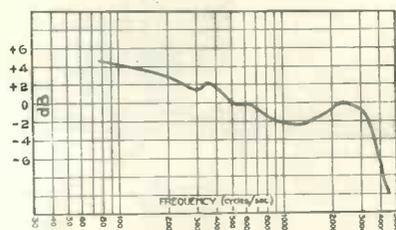
APPARATUS: Radiogram Unit.
 PRICE: Standard Model, £5 15s. 6d.
 Universal Model, £6 10s. 6d.
 MAKER: Univolt Electric, Ltd.

THE Univolt radiogram attachment provides a happy solution to the problem of converting your receiver to a radiogram with the minimum of trouble.

It consists of a shallow moulding carrying an electric motor of the induction type, while on a raised platform at one side is a pick-up mounting, volume control, and automatic start-and-stop mechanism.

There is also a small tumbler switch mounted on the casing and a speed control covering a range of about 70 to 90 r.p.m.

The pick-up is carried on a bronze-finished tonearm and is offset to give correct tracking; actually the tracking error is +10 degrees and -0 degrees. We suggest that this might be modified with advantage. The head swivels for convenience in inserting needles.



PICK-UP RESPONSE CURVE
 A curve showing the response of the Univolt pick-up at various frequencies

The response of the pick-up is good, although it was slightly lacking in top as compared with our standard. Sensitivity was high and the unit had a rising bass response, as can be seen.

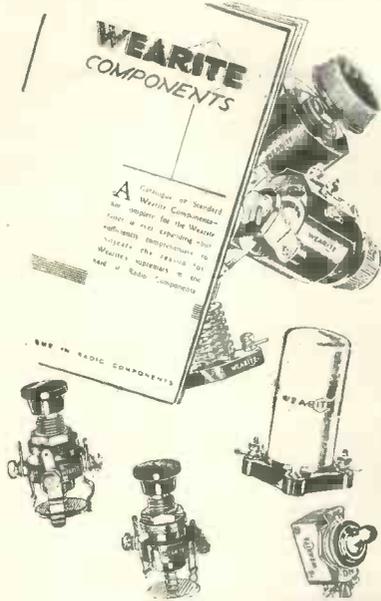
The whole assembly is neat and compact—the height is only 2 in. (Continued on page 674)



RADIOGRAM ASSEMBLY WITH MOTOR AND PICK-UP
 The Univolt assembly consists of an induction motor, turntable, and pick-up. Added to any set provided with pick-up terminals, it forms a complete radio gramophone

WRITE TO-DAY FOR YOUR

NOW — "SQUARE PEAK"



COPY OF
THE NEW
WEARITE
BOOKLET

Before you build any Wireless Magazine Set, or any other set, send for this book, No. M11, and have it by you. It contains a wealth of information on really up-to-the-minute components. Coils, resistances, chokes, mains transformers, volume controls—indeed, every need of the constructor is covered. Get your copy now—and use the components made by the specialist—WEARITE.

Send our "Switch Section Dept." your technical query—they will help you in any difficulty.

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COMPONENTS

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ALWAYS—
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WEARITE
TUBE,
PRICE ... 3/6



1474

**STENIBAC
CABINET**

SPECIFIED FOR THE "WIRELESS MAGAZINE" "CALIBRATOR"

Model No. 19. A Radio-Gramophone Cabinet, 3 ft. 3 in. high, 2 ft. 2 in. wide, 1 ft. 4 in. deep, will take a baseboard 24 in. by 15 in., or smaller. The Top Panel above the Fret we will cut to your specification. Should you be using an ebonite panel, a paper pattern must be forwarded. Will accommodate any type of Gramophone Motor.

PRICES:
OAK £4.10.0
MAHOGANY £4.15.0
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Model No. 19

**YOUR OLD -
COMPONENTS**



are worth money. Sort out the spare radio parts you no longer require and advertise them in the "Miscellaneous Columns" of AMATEUR WIRELESS. You will be surprised how quickly they will be snapped up.

Your announcement will cost you 3d. a word. Send your list of parts, together with your name, address and remittance, to:

"Small Advertisement" Dept.,

AMATEUR WIRELESS 58-61 Fetter Lane, London, E.C.



SUPER-HETS

TABLE MODEL

Sockets for Pick-up. Provision for using an external speaker. Concealed handle for easy carrying.

List No. AP38. Undistorted output, 1,600 Milliwatts. Price 26 guineas (25 cycle Model, 1 guinea extra). Available on H.P. terms.

Overall dimensions: 16 1/2" high x 12" deep x 13" wide.

CONSOLE MODEL

Sockets for Pick-up. Provision for using an external speaker. No external controls on front or sides. Moving-coil speaker of extra powerful type.

List No. AP44. Undistorted output, 2,250 Milliwatts. Price, 35 guineas (25 cycle Model, 1 guinea extra). Available on H.P. terms.

Overall dimensions, 35" high x 15" deep x 20" wide.

Both Models are for A.C. Mains only. 100/120 or 200/250 v. 40/100 cycles.

Another triumph for "Square Peak" . . .

Station after station clearly heard, tuned by a single knob. All the bass and all the treble—a tone-quality that keeps faith with the original.

Separate illuminated scales for long and short waves, changing automatically. British Moving-coil Speakers to handle the powerful signals. Walnut cabinets, striking in design and craftsmanship.

Solve your selectivity problems with a Super-het—but see it's "Square Peak" and get *tone* as well.

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Advert. of Oliver Pell Control Ltd., 108 Kingsway, London, W.C.2. Phone: Holborn 5803.

Better service results from mentioning "Wireless Magazine" when writing to advertisers

TESTS OF NEW APPARATUS—Cont. from page 672



CLARION PICK-UP

APPARATUS: Gramophone pick-up.
PRICE: £1 1s.
MAKER: British Clarion Co., Ltd.

THE Clarion pick-up which has been put on the market is a worthy addition to this firm's range. It is supplied complete with a moulded-bakelite tonearm of pleasing appearance curved to give accurate tracking. Actually, we found that when properly set up the tracking error was less than 2 degrees.

Conventional Construction

The pick-up itself is of conventional construction, a moving reed running through the centre of the coil. Rubber damping of a fairly stiff character is provided.

On test the results were well balanced and the upper frequencies strongly in evidence. The bass was not so marked as on our standard pick-up, but was still well reproduced down to 150 cycles. The general reproduction was good and the output was of the order of .5 to 1 volt.

R. & A. BANTAM LOUD-SPEAKER

APPARATUS: Permanent-magnet moving-coil loud-speaker.
TYPE: Bantam.
PRICE: £1 7s. 6d.
MAKER: Reproducers and Amplifiers, Ltd.

THE R. & A. Bantam loud-speaker is a really good lightweight model. It is of the moving-coil type, the magnetic field being provided by a small permanent magnet which must contain a high percentage of cobalt, since the sensitivity is quite up to standard.

Output Transformer

A light pressed-steel frame holds the diaphragm, which is centred with a three-leg spider. An output transformer having three ratios is carried on the framework. The diaphragm is 7½ in. in diameter overall, while the depth of the loud-speaker is 3 in.

The test results showed a level response with a slight bass resonance

at 128 cycles. Frequencies up to 5,000 cycles were quite well reproduced. It handled inputs up to 1 watt quite satisfactorily, but was inclined to dither

beyond this point. This cannot be considered a defect since one cannot expect public-address results from a lightweight speaker. Altogether we were very pleased with the results.

The impedances at 512 cycles, measured at the input to the trans-



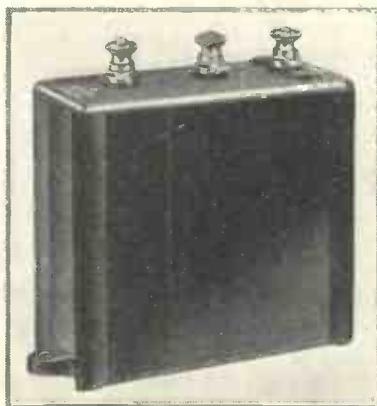
R. and A. BANTAM
For a lightweight model the R. and A. Bantam gives excellent results

former, were 1,400, 2,200, and 6,200 ohms, on the 19, 33, and 52 to 1 ratios respectively.

WEARITE WHISTLE FILTER

APPARATUS: Whistle filter.
PRICE: 10s. 6d.
MAKER: Wright & Weaire, Ltd.

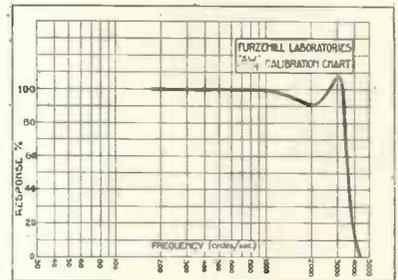
THE use of some form of whistle filter is becoming very popular. It enables one to cut out the whistles



HETERODYNE WHISTLE FILTER
The Wearite heterodyne whistle filter is connected between the output terminals of the set and the loud-speaker

and mush which often accompany reception, even from local stations. These interfering currents are caused by circumstances beyond the normal control of the listener and they must either be tolerated or removed by using a cut-off filter.

True, such a filter removes some of the upper frequencies in the re-



RESPONSE CURVE
Curve of the Wearite whistle filter, showing the distinct cut-off at about 3,500 cycles

production, but this can be afforded to a much greater extent than is popularly supposed. The secret is to have a filter which cuts off really sharply.

Two Models

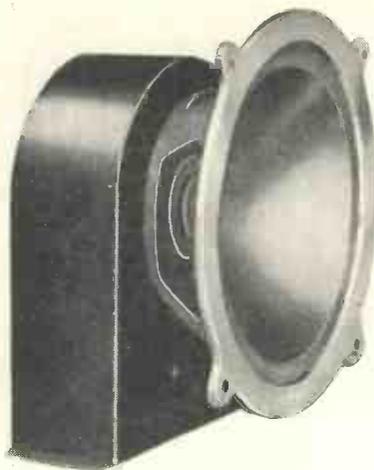
The Wearite filter which we have just tested is an excellent example. Two types are made, one cutting off at 3,500 and the other at 5,000 cycles. The curve of the 3,500-cycle filter is reproduced here and it will be seen that all frequencies below the cut-off point are reproduced practically unaltered, but that there is a very sharp cut-off afterwards.

The filter is designed for connecting in the loud-speaker circuit. A few simple connections only are necessary and the instrument may be used with any existing loud-speaker. This gadget should interest listeners.

Write for Illustrated Catalogue of Radio Gramophone CABINETS of exclusive modern design, made by craftsmen, in highly figured Oak, Walnut, or Mahogany, post free. Remarkable Values Cabinets made to order a speciality Maker, under licence of the

Howe Box Baffle Recommended by the B.B.C. Full details on request. GILBERT CABINET MAKER, SWINDON Estimates Free. Estd. 1865





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PRICE:

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including transformer

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by the "Wireless Magazine" for their new Receiver

BAKER'S "STANDARD" PERMANENT
MAGNET MOVING-COIL SPEAKER

The fact that the "Wireless Magazine" has *once more* selected a Baker Speaker is convincing proof of its outstanding superiority. Baker Speakers are still unsurpassed for sheer brilliance and high quality of reproduction.

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Send for fully descriptive leaflet.

FULLY GUARANTEED 2 YEARS

Standard Unit Universal Model
For A.C. Mains as described above. For A.C. and D.C. Mains complete with pick-up and start-and-stop equipment. Cash Price £5-15-6, or 11 monthly payments of 12/-.
Send Direct to

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51/52, Fenchurch Street, London, E.C.3. Royal 4014.

GRIP

The "BOWSPRING" gives strong pressure over a far wider range of diameters than any plug we have so far tested.

Here are some tests with various well-known types of wander plugs. Starting from a small socket, each plug was pushed into progressively larger sockets until no contact was made, the force needed to remove the plug from each size of socket being measured in ounces.

In each case the "Bowspring" showed itself the better plug. Here is an example.

Socket diameter.	Grip of Bowspring.	Grip of typical split-pin Plug.
.127"	65 oz.	20 oz.
.133"	36 oz.	2 oz.
.134"	28 oz.	No contact.

The "Bowspring" continued to make contact until a socket just over .144" was reached.



Strong spring and wide self-adjustment. Side entry with Belling-Lee patent grip for flex. 12 indications and 6 plain colours.

BELLING-LEE
FOR EVERY RADIO CONNECTION

1 1/2^d

Advt. of Belling & Lee, Ltd. Cambridge Arterial Road, Enfield, Mdx.

THE TABLE QUAD

Further Notes for the Constructor

COMPONENTS NEEDED FOR THE TABLE QUAD

CHOKE, LOW-FREQUENCY

1—Varley Nichoke II, type DP23, 10s. 6d. (or Bulgin, Tunewell).

CHOKES, HIGH-FREQUENCY

1—Telsen binocular, type W74, 5s. (or R.I.)

1—Ready Radio Standard, 1s. 6d. (or Igranic).

COILS

1—Set of Formo coils, comprising: 1 pair of band-pass, types 62c and 63c, and 1 anode coil, type 61c, £1 2s. 6d.

CONDENSERS, FIXED

2—T.C.C. .0002-microfarad, type 34, 3s. (or Lissen, Telsen).

1—T.C.C. .0002-microfarad, SP type, 2s. 4d. (or Lissen, Telsen).

1—T.C.C. .0006-microfarad, type 34, 2s. 6d. (or Dubilier).

1—T.C.C. .01-microfarad, type 34, 3s. (or Dubilier).

1—T.C.C. 1-microfarad, type 50, 2s. 10d. (or Lissen, Telsen).

2—T.C.C. 2-microfarad, type 50, 7s. 8d. (or Lissen, Telsen).

CONDENSERS, VARIABLE

1—Polar .0005-microfarad three-gang, Star type with disc drive, £1 10s. 6d. (or J.B., Utility).

1—Telsen .0003-microfarad, type W188, 2s. (or Ready Radio, Polar).

HOLDERS, VALVE

4—W.B. four-pin, miniature type, 2s. (or Lotus, Benjamin).

PLUGS AND TERMINALS

7—Belling-Lee wander plugs, marked: H.T.—2, H.T.—1, H.T.—5, G.B.—1, G.B.—2, G.B.—3, 1s. 2d. (or Clix, Ealex).

2—Belling-Lee spade terminals, marked: L.T.—, L.T.—, 4d. (or Clix, Ealex).

4—Belling-Lee terminals, marked: Aerial, Earth, L.S. (2), 1s. (or Clix, Ealex).

RESISTANCES, FIXED

1—Graham Farish 20,000-ohm Ohmite, 1s. 6d. (or Claude Lyons, Eerie).

1—Graham Farish 40,000-ohm Ohmite, 1s. 6d. (or Claude Lyons, Eerie).

1—Graham Farish 50,000-ohm Ohmite, 1s. 6d. (or Claude Lyons, Eerie).

1—Graham Farish .5-megohm Ohmite, 1s. 6d. (or Claude Lyons, Eerie).

1—Telsen 2-megohm grid leak, 1s. (or Dubilier).

RESISTANCES, VARIABLE

1—Varley 50,000-ohm potentiometer, type CP 159, 6s. (or Lewcos, Colvern).

SUNDRIES

Tinned-copper wire for connecting (Lewcos).

Lengths of oiled-cotton sleeving (Lewcos).

Length of rubber-covered flex (Lewcos).

2—Sovereign terminal blocks, 1s. (or Lissen, Belling-Lee).

SWITCH

1—Bulgin three-point, type S39, 1s. (or W.B., Telsen).

TRANSFORMER, LOW-FREQUENCY

1—Slektun, ratio 1 to 5, 8s. 6d. (or Ferranti AF8, Lissen Hypernik).

ACCESSORIES

BATTERIES

1—Lissen 120-volt high-tension, type LN539, 11s. (or Siemens, Pertrix).

1—Lissen 9-volt grid-bias, 1s. (or Siemens, Pertrix).

1—Smith 2-volt accumulator, type 2-RGC-9, 12s. 6d. (or Siemens, Pertrix).

CABINET

1—Cameo Empire in walnut or mahogany, £1 15s.

EARTH

1—Filt earth connector, 2s. 6d.

LOUD-SPEAKER

1—Motor Minor permanent-magnet moving-coil, £1 19s. 6d.

VALVES

1—Cossor 220VSG metallised, 16s. 6d. (or Mullard PM12V).

1—Mazda H1210 metallised, 7s. (or Six Sixty 210HL, Cossor 210HL).

1—Mazda L210, 7s. (or Six Sixty 210LF, Cossor 210LF).

1—Mazda P220, 8s. 9d. (or Six Sixty 220P, Cossor 220P).

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

particularly efficient and they gang up without difficulty with a standard three-gang condenser.

It follows that there is only one tuning control for the set, which on test gave remarkably good results.

Readers may be reminded that full-size blueprints of the 'Table Quad' are still available, but not under the special half-price scheme. The price of the blueprints is now 1s. 6d. each, post free. Applications should be sent to "Wireless Magazine" Blueprint Department, 58-61 Fetter Lane, London, E.C., and the reference No. WM303 should be quoted.

Standard Components

Prospective constructors of the set will see from the list of parts reproduced on this page that most of the components used are standard lines; they can, therefore, be obtained from local radio dealers without difficulty.

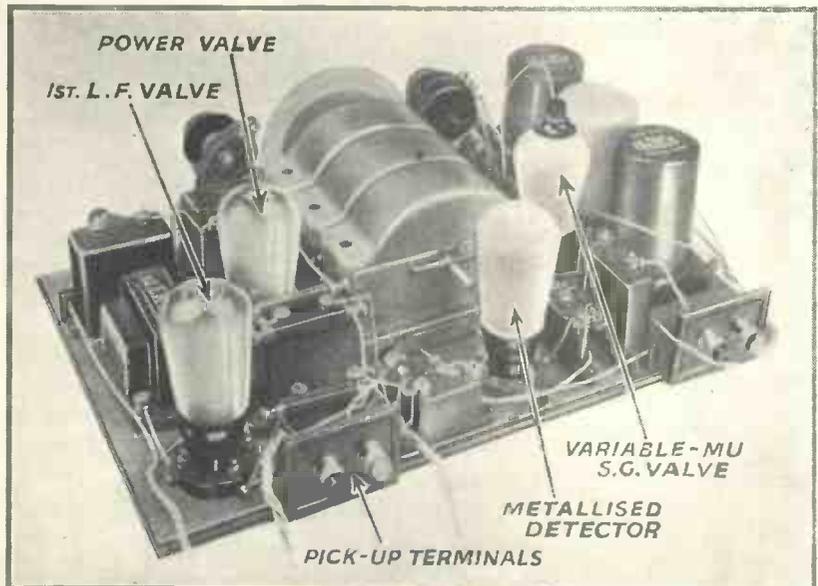
One point of interest about the Table Quad is that it goes down to comparatively short wavelengths in the medium waveband, which is more than many coils will. Listeners in the Newcastle and Aberdeen areas will therefore have no trouble about picking up their local stations.

ONE of the most popular four-valvers for battery operation that has been described in these pages is the Table Quad, of which full constructional details were given in the November issue of "Wireless Magazine."

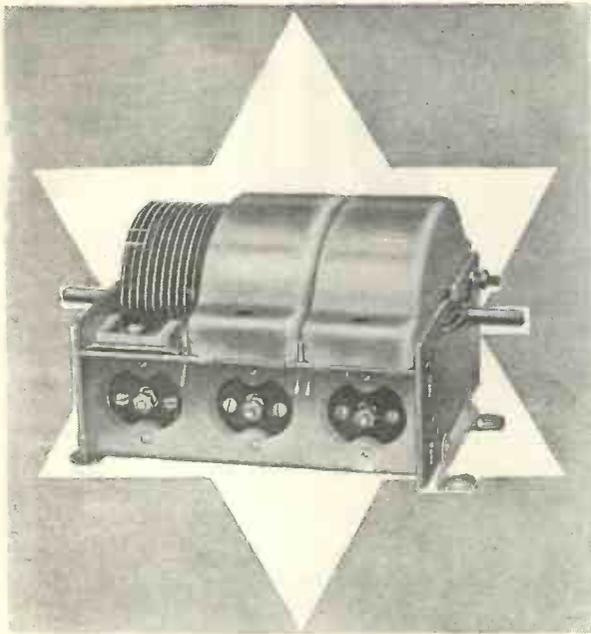
The valve sequence utilised in this set is a screen-grid high-frequency amplifier (of the variable-mu type), a leaky-grid detector, low-frequency amplifying stage, and a power valve. This combination has always been efficient and the Table Quad is no exception.

"Colour-Code" Coils

Of course, the efficiency of any set depends a great deal on the tuning gear associated with it. In the Table Quad the "Wireless Magazine" Technical Staff made use of the new "colour-code" coils produced by Formo. These have been found to be



AN UP-TO-DATE FOUR-VALVER TO BE PROUD OF!
This photograph of the Table Quad shows how well it has been designed. Not only is the appearance attractive but the performance is all that can be desired



POLAR

CONDENSERS



The exacting demands of selectivity make it essential that a very high degree of accuracy must be obtained. It is obtained with Polar "Star" Gang Condensers, and furthermore is maintained at all times and under all conditions.

We particularly call your attention to the outstanding features given below. Search where you may, it is impossible to meet better condenser design and construction.

OUTSTANDING FEATURES:

TRIMMERS. These are conveniently operated from the top and cannot go out of adjustment.

VANES. Accurate spacing of vanes is obtained by precision machine assembly, thereby entirely eliminating possibility of error.

MATCHING. This is accurate to within $\frac{1}{2}$ of 1 per cent. plus or minus 1 mfd.

FRAME. All-steel frame and rigid construction ensure that this accuracy will never vary.

BEARINGS. Strong spring journal bearings give absolute freedom from shake or end play

Write for Complete Polar Catalogue W.M. Correspondence in all languages.



WINGROVE & ROGERS, LTD.
188-189 STRAND, LONDON, W.C.2

Polar Works: Old Swan, Liverpool.

Specified
for the
"TABLE QUAD"
STAR 3-GANG
25/6

Other Models:

4 x .0005 ... 34/-

Super-het. type

(Comprising two sections .0005

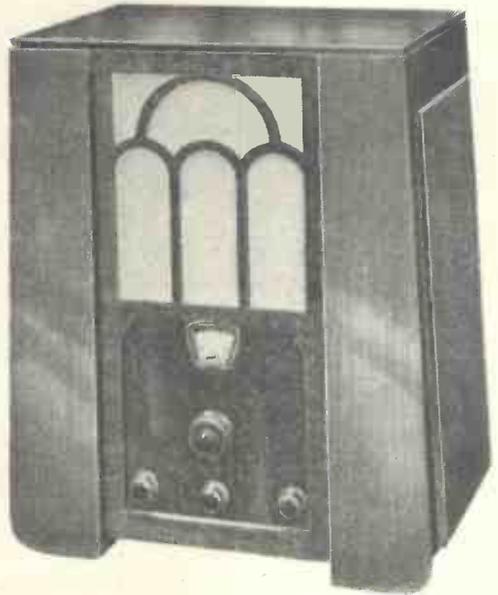
and one tracking section.) 27/6

(All prices include covers)

Disc Drive ... 5/-

Drum Drive ... 7/6

RANGE, VOLUME AND QUALITY



THE BRITISH MADRIGAL

TRANSPORTABLE
ALL ELECTRIC RECEIVER

"Madrigal" is no newcomer—it is the acknowledged best Radio Receiver for musical quality—musicians confirm this.

This year, as in all R. I. sets since 1922, it embodies the most progressive principles of radio and electrical design. Its amazing superiority of performance and exceptional qualities, hitherto only possible to those who could afford such refinement, are now within reach of all. It is important to remember that "Madrigal," despite its low price, is not a mass production job. It is built by craftsmen and tested by technicians in co-operation with musicians to maintain its reputation as the best radio receiver money can buy. Ask your dealer.

"MADRIGAL" FEATURES:

1. Gives widest selection of stations home and abroad with or without aerial—a boon to flat dwellers
2. Amazing fidelity of musical and aural tone at full speaker strength.
3. Easy one knob tuning. Illuminated dial marked in wavelengths.
4. Can be used in any room—just plug in to the electric light or power socket—that's all.
5. Connections for gramophone pick up.
6. Latest nickel chrome moving-coil speaker.
7. HANDSOME MODERN POLISHED WALNUT CABINET.

PRICE INCLUDING VALVES AND ROYALTIES
Or 50/- down and 12 payments of 28/9.

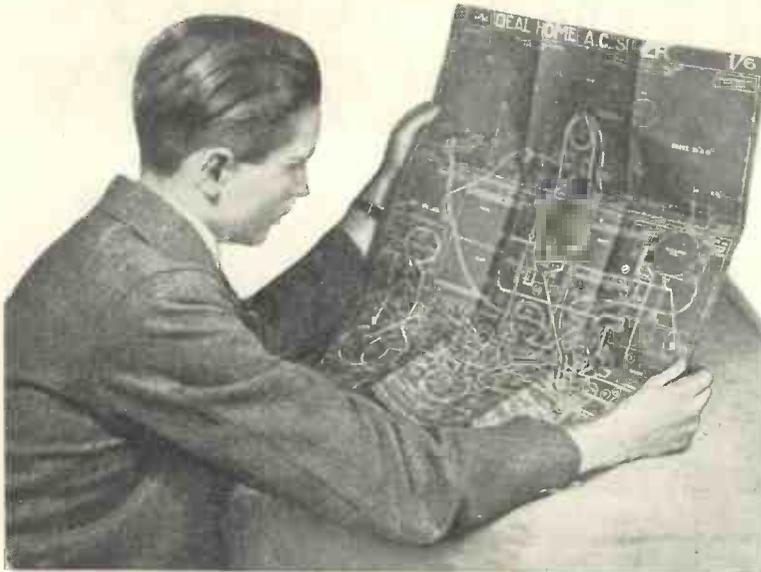
17 G N S.



SUPERIOR RADIO

Radio Instruments Ltd., Croydon, Surrey.

Advertisers take more interest when you mention "Wireless Magazine"



BUILD

Do you realise that, except for a small number in a range of more than 600; all "W.M." and "A.W." blueprints are full-scale drawings? They are not small-scale drawings which, as you know, are useless as patterns and templates.

Do you appreciate the fact that they save much time and trouble in construction, as they can be used as panel and baseboard templates for marking the centres for drilling holes and laying out components?

CRYSTAL SET

6d. post free

1931 Crystal Set AW308

ONE-VALVE SETS

1s. each, post free

Short-wave One-valver (6d.) AW327
 Easy-to-Build One AW304
 "B.B.C." One AW344
 Portable Short-wave One AW354

TWO-VALVE SETS

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
 Two for Seven Metres (D, Trans) .. WM295
 New Style Radiogram (D, Trans) .. WM299
 Big-volume Two (D, Pen) .. AW309
 Two Star 2 (D, Pen) .. AW315
 25/- Two (D, Trans) .. AW330
 Ten Station Two (D, Trans) .. AW336
 Hiker's Two (D, Trans) .. AW345
 Inexpensive A.C. Two (D, Trans) .. AW346
 Midget Two (D, Trans) .. AW348
 Mascot Two (D, Trans) .. AW357
 Ideal Regional Two (D, Trans) .. AW357
 Quality 30/- Two (D, Trans) .. AW361

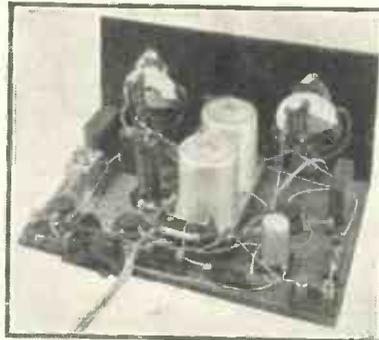
THREE-VALVE SETS

All these 1s. each, post free

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

Each blueprint shows the position of all components and every wire, and makes construction a simple matter. Copies of "Wireless Magazine" and of "Amateur Wireless" containing descriptions of most of these sets can be obtained at 1s. 3d. and 4d., respectively, post free. Index letters "A.W." refer to "Amateur Wireless" sets and "W.M." to "Wireless Magazine" sets.

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
 Prosperity Three for Batteries (SG, D, Pen) .. WM296
 Prosperity Three for A.C. Mains (SG, D, Pen) .. WM297
 Prosperity Three for D.C. Mains (SG, D, Pen) .. WM298
 ★1933 Economy S.G. Three (SG, D Trans) .. WM306
 Square-Peak Three (SG, D, Trans) .. AW293



A NOTABLE THREE

The Wizard (A.W. 360) has been tested in all parts of the country and gives splendid results

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 Olympian Three (SG, D, Trans) .. AW306
 Tonality Three (D, RC, Trans) .. AW321
 35/- Three-valver (D, 2RC) .. AW323
 Baby Three (D, RC, Trans) .. AW324
 World Wide Short-wave Three (D, RC, Trans) .. AW332
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 Home Lover's Battery Three (SG, D, Pen) .. AW341
 New Regional Three (D, RC, Trans) .. AW349
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 Wizard (SG, D, Trans) .. AW360

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All these 1s. 6d. each, post free

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 Ideal A.C. Home Super (Super-het) .. WM290
 Gold Coaster (AC Short-wave) .. WM292
 Triple-tune Four (2SG, D, Trans) .. WM293
 Calibrator (SG, D, RC, Trans) .. WM300
 Table Quad (SG, D, RC, Trans) .. WM303
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Stability Four (HF, D, RC, Trans) .. AW182
 4/3s. Four (SG, D, RC, Trans) .. AW303
 4/3s. Four (Improved Model) .. AW303A
 Four-star Four (SG, D, RC, Trans) .. AW318
 The 50/- Four (SG, D, RC, Trans) .. AW331
 Up-to-the-Minute Four (2SG, D, Trans) .. AW356
 Your Home Radiogram (SG, D, RC, Trans) .. AW358

FIVE-VALVE SETS

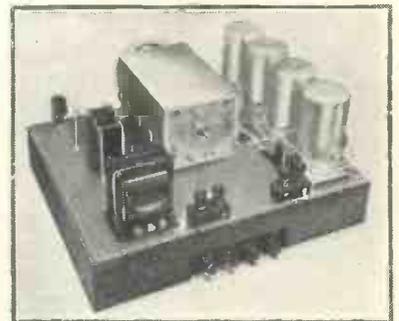
All these 1s. 6d. each, post free

Regional D.C.5 (SG, D, LF, Push-pull) WM252
 Ideal Home Super (Super-het) .. WM280
 Easytune 60 (Super-het) .. WM284
 Easytune 60 on a Frame Aerial (super-het) .. WM301
 "W.M." Short-wave Super (super-het) WM302
 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

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Super 60 (Super-het) .. WM229
 A.C. Super 60 (Super-het Radiogram) .. WM239
 A.C. Super 60 (Super-het Table Model) WM245



A FINE A.C. SET

The A.C. Quadradyne (W.M. 279), which was recently described in "W.M.," incorporates all modern refinements in A.C. receiver design

Send, preferably, a postal order (stamps over sixpence in value unacceptable) to—

from a BLUEPRINT!

Further than this, do you know that all the connecting wires are numbered separately, so that they can be assembled easily and automatically?

Remember also that a blueprint of any set constructionally described in "Wireless Magazine" can be obtained for half price during the currency of the issue by using the coupon to be found on the last page.

"Wireless Magazine" and "Amateur Wireless" are the only papers that can supply full-size blueprints of every set described.

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
Dual-speaker Amplifier (A.C.)	..	WM304
A.C. Push-pull Amplifier	..	AW291
Add-on H.F. Screened-grid Unit	..	AW296
Universal Push-pull Amplifier	..	AW309
"A.W." Record Player (LF, Push-pull)	..	AW310

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/-
Simple Gramophone Amplifier	..	AW257	1/-
Novel Linen Diaphragm Speaker	..	AW260	1/-
H.T. Unit for A.C. Mains	..	AW262	1/-
Gramophone Tone Control	..	AW264	1/-
H.T. Unit and Trickle Charger for D.C. Mains	..	AW272	1/-
2-Watt A.C. Amplifier	..	AW283	1/-
"A.W." Selectivity Unit	..	AW290	6d.
B.B.C. Official Selectivity Unit	..	AW294	6d.
A.C. Trickle Charger	..	AW305	1/-
Amateur's Linen Speaker	..	AW307	1/-
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/-
"A.W." Trickle Charger	..	AW352	1/-
Add-on Band-pass Unit	..	AW359	1/-

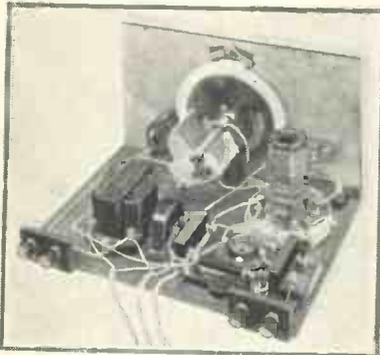


A TWO-VALVE RADIOGRAM
The New Style Radiogram described in the October issue of "W.M." is cheap to build and gives fine results

MISCELLANEOUS

"W.M." Standard A.C. Unit	..	WM214	1/-
"W.M." Standard D.C. Unit	..	WM215	1/-
Super 60 A.C. Unit (for Battery Super 60)	..	WM248	1/-
Simple Neon Oscillator	..	WM251	1/-

A blueprint of any one set described in the current issue of "Wireless Magazine" can be obtained for half price up to the date indicated on the coupon (which is to be found on the last page) if this is sent when application is made. These blueprints are marked with an asterisk (*) in this list and are printed in bold type. An extension of time is made in the case of overseas readers.



A QUALITY TWO-VALVER
The 30/- Quality Two (No. A.W. 361) is easy and cheap to build. It gives splendid results

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
New Century Super (super-het) with copy of A.W. 4d. post free	..	AW362

SEVEN-VALVE SETS

1s. 6d., post free

Super Senior (Super-het)	..	WM256
*Seventy-seven Super (A.C. Super-het)	..	WM305

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
General-purpose Portable (SGD, RC, Trans)	..	AW351	1/6

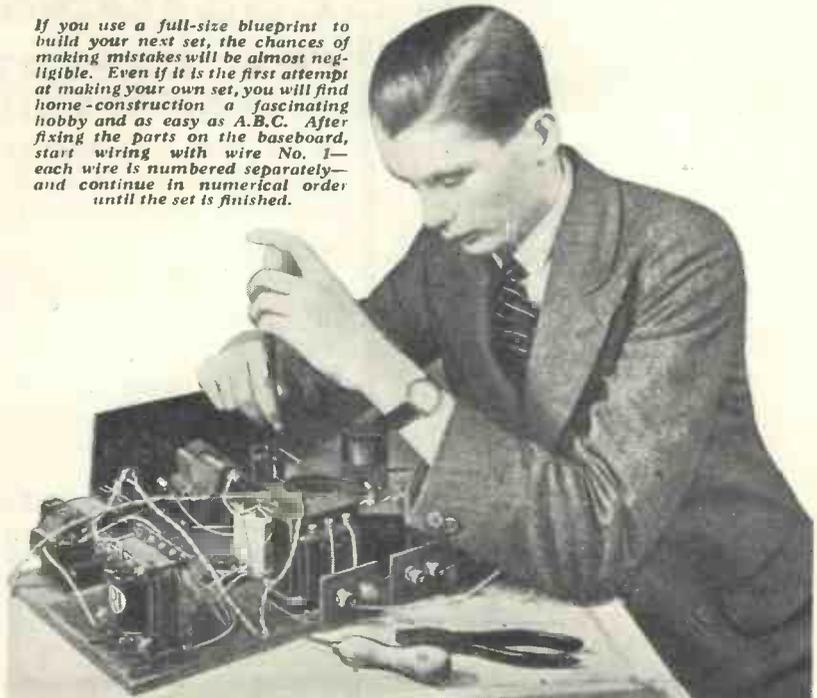
AMPLIFIERS

All these 1s. each, post free

Radio-record Amplifier (DC Mains)	..	WM183
Selecto Amplifier (HF Unit)	..	WM210
D.C. Fader	..	WM241

WIRELESS MAGAZINE
Blueprint Dept.,
58/61 Fetter Lane,
LONDON, E.C.4.

If you use a full-size blueprint to build your next set, the chances of making mistakes will be almost negligible. Even if it is the first attempt at making your own set, you will find home-construction a fascinating hobby and as easy as A.B.C. After fixing the parts on the baseboard, start wiring with wire No. 1—each wire is numbered separately—and continue in numerical order until the set is finished.



BLUEPRINT COUPON

Valid only until December 31, 1932 (or until January 31, 1933 for overseas readers)

FOR ONE BLUEPRINT ONLY

If you want a full-size blueprint of any ONE of the sets constructionally described in this issue for half price, cut out the above coupon and send it, together with a postal order, to Blueprint Department, WIRELESS MAGAZINE, 58-61 Fetter Lane, London, E.C.4.

This coupon is valid for a blueprint of any ONE only of the following sets at the prices indicated:—

SEVENTY-SEVEN SUPER (page 620), No. WM305, price 9d., post free.

1933 **ECONOMY S.G. THREE** (page 664), No. WM306, price 6d., post free.

INFORMATION COUPON

Valid only until December 31, 1932 (or until January 31, 1933, for overseas readers)

If you want to ask any questions, cut out the above coupon and send it, together with a postal order for 1s. and stamped-addressed envelope, to the Information Bureau, WIRELESS MAGAZINE, 58-61 Fetter Lane, London, E.C.4.

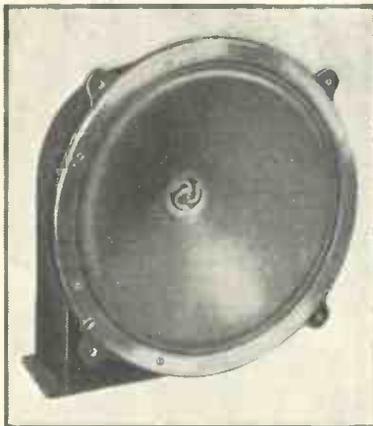
Note that not more than two questions may be asked at a time and that queries should be written on one side of the paper only.

Under no circumstances can questions be answered personally or by telephone. All inquiries must be made by letter so that every reader gets exactly the same treatment.

Alterations to blueprints or special designs cannot be undertaken; nor can readers' sets or components be tested.

If you want advice on buying a set, a stamped-addressed envelope only (without coupon or fee) should be sent to the Set Selection Bureau, WIRELESS MAGAZINE, 58-61 Fetter Lane, London, E.C.4.

For the Latest in Super-hets



For the Seventy-Seven Super it was decided to utilise the Baker standard model permanent-magnet moving-coil reproducer, of which a photograph appears above. This loud-speaker is provided with an output transformer.

RADIO SUPPLIES

Send your list of Radio needs for our quotation. Kits, Parts, Sets, etc. Everything in Radio stocked. Prompt delivery; seven days' approval. Catalogue free. Taylex and Standard Wet H.T. replacements stocked. B. TAYLOR, 57 Studley Road, STOCKWELL, LONDON

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FOR EXPERT WORKMANSHIP

Have your "Wireless Magazine" set built, repaired or overhauled by experts.

You will be amazed at the wonderful improvements in performance.

No matter what your requirement, send us details and ask for free quotation.

SCOTT SESSIONS & CO.

RADIO ENGINEERS
MUSWELL HILL
LONDON, N.10

Telephone No. Tudor 5326

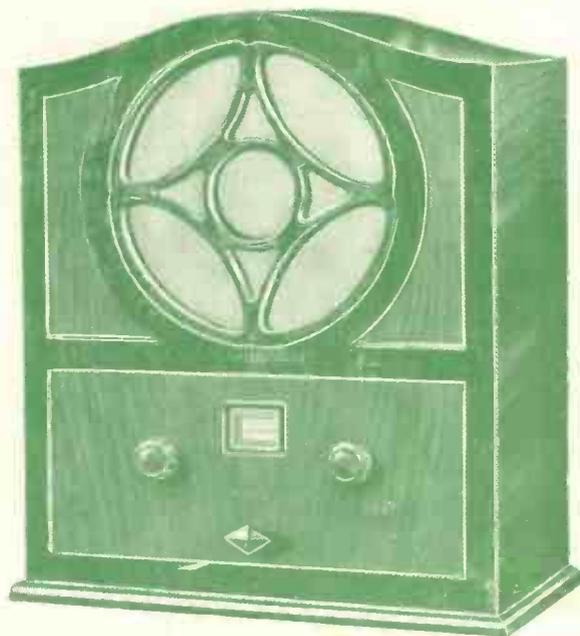
Contractors to H.M. Office of Works, etc.

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You need a Modern Set to enjoy Modern Programmes

BLUE SPOT Battery Operated FOUR



The Most Modern of All

THE modern Blue Spot is the complete answer to the listeners' question — "What's the use of getting stations by the dozen if you can only hear a few of them really well enough to enjoy the full programmes?"

The modern Blue Spot Receivers not only pick out the best programmes in Europe, they also shut off each one from all possibility of interference and consistently maintain a clarity of reproduction as good as that of your local station.

Such is the standard of performance offered exclusively by Blue Spot. It opens up a new world of pleasure to listeners. It gives a new meaning and point to foreign listening. For the first time the stations of Europe "received" are raised from the level of "that's Madrid, here's Rome" to the level of really entertaining programmes which can be enjoyed to the full because they can be heard to perfection. It is truly said: "Buy a modern Blue Spot and you will get the full value of the programmes."

K252—Table Model in walnut, as illustrated, 12 gns.

R336P—Pedestal Model in walnut with Pentode Valve and Output Filter, £17. 8s. 6d.

Send for Catalogue W.M.23.R. giving full particulars of Blue Spot battery-operated Four-Valve Receivers and also the famous All-Mains Five-Valve Receivers.



STUDY THESE SPECIAL FEATURES

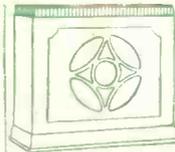
1. Four latest type valves — 2 Variable - MU Screened Grid, Non - Microphonic Detector, Power or Pentode Output.
2. Astonishing Selectivity.
3. Simplicity of operation—single knob tuning.
4. On-off, medium and long wave, and pick-up control on one switch.
5. Stations calibrated in wavelengths—important ones named.
6. Blue Spot Speakers.
7. Notable saving in A.T. battery consumption.
8. Walnut Cabinets.

—AND DON'T FORGET THESE SPEAKERS

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This very beautiful oak speaker has the famous 100U movement which experts are agreed is the equal of all but the very highest quality moving coils. It can be used with battery or all-mains sets, and even when Pentode Valves are employed no matching transformer is needed.

Price 52/6
100U—the unit mounted to chassis, as used in 100D—costs only 32/6.



32.PM

The dignity and beauty of this cabinet is such that it attracts favourable attention at once. The movement is the remarkable Blue Spot 99 P.M. No other moving coil speaker can compare with it for freshness and fidelity of reproduction. It is the wonder of the industry.

Price £7 6
99 P.M. chassis only. Price 59/6.

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**"Take it
from me"**

says **CHRISTOPHER
STONE** •



I have been an obstinate critic of radio and electrical reproduction up till now, but Olympia this year was an eye-opener to me when I was giving recitals on the new Columbia Radiograms.

Take my word for it the Columbia models are the last word—and the first choice.



Columbia

TEN-POINT RADIO
and
RADIO-GRAPHOPHONES



MODEL 620. "Radiograph Four." Simplified tuning with scale calibrated in wavelengths. Field-excited moving coil speaker. COLUMBIA CRADLE CHASSIS. Walnut Cabinet. Marconi Valves Standard
32 gns.

2 interesting
FREE Booklets

★ Please send me a free Magazine Catalogue of the 15 Columbia Models (£47.6 to 90 Gns.)
→ Please send me free a copy of Christopher Stone's book.
→ Cross out if not required.

NAME
ADDRESS

W.M. DEC. 1932
Cut this out and post it in unsealed envelope bearing 1d. stamp to Columbia, 98 108 Clerkenwell Road, London, E.C.1.