128 PAGES, WITH COMPLETE LOUD-SPEAKER GUIDE

Wireless Magazine

No. 59. DECEMBER 1929. 1/-

A CHAT WITH CLAPHAM AND DWYER

SPECIAL TESTS OF SETS & BUYERS' GUIDE

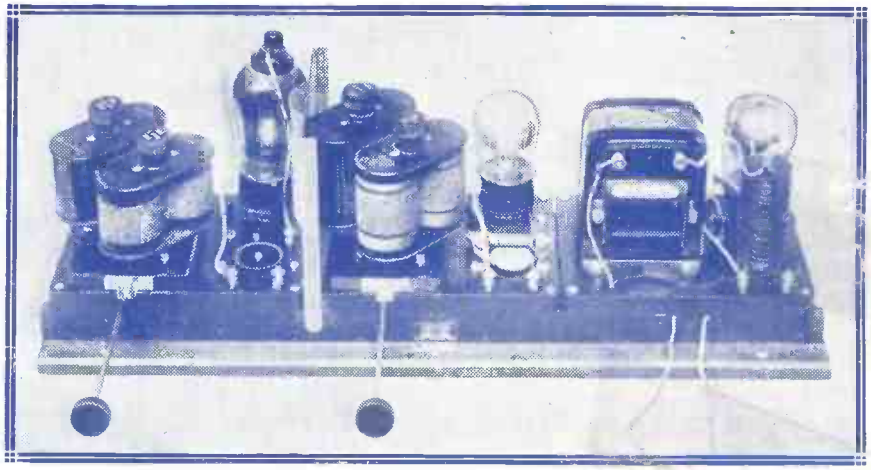
MAKING AN IMPROVED LINEN LOUD-SPEAKER

SNAPPY RECORD REVIEWS

And These Sets :—

The 1930 Five, Concentrator H.F. Unit, New Q Three *and* Brookman's Push-pull Three

A complete receiver assembled in fifteen minutes *with the—*



This latest Lewcos production is almost a complete 3-valve set, and makes radio receiver assembly a simple job with the certainty of first-class results

LEWCOS 3 VALVE KIT

as illustrated (without Valves)

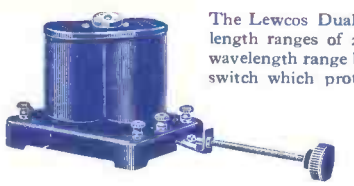
The chassis consists of three units, namely, H.F., detector, and L.F., the components for each being mounted and wired. The usual terminals for batteries, L.S., etc., are provided on the back edge, while in addition, a number of terminals are mounted on the front edge of the chassis, so that connections can be taken very easily to condensers when mounted on panel.

The circuit comprises screened-grid H.F., detector, and L.F., with option of power valve or pentode, as desired. The coils consist of the well-known Lewcos Binocular Type, and are for both wave-bands mounted side by side on a dual six-pin base, which is operated by a control knob from the panel.

There are several novel features incorporated on the chassis which permits the use of screened-grid and pentode valves of the usual type, or alternatively the recently developed A.C. mains valves, with indirectly-heated filaments.

Price of the three-valve kit assembly—as described on page 489 of this issue—including coils, £7, but not valves.

LEWCOS DUAL BINOCULAR COIL



The Lewcos Dual Range Binocular Coils have wavelength ranges of 235-550m. and 1,000-2,000m.; the wavelength range being selected by a simple push-pull switch which protrudes through the receiver panel.

Price **17/6** each

Ganged Switching Mechanism Ref. SM5, **3/-**

Specified in the "1930 Five"

THE LONDON ELECTRIC WIRE COMPANY AND SMITHS LIMITED
Church Road Leyton London, E.10
Trade Counter: 7 Playhouse Yard, Golden Lane, London, E.C.1

Editor:
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Wireless Magazine

The Best Shillingsworth in Radio

Vol. X :: DECEMBER, 1929 :: No 59

Research Consultant:
W. JAMES

Assistant Editor:
D. SISSON RELPH

Beat It for A Bob!

WOULD you mind running your eye over the list of contents alongside this column? Do you know of any other radio magazine that gives such quality, such quantity, and such variety—or even attempts to do so?

Sets to build, sets to buy, loud-speakers to build and loud-speakers to buy; gramophone records listed and reviewed for your choice, and a miscellany of illustrated articles by Andrew Soutar, H. J. Barton-Chapple, J. H. Reyner W. James, and very many others!

I think my challenge could be crystallised into five monosyllables: "Beat it for a Bob!"

Our Set Buyers' Guide is filling a "long-felt want." Readers are basing their choice on the independent information we provide in this guide and in our unique test reports and, in addition, are writing to us for help.

We are regularly dealing with a large number of applications from readers who wish for guidance in the choice of a set. This month we have further test reports; the Set Buyers' Guide is revised up to date and there is a special article on the choice of mains sets.

Among the home-constructor sets, which we describe in complete detail and of which we provide full-size blueprints at half-price, are

The 1930 Five, a last-word set, which will revive memories of the famous set we produced just over three years ago—the 1927 Five, which was flattered by imitation everywhere; the Brookman's Push-pull Three, based upon W. James's great success, the Brookman's Three, in our October issue, and now adapted for gramo-radio; the new Q Three, in which its designer, J. H. Reyner, makes revolutionary use of a pentode as a detector, with advantages which he fully explains, and, finally, the Concentrator, an H.F. unit, adding range and volume and, what is of much more importance in these days, selectivity.

Our Loud-speaker Guide is our star feature this month. We are illustrating about seventy different models and providing quick-reference details of many more than that number, some of which, as you will see, we have had an opportunity of testing in our own laboratory.

This Loud-speaker Guide is still further evidence of our intention to keep readers acquainted with all new developments and to assist them in choosing the best possible apparatus.

May I very warmly thank readers who have written to compliment us on our new departure in giving lists and reviews of gramophone records? The feature has jumped into popularity, and this month we are listing more than 120 records (both sides) and reviewing a large proportion of them. Will you turn over our pages and see how time-saving, interesting, and reliable those reviews are?

There is scarcely room for further comments on this month's bill-of-fare, but you will notice that Andrew Soutar is discussing radio critics, J. Godchaux Abrahams is chatting with Clapham and Dwyer, and H. J. Barton-Chapple is revealing televisor secrets.

Do Not Overlook the Half-price Blueprint Coupon on Page iii of the Cover

Bernard E. Jones

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See the Special Notes on FULL-SIZE Blueprints on Page 469 of This Issue!

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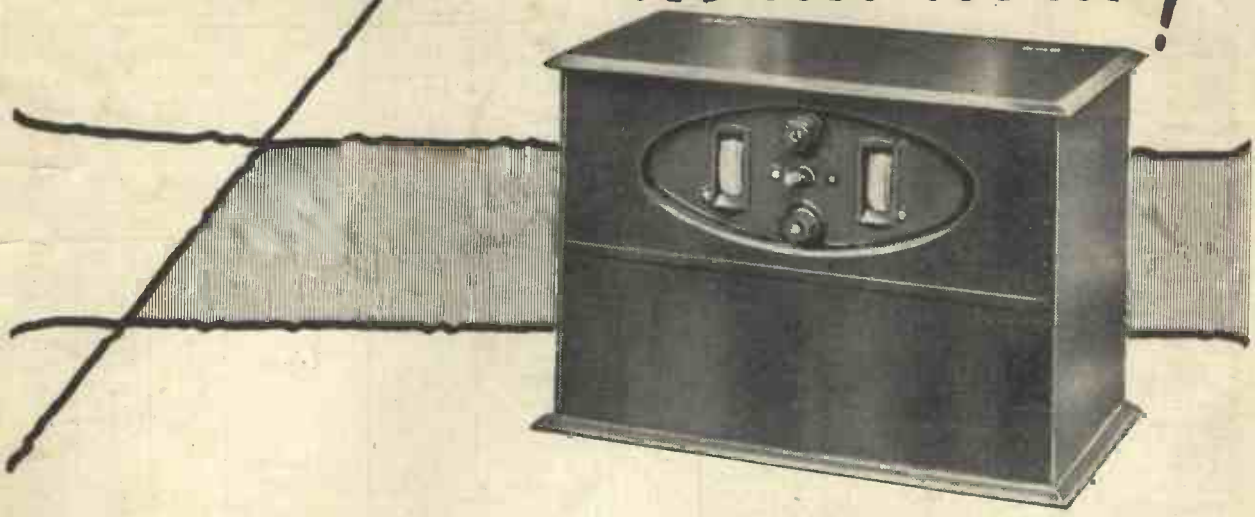
41 Radio Programmes in an hour!



An astonishing FACT!

YOU can get over 40 different stations on the wonderful Brown Receiver! That is not a vain boast; it is a statement of sober fact—backed by the reputation of the oldest loud speaker firm in the country.

It has been done many times, and on Tuesday, October 1st, 41 stations were obtained at full loud speaker strength in less than an hour—33 on the short and eight on the long wave band.

The reason for such amazing performance is the careful balance of the circuit and the use of the finest components that money can buy — a 30/- Brown Transformer, high precision Polar Variable Condensers. the world-famous T.C.C. Fixed Condensers and the highly efficient Brown Dual-wave Coils.

If you paid £100, you could not get a better 3-valve Set than the Brown Screened Grid Receiver. Good things always cost more than poor ones, but it is well worth the extra cost. Prove this for yourself at any Wireless Dealers'!

In 4 Models
for battery or electric mains operation.
Prices from:
£9 to £20
All obtainable on easy payments.

Also supplied ready built and tested at slightly higher prices.

The Brown
3-Valve Screened Grid RECEIVER

FREE!
Write for Free Illustrated Folder to Dept. H
S. G. Brown, Ltd., Western Ave., N. Acton, London, W.3

Valves to Use in Your Set

TWO-VOLT VALVES

Three-electrode

Make	Type	Impedance	Amp. Factor	Anode Volt.	Fil. Cur.
Dario ...	Resist.	60,000	30	150	.1
Mazda ...	H210	59,000	47	150	.1
Lissen ...	H210	58,000	35	150	.1
Six-Sixty	210RC	55,500	39	150	.1
Mullard ...	PM1A	51,000	36	150	.1
Cossor ...	210RC	50,000	36	150	.1
Marconi ...	H210		35	150	.1
Osram ...	H210		35	150	.1
Triotron ...	WD2	46,000	46	150	.07
Six-Sixty	210HF	25,000	19	150	.1
Marconi ...	HL210	23,000	20	150	.1
Osram ...	HL210		20	150	.1
Mullard ...	PM1HF	22,500	18	150	.1
Dario ...	Super HF	21,000	25	150	.18
Lissen ...	HL210		18	150	.1
Mazda ...	HL210		26	150	.1
Cossor ...	210HF	20,000	20	150	.1
Triotron ...	T10		9	120	.2
Triotron ...	HD2	12,500	16	120	.07
Six-Sixty	210LF		10.6	150	.1
Cossor ...	210LF	12,000	10	150	.1
Marconi ...	L210		11	150	.1
Mullard ...	PM1LF		11	150	.1
Osram ...	L210		11	150	.1
Triotron ...	TD2	11,400	8.5	120	.06
Six-Sixty	225D	11,000	13.5	150	.25
Mullard ...	PM2DX	10,700	13.5	150	.25
Dario ...	Univ.	10,000	9	150	.1
Lissen ...	L210		10	150	.1
Mazda ...	L210		15.5	150	.1
Triotron ...	SD2	6,250	5	120	.1
Marconi ...	P215	5,000	7	150	.15
Osram ...	P215		7	150	.15
Six-Sixty	220P	4,800	7.2	150	.2
Lissen ...	P220	4,700	7	150	.2
Dario ...	SP	4,500	9	150	.15
Mullard ...	PM2	4,400	7.5	150	.2
Cossor ...	220P	4,000	8	150	.2
Triotron ...	UD2	3,750	6	140	.2
Mazda ...	P220	3,700	12.5	150	.2
Six-Sixty	230SP	2,750	5.5	150	.3
Dario ...	Hyper	2,700	5	150	.3
Mullard ...	PM252	2,600	5.4	150	.3
Marconi ...	P240	2,500	4	150	.4
Osram ...	P240		4	150	.4
Cossor ...	230XP	2,000	4	150	.3
Mazda ...	P240	1,900	7	150	.4

Screened-grid—Four-electrode

Dario ...	SG	250,000	250	150	.15
Mullard ...	PM12	230,000	200	150	.15
Six-Sixty	215SG	220,000	190	150	.15
Cossor ...	220SG	200,000	200	150	.2
Marconi ...	S215		170	150	.15
Osram ...	S215		170	150	.15
Mazda ...	215SG	400,000	400	150	.15

Pentodes—Five-electrode

Lissen ...	PT225	64,000	90	150	.25
Six-Sixty	230PP	64,000	80	150	.3
Mullard ...	PM22	62,500	82	150	.3

TWO-VOLT VALVES: Pentodes—Five-electrode (Continued)

Make	Type	Impedance	Amp. Factor	Anode Volt.	Fil. Cur.
Dario ...	Pent.	55,000	100	120	.3
Marconi ...	PT240		90	150	.4
Osram ...	PT240		90	150	.4
Cossor ...	230PT	20,000	40	180	.3
Mazda ...	230Pen	—	—	150	.3

FOUR-VOLT VALVES

Three-electrode

Cossor ...	410RC	60,000	40	150	.1
Dario ...	Resist.		30	150	.075
Marconi ...	H410		40	150	.1
Osram ...	H410		40	150	.1
Six-Sixty	4075RC	58,000	37	150	.075
Mullard ...	PM3A	55,000	38	150	.075
Triotron ...	WD4	46,000	46	140	.07
Dario ...	Super HF	21,000	25	100	.075
Cossor ...	410HF	20,000	20	150	.1
Mullard ...	PM3	13,000	14	150	.075
Triotron ...	AD4		13	120	.07
Six-Sixty	4075HF	12,500	13.5	150	.075
Dario ...	Univ.	10,000	10	150	.075
Triotron ...	RD4	9,000	9	140	.07
Cossor ...	410LF	8,500	15	150	.1
Marconi ...	L410		15	150	.1
Osram ...	L410		15	150	.1
Triotron ...	SD4	7,700	15.5	140	.14
Mullard ...	PM4DX	7,500	15	150	.1
Six-Sixty	410D	7,250	14.5	150	.1
Marconi ...	P410	5,000	7.5	150	.1
Osram ...	P410		7.5	150	.1
Dario ...	SP	4,500	9	150	.1
Mullard ...	PM4	4,450	8	150	.1
Six-Sixty	410P	4,200	7.7	150	.1
Cossor ...	410P	4,000	8	150	.1
Triotron ...	UD4	3,750	6	140	.1
Dario ...	Hyper P	2,700	5	150	.15
Triotron ...	SD4	2,500	4.5	140	.15
Marconi ...	P425	2,300	4.5	150	.25
Osram ...	P425		4.5	150	.25
Triotron ...	XD4	2,200	6	140	.15
Cossor ...	415XP	2,000	4	150	.15
Mullard ...	PM254		4.2	150	.18
Six-Sixty	420SP		4	150	.2
Mazda ...	P425	1,950	3.5	150	.25

Screened-grid—Four-electrode

Dario ...	SG	250,000	250	150	.075
Mullard ...	PM14	230,000	200	150	.075
Six-Sixty	4075HF	220,000	190	150	.075
Cossor ...	410SG	200,000	200	150	.1
Marconi ...	S410		180	150	.1
Osram ...	S410		180	150	.1
Mazda ...	410SG	—	—	150	.1

Pentodes—Five-electrode

Dario ...	Pent.	55,000	100	120	.15
Mullard ...	PM24A	53,000	83	300	.275
Marconi ...	PT425	50,000	100	150	.25
Osram ...	PT425		100	150	.25
Mullard ...	PM24	28,000	62	150	.15
Six-Sixty	415PP	27,000	60	150	.15
Cossor ...	415PT	20,000	40	180	.15
Mazda ...	425Pen	—	—	150	.25

(Continued on page 450)

Valves to Use in Your Set—*Continued*

SIX-VOLT VALVES

Three-electrode

Make	Type	Impedance	Amp. Factor	Anode Volt.	Fil. Cur.
Mazda ...	H607	90,000	40	150	.07
Cossor ...	610RC	60,000	50	150	.1
Marconi ...	H610		40	150	.1
Osram ...	H610		40	150	.1
Six-Sixty	6075RC	58,000	42	150	.075
Mullard ...	PM5B	33,000	40	150	.075
Marconi ...	HL610	30,000	30	150	.1
Marconi ...	DE5B		20	150	.25
Osram ...	HL610		30	150	.1
Marconi ...	LS5B	25,000	20	400	.8
Cossor ...	610HF	20,000	20	150	.1
Mazda ...	HL607		20	150	.07
Six-Sixty	6075HF	15,200	17	150	.075
Mullard ...	PM5X	14,700	17.5	150	.075
Six-Sixty	D610	9,250	18.5	150	.1
Mullard ...	PM6D	9,000	18	150	.1
Cossor ...	610LF	7,500	15	150	.1
Marconi ...	L610		15	150	.1
Osram ...	L610		15	150	.1
Marconi ...	DE5	7,000	7	140	.25
Marconi ...	LS5	6,000	5	400	.8
Osram ...	LS5		5	400	.8
Six-Sixty	610P		7.2	100	.1
Marconi ...	DE5A	4,000	3.5	120	.25
Mullard ...	PM6	3,550	8	150	.1
Cossor ...	610P	3,500	8	150	.1
Marconi ...	P610		8	150	.1
Osram ...	DEP610		8	150	.1
Marconi ...	LS5A	2,750	2.5	400	.8
Mazda ...	P625B	2,500	7	200	.25
Marconi ...	P625	2,400	6	250	.25
Osram ...	P625		6	250	.25
Cossor ...	610XP	2,000	5	150	.1
Mullard ...	PM256	1,850	6	180	.25
Six-Sixty	625SP	1,780	5.8	180	.25
Mazda ...	P650	1,750	3.5	200	.5
Marconi ...	P625A	1,600	3.7	180	.25
Mazda ...	P625A		4	180	.25
Osram ...	P625A		3.7	180	.26
Marconi ...	LS6A	1,300	3	400	1.6
Osram ...	LS6A		3	400	1.6

SIX-VOLT VALVES: Screened-grid—Four-electrode

Make	Type	Impedance	Amp. Factor	Anode Volt.	Fil. Cur.
Cossor ...	610SG	200,000	200	150	.1
Mullard ...	PM16		200	150	.075
Marconi ...	S610		210	150	.1
Osram ...	S610		210	150	.1
Marconi ...	S625	175,000	110	180	.25
Osram ...	S625		110	180	.25

Pentodes—Five-electrode

Mullard ...	PM26	25,000	50	150	.17

MAINS VALVES

.8 Volt .8 Ampere

Marconi ...	S.8	200,000	160	150	.8
Osram ...	S.8		160	150	.8
Marconi ...	H.8	55,000	40	150	.8
Osram ...	H.8		40	150	.8
Marconi ...	D.8	21,000	14	150	1.6
Osram ...	D.8		14	150	1.6
Marconi ...	HL.8	17,000	17	150	.8
Osram ...	HL.8		17	150	.8
Marconi ...	P.8	6,000	6	150	.8
Osram ...	P.8		6	150	.8

4 Volt 1 Ampere

Mullard ...	S4V	1,330,000	1,000	150	1
Mazda ...	AC/SG	600,000	1,200	150	1
Cossor ...	MSG41	200,000	400	150	1
Cossor ...	M41RC	20,000	35	180	1
Six-Sixty	SS4GP	14,500	35	180	1
Cossor ...	M41HF	14,000	25	180	1
Mullard ...	354V		35	180	1
Mazda ...	AC/HL	13,500	35	200	1
Cossor ...	M41LF	7,900	15	180	1
Six-Sixty	SS4Det	7,000	16	180	1
Mullard ...	164V	6,650	16	180	1
Cossor ...	M41P	5,000	10	180	1
Six-Sixty	SS4P	3,000	10	180	1
Mullard ...	104V	2,850	10	180	1
Mazda ...	AC/P	2,650	10	200	1
Cossor ...	M41XP	2,000	4	180	1
Mazda ...	AC/P1		5	200	1

The above list of valves will enable listeners to see at a glance what types are available that will meet the needs of their own receivers.

There is a choice of no fewer than sixty-two two-volt valves, forty-seven three-electrode type, seven screened-grids, and eight pentodes.

Of the fifty-one four-volters there are only thirty-six three-electrode valves, but there are again seven screened-grids and eight pentodes.

A total of forty-eight six-volt valves includes forty-one three-electrode and six screened-grid, but only one pentode.

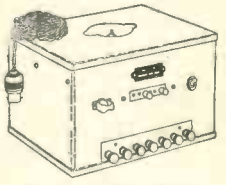
Mains valves, the filaments of which are run direct on low-voltage A.C., are now divided into two classes, the first (directly heated) type numbering ten and the second (indirectly heated) type totalling seventeen.

It should be noted that the old B.T.H., Cosmos, and Ediswan valves are now made under the one type—Mazda.

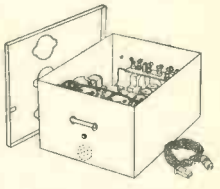
THE PERFECTED ELIMINATOR

A MODERN-TO-THE-MINUTE XMAS PRESENT.

MET-VICK MODEL "BS" ELIMINATOR for A.C. Mains Operation (Combined L.T., H.T., G.B., and S.G.V. Eliminator, A.C Type). Price—40/100 cycle Model, £8 (complete with valve); 25 cycle Model, £10 (complete with valve).



MET-VICK MODEL "C" ELIMINATOR MEDIUM POWER TYPE for A.C. Mains Operation (Combined L.T., H.T., G.B., and S.G.V. Eliminator). Price—40/100 cycles, £10 10s. (complete with valves; 25 cycle Model, £11 5s (complete with valves).



MET-VICK MODEL "D" ALL-ELECTRIC POWER ELIMINATOR HIGH VOLTAGE TYPE. Price £21 (including valves).

A Met-Vick Eliminator makes an ideal present for your radio friend. It cuts out the L.T. and H.T. batteries and the attendant bother and expense of replacing or recharging at frequent intervals. First cost will be last cost if you get a Met-Vick Eliminator.

In the wide range of Met-Vick Eliminators there is one to suit every need—there's the model "D" for the man with the big power valves and moving coil loudspeakers and there is the model "B.S" for the listener with a modest 3-valver.

Order from your radio dealer who has full particulars of the complete range of Battery Eliminators, Chargers and Power Components, or write to us for the Ediswan Blue Book.

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RADIO PRODUCTS

THE EDISON SWAN ELECTRIC CO., LTD.,

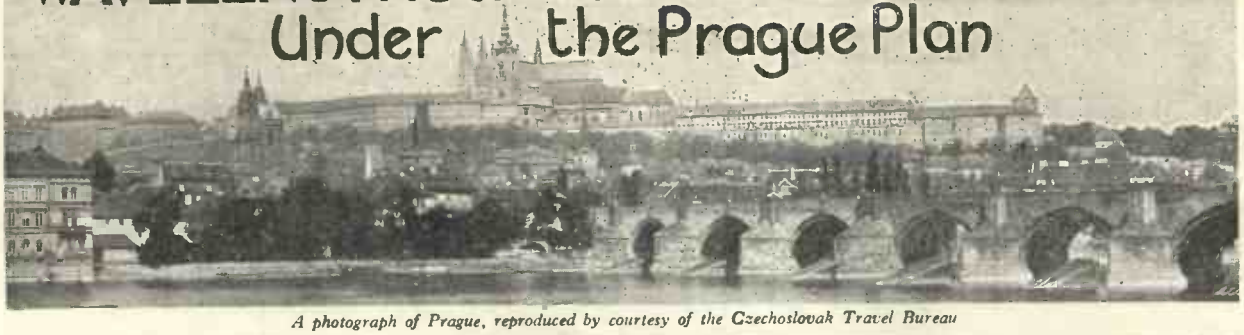
HEAD OFFICE & SHOWROOMS EDISON RADIO DIVISION:

1a, NEWMAN STREET, OXFORD STREET, W.1.

('Phone: MUSEUM 9801).

W.49.

WAVELENGTHS of the EUROPEAN STATIONS Under the Prague Plan



A photograph of Prague, reproduced by courtesy of the Czechoslovak Travel Bureau

Wave-length	Name of Town	Country	Dial Reading
25.53	Chelmsford (5SW)	Great Britain	
31.4	Eindhoven (PCJ)	Holland	
200	Leeds (2LS)	Great Britain	
221	Helsingfors	Finland	
225	Cork (1FS)	Irish Free State	
227	Cologne	Germany	
231	Malmo	Sweden	
234	Muenster	Germany	
238	Bordeaux (Sud-Ouest)	France	
239	Nurnberg	Germany	
242	Belfast (2BE)	Ireland	
246	Kiel	Germany	
	Cassel	Germany	
251	Almeria (EAJ18)	Spain	
253	Gleiwitz	Germany	
255	Toulouse (PTT)	France	
257	Hoerby	Sweden	
259	Leipzig	Germany	
265	Lille (PTT)	France	
268	Strasbourg	France	
270	Kaiserslautern	Germany	
	Trollhatten	Sweden	
274	Turin	Italy	
276	Koenigsberg	Germany	
279	Bratislava	Czecho-Slovakia	
281	Copenhagen	Denmark	
283	Stettin	Germany	
	Berlin	Germany	
288.5	Swansea (5SX)	Great Britain	
	Stoke-on-Trent (6ST)	" "	
	Sheffield (6LF)	" "	
	Plymouth (5PY)	" "	
	Liverpool (6LV)	" "	
	Hull (6KH)	" "	
	Edinburgh (2EH)	" "	
	Dundee (2DE)	" "	
	Bournemouth (6BM)	" "	
	Bradford (2LS)	" "	
	Newcastle (5NO)	" "	
292	Radio Lyons	France	
293	Kosice	Czecho-Slovakia	
294	Liège	Belgium	
298	Hilversum	Holland	
301	Aberdeen (2BD)	Great Britain	
304	Bordeaux (PTT)	France	
305	Agen	France	
309	Radio Vitus, Paris	France	
310	Cardiff (5WA)	Great Britain	
313	Cracow	Poland	
314	Oviedo	Spain	
316	Marseilles (PTT)	France	
319	Bremen	Germany	
322	Goeteborg	Sweden	
	Falun	Sweden	
325	Breslau	Germany	
329	Grenoble (PTT)	France	
330	Naples	Italy	
335	Posen	Poland	
331	Petit Parisien	France	
342	Brunn	Czecho-Slovakia	
349	Barcelona (EAJ1)	Spain	
351	Leningrad	Russia	
352	Graz	Austria	
356	Brookman's Park	Great Britain	

Wave-length	Name of Town	Country	Dial Reading
360	Stuttgart	Germany	
368	Seville (EAJ5)	Spain	
	Radio LL (Paris)	France	
372	Hamburg	Germany	
377	Manchester (2ZY)	Great Britain	
381	Radio Toulouse	France	
	Genoa (1GE)	Italy	
385	Wilno	Poland	
390	Frankfurt	Germany	
394	Bucharest	Roumania	
399	Glasgow (5SC)	Great Britain	
403	San Sebastian (EAJ8)	Spain	
	Berne	Switzerland	
408	Kattowitz	Poland	
413	Dublin (2RN)	Irish Free State	
418	Berlin	Germany	
426	Madrid (EAJ7)	Spain	
427	Kharkov (NKO)	Russia	
436	Stockolm	Sweden	
441	Rome	Italy	
447	Paris (Ecole Sup. PTT)	France	
	Bolzano (1BZ)	Italy	
453	Salamanca (EAJ22)	Spain	
456	Aachen	Germany	
459	Zurich	Switzerland	
465	Barcelona (EAJ13)	Spain	
468	Lyons (PTT)	France	
473	Langenberg	Germany	
479	Daventry (5GB)	Great Britain	
487	Prague	Czecho-Slovakia	
493	Oslo	Norway	
501	Milan	Italy	
509	Brussels	Belgium	
517	Vienna	Austria	
525	Riga	Latvia	
533	Munich	Germany	
542	Sundsvall	Sweden	
550	Buda-Pest	Hungary	
560	Hanover	Germany	
575	Freiburg	Germany	
680	Lausanne	Switzerland	
760	Geneva	Switzerland	
770	Ostersund	Sweden	
825	Moscow (PTT)	Russia	
1,000	Leningrad	Russia	
1,010	Basle	Switzerland	
1,070	Scheveningen-Haven	Holland	
1,071	Hilversum	Holland	
1,153	Kalundborg	Denmark	
1,200	Reykjavik	Iceland	
	Boden	Sweden	
1,304	Kharkov	Russia	
1,348	Motala	Sweden	
1,411	Warsaw	Poland	
1,458	Eiffel Tower, Paris	France	
1,554	Daventry (5XX)	Great Britain	
1,635	Zeesen	Germany	
1,796	Lahti	Finland	
1,725	Radio Paris	France	
1,875	Huizen	Holland	
1,935	Kovno	Lithuania	
2,100	Norddeich	Germany	
2,290	Norddeich	Germany	

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The new Special Model with 7¾-in. "LEXIDE" Cone is the world's finest Moving-Coil Speaker, while the Standard Model, with 10½-in. "LEXIDE" Cone, heralds the greatest advance in dynamic power speaker construction.

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„ 201	6/12 v. D.C. ...	8	0	0
„ 401	110 v 50 cy. A.C.	11	0	0
„ 405	200/240 v. 50 cy. A.C.	11	0	0

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7¾ in. CONES

		£	s.	d.
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„ 108	180/300 v. D.C.	6	7	6
„ 200	6/12 v. D.C. ...	6	0	0
„ 400	110 v. 50 cy. A.C.	8	5	0
„ 404	200/240 v. 50 cy. A.C.	8	5	0

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IN TUNE WITH THE TRADE

FETTER LANE'S Review of Catalogues and Pamphlets

New H.T. Batteries

A COMPARATIVE newcomer to the ranks of H.T. batteries is the Obeta, the sole agent for the United Kingdom being F. L. Lesingham, of 13 Victoria Street, S.W.1. The Obeta has a new method of construction which, it is claimed, gives it an exceptionally long life, and increases its recuperative properties.

I have just received a folder giving details and prices of the Obeta range, and containing a graph which is most interesting, because it shows the actual life of a 60-volt Obeta battery during the most important period, namely the first two or three hundred hours of its life.

This chart is very convincing, and all interested in a new battery for the new year should get the folder. **71**

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A Five Years' Guarantee

TO the best of my knowledge there are only four cars on the market, American, British or European, which are supplied with a five-years' guarantee. Such a guarantee is, of course, equivalent to about a 25 per cent. increase in value, and incidentally equal to about 100 per cent. greater confidence in the manufacturers' product.

Therefore, when the Cyldon folk sent me a folder, giving details of the whole of their range, I enthused tremendously on seeing that all Cyldon condensers, irrespective of price or type, are individually tested before dispatch and are guaranteed for five years.

The new Junilog condensers interested me very much, in view of the restrictions as to space in many modern sets. There is, also, a new Synchratune range, which consists of dual sets of thumb-control Junilog condensers.

Yes, I think the Synchratune and Junilog ranges are well worth going into, and if you, too, are of the same mind, then write to Sydney S. Bird & Sons, Ltd., of Cyldon Works, Sarnesfield Road, Enfield Town, Middlesex, for this five years' guarantee leaflet. **72**

◆ ◆ ◆

A Truthful Book

SUSPECTING that there is a certain amount of prevarication in radio, the Igranic Electric Co., Ltd., have come out with a booklet entitled "27 Truths About the Truth Collector"—being the considered opinion of twenty-seven well-known people on the Igranic Neutrosonic Seven.

If you are considering getting a really good set in which performance has been put before everything else, and which is meeting with wide approval in the open market, then it is worth your while getting this book. Not only to see what other people think about it, but also to form your own opinion, so that after judgment you may try—and then approve, yourself.

You can have a demonstration of the Neutrosonic Seven at your own home, or at the nearest Igranic branch, and a form of application for such a demonstration is enclosed with each "27 Truths Booklet." I should advise you to make application direct to the Sales Manager, Mr. J. T. Mould, Igranic Electric Co., Ltd., of 149 Queen Victoria Street, E.C.4. **73**

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An Ediswan Batch

MY good friend, the publicity manager of Edison Swan Electric Co., Ltd., of 123-5 Queen Victoria Street, E.C.4., has just sent me a batch of catalogues and, slipping off the rubber band, I find that they deal with the following :—

H.T. and L.T. batteries, complete sets, cone speakers, coils, transformers, and other constructive tit-bits, and, finally, a comprehensive catalogue dealing with the new Mazda valves. These new Mazdas, of course, are the product of the combined research and manufacturing experiences of the Ediswan, B.T.H. and Cosmos organisations. The new series is most interesting and one can spend a deal of useful time delving into the characteristic curves given.

Write to Ediswans for any of the other books that interest you, no matter whether you are in need of a grid leak, or an electric gramophone, but don't overlook the Mazda valve book. **74**

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The Edison Bell Rings

WHENEVER I receive a catalogue dealing with complete sets and components, it is always my habit to turn to the back pages first of all, and reading through the details of components before turning to the complete sets, one can often judge the quality of a component by looking at it, whereas a complete set is, frequently, a mystery box.

I did the same with a recently-received Edison Bell catalogue, although there really wasn't much need to do so, because the quality of the whole Edison Bell range rings clear and is well-known.

This new Edison Bell catalogue is well worth having, and it would be impossible in this small space to precis the whole range, so let it suffice if I advise you to write direct to Edison Bell, Ltd., of Glengall Road, S.E.15. **75**

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Varley's Section Catalogue

IF you could see the file which your "Fetter" is slowly accumulating in connection with his catalogue service, you would appreciate the smile which grew on his face when he received from Oliver Pell Control (Varley), Ltd., of Kingsway House, 103 Kingsway, W.C.2, a catalogue which does not necessitate your having it all at once.

This new Varley book is issued in sections. There are five of them, and they deal each with some phase of Varley production. F'rinstance. The first deals with complete sets and electric gramophones and the Varley pick-up and auto arm. The second deals with coils and H.F. components, and the whole range of resistances for which the Oliver Pell people have earned such a justly famous name.

In like manner, each of the other sections deals with some range of components likely to be of use to the constructor. *Aussi*, what I particularly like about these Varley catalogues is that they give plenty of real technical dope, so that one is not in the dark when making a choice. **76**

◆ ◆ ◆

The Climax

THE name Climax is coming rapidly to the fore, backed up by many good components and a new complete receiver. The Chelloset Climax mains units interest me in particular, and a wide range is available, both for A.C. and D.C. The A.C. models follow the best fashion and employ the Westinghouse metal rectifier.

I have just received a leaflet giving details of all the Climax components, including such old favourites as the Climax low-frequency transformer, as specified for the Mullard Master Three Star receiver. The Climax slogan is : "A Year Ahead," and careful perusal of this folder shows that the slogan is fully carried out in practice.

The address is Climax Radio Electric, Ltd., of Haverstock Works, Parkhill Road, Hampstead, N.W.3. **77**

SEND TO US FOR THESE CATALOGUES!

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

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

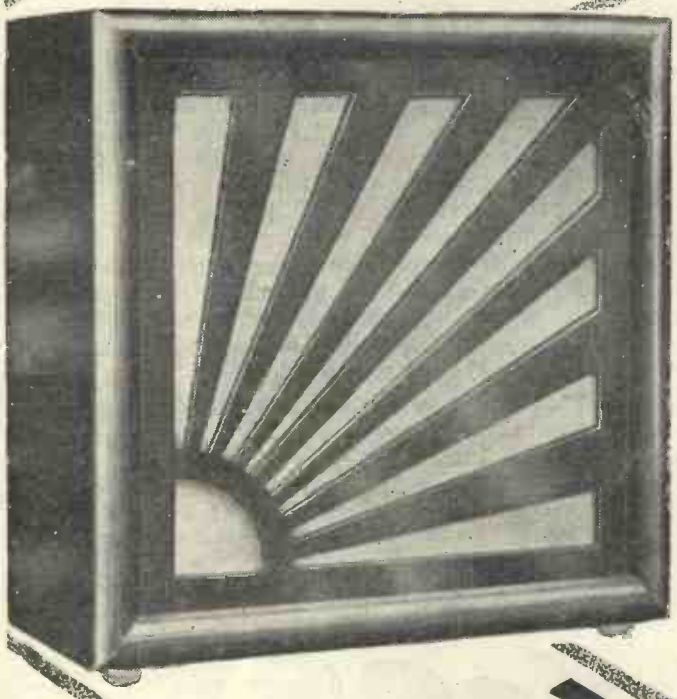
Just indicate the numbers (seen at the end of each paragraph) of the catalogues you want below :—

My name and address are :—

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

29/6

THE UTMOST IN QUALITY .... YET SEE THE PRICE



THE name Ormond is a surety that not only the parts seen but in all those hidden details, however small, there is the same perfection of construction and design as shown in the beautifully finished exterior.

The new Ormond Loud-speaker is no exception to the rule. Its exterior design is original and most attractive, whilst the finish is perfect.

The handsome Oak or Mahogany cabinet is fitted with the famous Ormond 4 Pole Adjustable Unit and specially designed "wonder" cone with the result that the tone and volume is of exceptional excellence. "Blare" is absent and the reproduction, whilst powerful, is very mellow.

THE NEW ORMOND LOUDSPEAKER

ORMOND ENGINEERING COMPANY LTD.

for PUNCH POWER & PURITY

The low price affords no criterion of the high quality of this new Ormond Speaker—it is but another example of amazing Ormond value.

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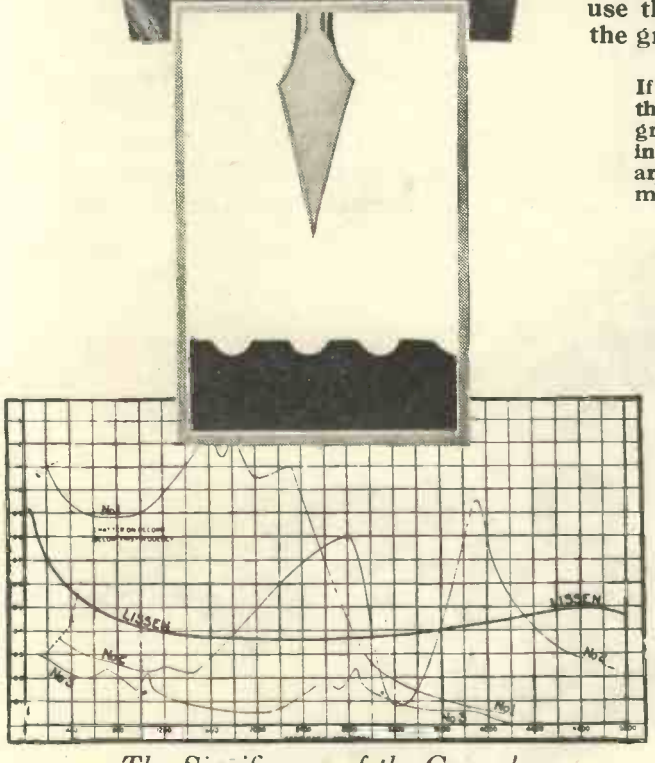
Revolutionary new Lissen Pick-up

MAKES EVERY RECORD A PICTURE TRUE IN TONE COLOUR



The Significance of the Curve!

Look at Curve 1. A particularly fine response for part of its curve, but notice the peaks and depressions and the very serious falling off in output after 2,800 cycles—after 200 cycles it would not remain on the record. In curves 2 and 3 the same deficiencies exist. NOW LOOK AT THE LISSEN CURVE. It is the only even curve. These are actual tests under ordinary conditions. The real significance of the Lissen curve is that you get true musical values from one end of the scale to the other.

New Needle-Armature so light that response is perfect at all frequencies

"Better than 'Talking' Picture reproduction"—that is what everybody says who hears a gramophone record played by this new Lissen Pick-up. And actually the reproduction *is* better than the film experts have achieved—more natural, nearer to reality, because no longer are the high notes thinned out or the lower bass notes lost. The Lissen Pick-up is so responsive that even the perfect electrical recordings of to-day can hardly do it justice. It responds to the most minute indentation on the record—the needle armature is so light that the needle-point actually *feels* its way along the record groove.

And you'll find your records almost everlasting when you use this new Lissen Pick-up, because the needle follows the groove and does not plough its way along.

If you want every single record to sound much better than those you hear at demonstrations—if you want radio-gramophone reproduction that comes so near to reality that in a darkened room you would suspect the presence of the artist—get this new Lissen Pick-up and learn what perfection means. Any Lissen radio dealer will demonstrate it for you.

LISSEN

NEEDLE-ARMATURE PICK-UP

30/-

Complete with moulded tone arm 37/6

LISSEN LIMITED

WORPLE ROAD, ISLEWORTH, MIDDLESEX

Factories also at Richmond and Edmonton

(Managing Director: Thos. N. Cole)

A Chat With CLAPHAM AND DWYER

[*J. GODCHAUX ABRAHAMS Meets the Famous Entertainers*]

TO tell you the truth I am under the impression that Dwyer—he's the fat one—would always be perfectly happy were it not for Clapham, the silly ass with the monocle. Dwyer, you see, is serious, or would like to be, and I feel convinced that if he were only allowed to give us his lecturettes in peace we could learn quite a lot from them.

Dwyer's Helpful Talks!

He chooses topics of general interest—well, in most instances; sometimes he tries to tell us something of the intricacies of life insurance, endowment policies, or how to fill up an income-tax form truthfully—a difficult task, this — and he would get away with it were it not for the idiotic interruptions made by his partner. How and why he puts up with them beats me!

It is not that Clapham does not know better, for he does, or at least he should do, but you will agree that he never seems to understand anything, and so many perfectly simple words floor him.

He makes many jaw-breaking attempts at pronouncing them and then—for he's clever that way—to hide his confusion rapidly changes the subject, and draws a red herring across the trail by asking some silly conundrum or riddle, two words, by the way, which he has not mastered to this day.

Listeners' Expectancy

The whole thing is ridiculous preposterous, too idiotic for words, yet on hearing this pair you cannot help punctuating their dialogue with loud guffaws. If you switch on the wireless set as they arrive in the studio and tell the family "Oh, it's Clapham and Dwyer" there immediately spreads over the room an atmosphere of expectancy.

There may be silence for a moment or two, but in anticipation some member of the audience is bound to giggle.

And therein, I think, lies the secret of Clapham and Dwyer's success. They spring surprises on you, for apart from advertising their "spot of bother, the announcer cannot describe them in any other way. As a matter of fact, he does not know what they are going to do; neither does the B.B.C., and for the matter of that, up to the moment of facing the microphone, apart from the rough outlines of their act, I doubt whether the two humorists have quite settled in their minds what it is all to be about.

Possibly ninety per cent. or more of the cross-talk is spontaneous; it is improvised for the occasion, can only be used once in its actual form and for this reason alone is always topical. Some of Clapham's most humorous funniosities are given out on the spur of the moment.

What Pleases Us

Taking these various factors into consideration, you will readily understand that a written dialogue would be impossible; it's the spontaneity and topicality of the act that pleases, and of these two qualities the artists have made a fine art.

Both, as it happens, are blessed with good microphonic voices; Dwyer in particular possesses an excellent delivery, and it is seldom you will miss any of Clapham's nonsensical observations unless, unfortunately, they are drowned by the laughter of the studio audience.

Studio Audience Justified

The presence of a small crowd in the studio is justified on such occasions; in fact, it is a necessity with all humorous turns. It might not be impossible to raise a laugh amongst outside listeners when standing before the "mike" in an empty

Can You Guess Who is Who?

Let us introduce you to two of the most popular radio entertainers. You can see that they are getting ready for another "spot of bother!"

A Chat with Clapham and Dwyer—*Continued*

Clapham and Dwyer face the microphone with—is it Cissie?

studio, but I should imagine it to be no easy task; it must be a very disheartening one, whereas, on the other hand, a few chuckles from appreciative onlookers act as a spur, and an encouragement to develop a vein of humour.

When I met Clapham and Dwyer for the first time, I think that both came up to my expectations, inasmuch as from their voices I had visualised them fairly correctly.

Mental Pictures

I suppose we all do this sort of thing, and endeavour to make a mental picture of the people we hear through the headphones or loudspeaker. In some instances, we may be hopelessly wrong, whilst in others —well, in my case I was right.

Dwyer is seriously inclined, but there lies a dangerous twinkle in his eye, which gives you to understand that he does not wish to be taken that way; as to Clapham, he is just Clapham, and as amusing as he is before the mike.

He was not destined either for the stage or concert platform, and some years ago had no thought of appearing in public. He was educated for the law, a career which, no doubt, could never have given any scope for his talents.

As a relaxation, theatricals appealed to him, and he joined an amateur dramatic society, and as an amateur was chosen by the Brighton and Hove Operatic Society in 1922 to play at the Theatre Royal, Brighton, the part created by George Graves in *Veronique*. This was his first appearance on any stage, and his success was such that he was persuaded to throw away his law books and to enter the field of entertainment.

In Clapham either the Bar or the Bench may have lost a celebrity; I do not pretend to know, but one fact is certain, when he decided to forsake law the British public gained a radio star.

I tackled both partners regarding their views on microfright, a subject which was dealt with in a recent issue of the WIRELESS MAGAZINE.

"We do not suffer from it," was the reply. "At least not to the extent of hampering our efforts to entertain. It's true that there is something awesome about the mike, if at any moment one happens to think that it is conveying a joke or a song to many hundred thousand homes.

"The thought alone that the 'turn' is being heard by so many different classes of the community, by so many listeners, in such varying moods, would tend to promote nervousness on the part of the performer in the studio."

"And that," added Clapham, "is where I think the studio visitors are helpful; they bring the outside audience nearer to the artist, and thus create a more intimate atmosphere. Personally, I have always endeavoured to visualise a very small number of listeners, say, just a few friends to whom I am telling a funny story."

Familiarity with the Mike

"Familiarity with the mike," interrupted Dwyer——

"Breeds contempt?" I suggested.

"No, certainly not," he retorted, "but it nerves one to face this unresponsive and awe-inspiring instrument."

"But what about Cissie?" I queried.

Frankly, I am interested in Cissie because Clapham has told us so much about her. He is so fond of retailing trivial incidents in that pet's life that I felt he would be only too pleased to give me more details of her past.

Dropped A Brick

Apparently, when I mentioned her name, I dropped a brick; Cissie seems to be a bone of contention between the two partners, for since she joined them Dwyer has had all his work cut out to prevent Clapham from drifting over to his favourite topic. Just as Uncle Dick could not keep the head of King Charles the

(*Continued on page* 468)

THE 1930 FIVE

EVER since its inception, the WIRELESS MAGAZINE has been famous—it is no exaggeration to say, literally, all over the world—for its five-valve designs. Starting with the famous old 1927 Five, the WIRELESS MAGAZINE Technical Staff has produced equally well-known receivers as the 1928 Five, Exhibition Five, and Empire Five.

Now we are able to give readers details of a new set—the 1930 Five.

Similar Successful Circuits

The circuit combination of all these five-valvers has been the same, in as far as each has incorporated two stages of high-frequency amplification, detector and two stages of low-frequency amplification. All, except for the Empire Five which used screened-grid valves, have employed ordinary three-electrode valves for high-frequency amplification, and the 1930 Five follows the same practice.

This new five-valver is intended specially for those who want a really powerful set that does not use screened-grid valves for high-frequency amplification. Many listeners will be able to convert existing five-valvers into 1930 Fives with the addition of a few parts at comparatively low cost.

For years now the WIRELESS MAGAZINE *has been known the world over for its successful five-valve designs, and this set is a worthy successor to such famous sets as the* 1927 *Five,* 1928 *Five, Exhibition Five, and Empire Five.*

Three-electrode valves have been used throughout to attain the greatest mechanical reliability. Dual-range coils are used (controlled by a single switch), and provision is made for cutting out two valves for the reception of very powerful stations.

Another switch puts the whole receiver on or off and also puts an electromagnetic pick-up in circuit, when it is desired to reproduce records electrically. A useful volume control is also incorporated.

Dual-range Coils—Single Switch

Every modern improvement has been incorporated in the set. Dual-range coils cover both upper and medium broadcast bands by the manipulation of a single switch. Stabilisation in working is assured by the inclusion of an anode-filter system associated with the detector valve.

Not only is the 1930 Five a powerful and satisfactory radio receiver, it is also an efficient amplifier for the electrical reproduction of gramophone records. Provision is made for keeping a pick-up permanently connected to the set and putting it in use when required by means of a single switch, which switches off the valves that are not used.

Some readers may wonder why gang control has not been incorporated. The experience of the WIRELESS MAGAZINE Technical Staff in this regard is that while ganging undoubtedly simplifies the operation of a set it is always at the cost of some efficiency. Maximum power was required from the 1930 Five and, therefore, each circuit is tuned separately.

The dual-range coils are a new type recently produced by one of the best-known coil manufacturers. These coils are connected together by special couplings, and all three switches are actuated by a single knob on the panel, through a special lever fixed to the baseboard.

It is obvious that a receiver of this description is far too powerful for the reception of nearby stations at comfortable strength. A special switching system has, therefore, been incorporated to ensure the economical operation of the set.

Actually, two filament switches are used. One, a simple push-pull on-off switch, controls the two high-frequency valves only.

Use of Three Valves Only

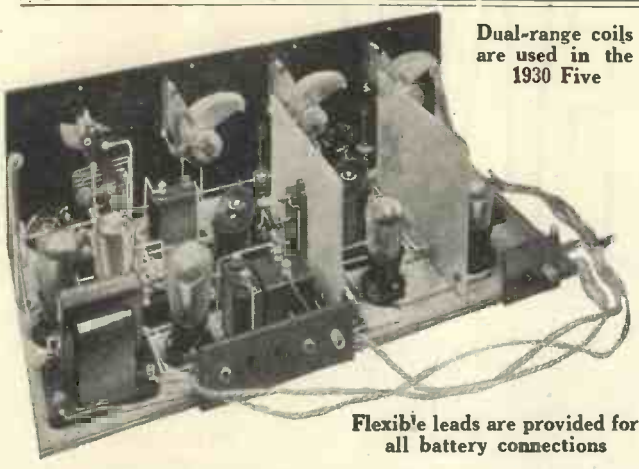
Two aerial terminals are provided. The first is used when all five valves are needed. For the reception of very powerful broadcasters, when three valves (detector and two low-frequency stages) are enough, the two high-frequency valves are switched right off and the aerial lead connected to the second aerial terminal, which, in turn, is connected to the coil associated with the detector.

The second switch is of the rotary type, having three poles and three positions. When the knob is turned to the central position, the whole receiver is switched off.

All Five Valves in Operation

As soon as the knob is turned to the left, however, all the filament circuits are completed, and all five valves are in operation, provided the auxiliary switch controlling the high-frequency valves is already on.

The 1930 Five—*Continued*



Dual-range coils are used in the 1930 Five

Flexible leads are provided for all battery connections

Turning the main switch to the right, on the other hand, switches off the first three valves (two high-frequency and detector), and leaves only the two low-frequency valves in circuit for amplifying currents provided by the electromagnetic pick-up, which is also switched into circuit automatically at the same time.

Neutralised Valves

Both high-frequency valves are, of course, neutralised; this is done on the split-primary principle, as will be evident from the circuit diagram.

Of course, any listener who has ordinary six-contact split-primary coils covering only one waveband can use them without any alteration in the connections.

How to Neutralise

Neutralisation of the high-frequency valves is best carried out for first one valve and then the other. The method is to switch off the first valve (by disconnecting the spade tag on lead No. 9) and turn the knob of the first neutralising condenser until a powerful station which has been previously tuned in becomes quite inaudible.

The spade tag is then replaced, and the second valve neutralised in a similar way, after removing the tag on lead No. 10 from the terminal on the screen.

The aerial coil is of the semi-aperiodic type, with a tuned secondary. Two aerial connections are available, to point No. 3 or No. 4, the former being the more selective of the two tappings.

Reaction is applied on the detector valve by a .0001-microfarad condenser.

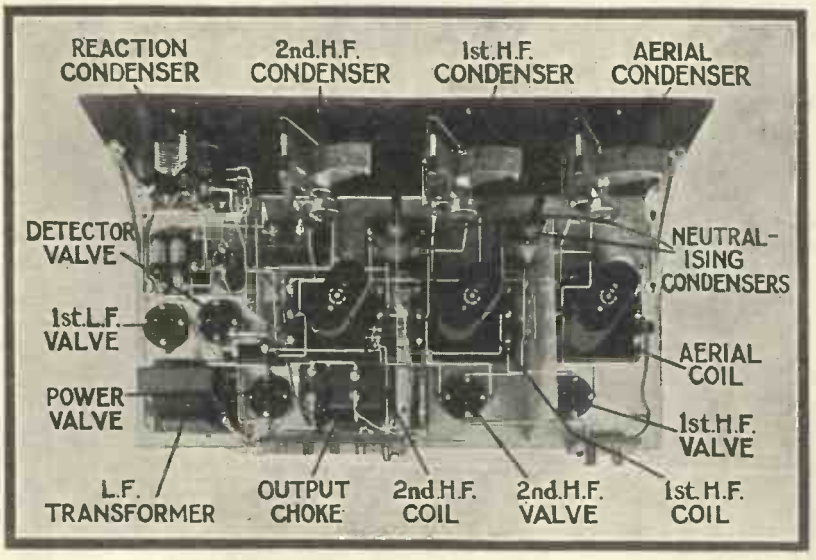
Rectification is arranged on the leaky-grid principle, as this is the most sensitive method. Experience has proved that WIRELESS MAGAZINE five-valvers are built by many overseas readers, whose local stations are often 1,000 miles away; they, therefore, need the maximum sensitivity that can be obtained—and the greatest mechanical reliability, which is one reason why screened-grid valves have not been used for high-frequency amplification.

Minimum Damping

The values of 3 megohms and .0002 microfarad for the grid leak and condenser respectively give the minimum damping and the maximum sensitivity.

Resistance-capacity coupling is used between the detector and first low-frequency valve, the resistance being 100,000 ohms for normal purposes, with a .005-microfarad coupling condenser.

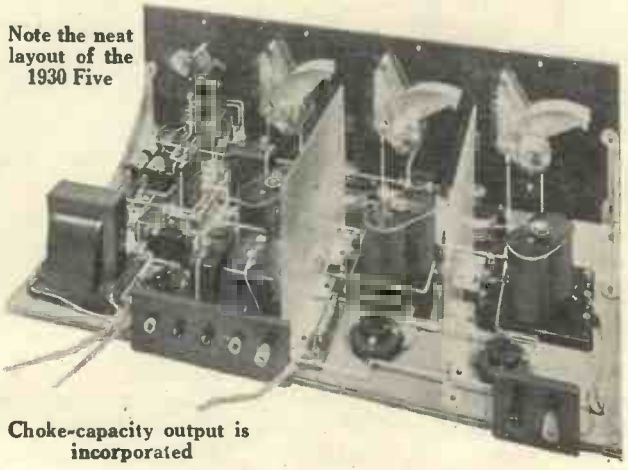
Associated also with the detector-anode circuit is a filter system, provided to obviate any tendency to low-frequency instability, such as often occurs with modern valves and super-efficient transformers. The filter resistance is 50,000 ohms, and the by-pass condenser to L.T.—is 2 microfarads.



This plan view of the 1930 Five shows how the parts are arranged on the baseboard

Record Reproduction

The performance of the set as a gramo-radio amplifier very largely depends upon



Note the neat layout of the 1930 Five

Choke-capacity output is incorporated

A Powerful Set with Three-electrode Valves

the choice of a good low-frequency transformer, which is the form of coupling between the first and second low-frequency valves.

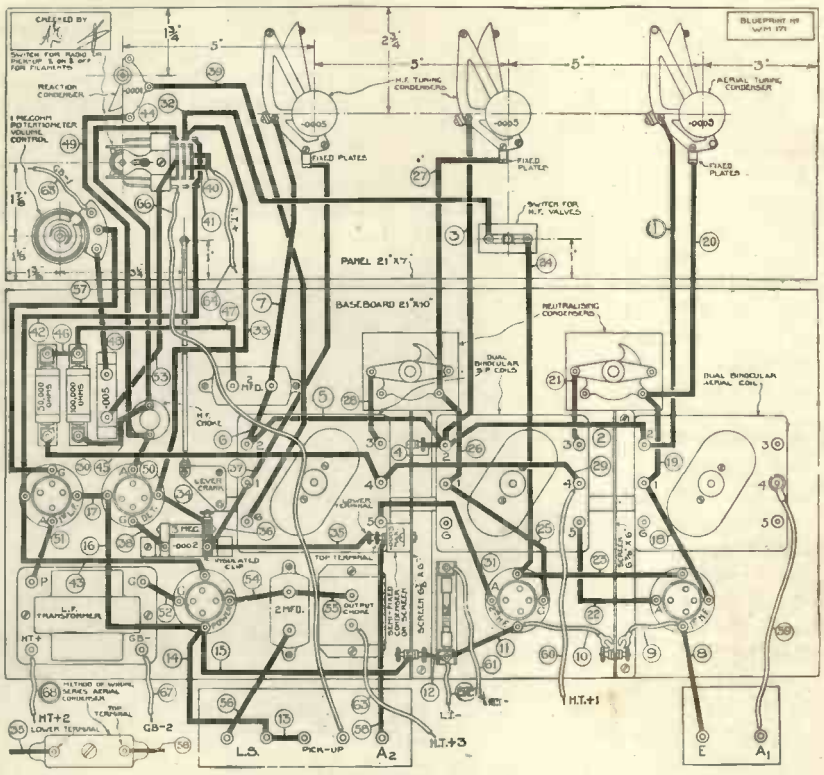
A number of people who have seen the 1930 Five have asked whether two valves give sufficient amplification to make the electrical reproduction of records worth while. But they need have no fear on that score.

Volume Available

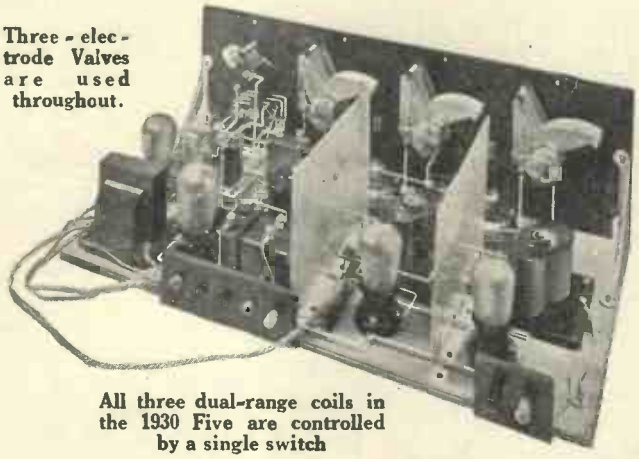
The amplification is sufficient to drive the linen loud-speaker described on page 520 of this issue at such volume that it can be heard clearly all over the WIRELESS MAGAZINE laboratory.

Indeed, with some records, the volume is too great and for this reason a volume control has been provided. This takes the form of a 1-megohm variable resistance, used as grid leak with the first low-frequency valve; it can be used for either radio or gramophone control, of course.

As a further safeguard against instability, as well as for the protection of the loud-speaker, a choke-capacity output is provided. In spite of its small size, the choke used in the original set was found to give quite satisfactory results.



This layout and wiring diagram of the 1930 Five can be obtained as a full-size blueprint for half-price (that is, 9d., post free), if the coupon on page iii of the cover is used by December 31. Ask for No. WM171. Wire up in numerical order



Three-electrode Valves are used throughout.

All three dual-range coils in the 1930 Five are controlled by a single switch

Connected between H.T.— and L.T.— is a special type of fuse to protect the valves from damage, in case of an accidental short-circuit of the high-tension supply through the low-tension circuit.

In spite of its size, the 1930 Five is not difficult to construct; it will certainly present no difficulties to those who built one or other of its forerunners, and who now feel the need for a more up-to-date circuit, especially with dual-range tuning coils.

For those who desire it, a full-size blueprint of the set has been prepared. This is available for half-price (that is, 9d., post free), if the coupon on page iii of the cover is used by December 31; an extension of time will be made in the case of overseas readers.

Ask for blueprint No. WM171; and address your inquiry to Blueprint Dept., WIRELESS MAGAZINE, 58-61 Fetter Lane, London, E.C.4.

A blueprint is not, of course, absolutely essential, although its use means a great saving of time and trouble; all the essential details are reproduced on a reduced scale in these pages.

There is little that need be said about the actual construction of the receiver. The method of fixing the lever for the wave-change switch will be evident.

One point may cause confusion unless it is explained, however. On one side of the central screen is screwed a small pre-set condenser in series with the second aerial terminal, already referred to.

Detail Drawing

This condenser has two terminals, one of which is above the other on the screen. Lead No. 58 is connected to the top terminal, and lead No. 35 to the lower one; this is made clear by the detail drawing at the bottom left-hand corner of the blueprint, and the reduced reproduction which appears above.

As is the case with all WIRELESS MAGAZINE sets, the leads should be placed in position in the numerical order indicated. In this way the wiring is built up from the baseboard in the most convenient way.

The 1930 Five—*Continued*

For the sake of convenience, battery terminals have been dispensed with. Rubber-covered flex is used, and this can be cut to any suitable length, so that the batteries can be placed out of sight on the floor under a table if desired. Care should be taken to slip the appropriate ivorine indicating tag on each lead as *it is connected*, otherwise there is a very real danger of accidents in the subsequent connecting up.

Arrangement of Controls

The actual arrangement of the controls on the front panel is as follows : In line along the top part are the three large main tuning dials for the aerial and two high-frequency transformers, respectively (*see heading photo*).

With all five valves in use, the three dials must be tuned; this is not a difficult matter for the readings of the second and third will be the same within a degree or two.

If, however, the aerial is connected to A2 and only three valves are in use, then only the third dial will have to be operated.

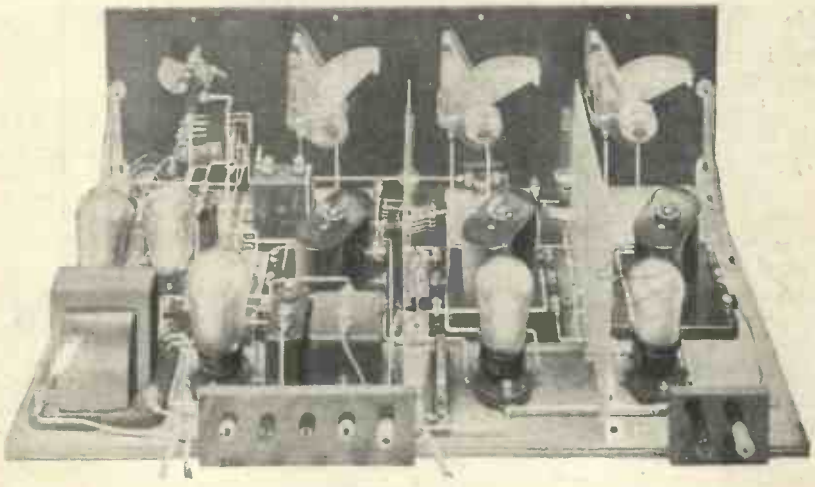
In line with the three large dials, at the right end of the panel, are a small dial and a knob; these are for the reaction condenser and "on-off gramo-radio" switch respectively.

Immediately under these, at the bottom of the panel, and side by side are the wave-change switch (in for long waves and out for medium waves), on the right of this is the volume-control knob (turn to right for maximum volume).

The small knob under the large centre dial is the on-off switch for the two high-frequency valves only.

Those who have not operated a powerful set of this type before should not expect magnificent results right at the start. When there are three tuned circuits to manipulate in a set it takes a little experience to get the best out of them. A little patience will be amply rewarded.

One of the most important things is to neutralise the high-frequency valves properly, as already explained. It will be found after a little manipulation that these controls can be advanced so that the set is almost on the verge of oscillation — a stage at which signal strength will be considerably increased owing to the minimisation of damping.

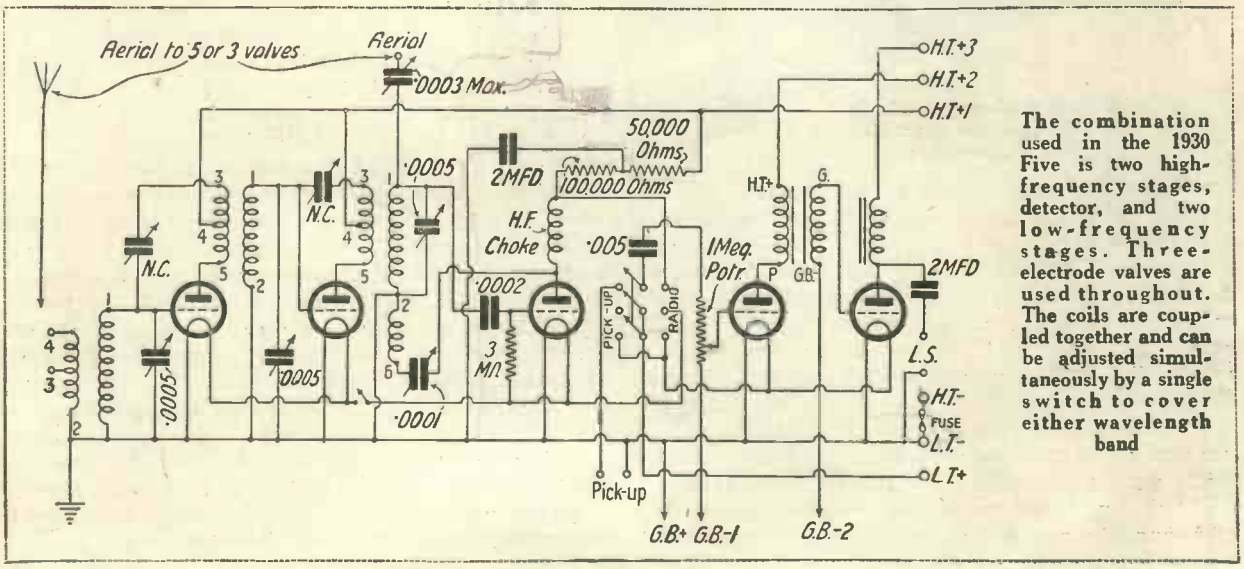


A back view of the 1930 Five, with valves in position

Cutting Out Interference

If any interference from unwanted stations is experienced—this will happen only in a few exceptional cases—remember that the application of a small amount of reaction will make the tuning much sharper. When the reaction control is advanced for this purpose the three main tuning condensers should also be readjusted.

In conclusion, let us repeat the main object in designing the 1930 Five was to produce a *reliable* and powerful set that would give good results.



The combination used in the 1930 Five is two high-frequency stages, detector, and two low-frequency stages. Three-electrode valves are used throughout. The coils are coupled together and can be adjusted simultaneously by a single switch to cover either wavelength band

Dual-range Coils :: Switch for Pick-up

COMPONENTS REQUIRED FOR THE 1930 FIVE

Choke, High-frequency
1—Keystone, type SG, 5/- (or Bulgin, Wearite).

Choke, Low-frequency
1—Climax Capital, 8/6 (or Watmel, Ormond).

Coils
3—Lewcos dual binoculars, one DBA and two DBP's, 52/6; special Lewcos switching, 3/-.

Condensers, Fixed
1—Dubilier .0002-microfarad, type 620, 2/6 (or Graham-Farish, Trix).
1—Dubilier .005-microfarad, type 620, 3/- (or Graham-Farish, Watmel).
2—Dubilier 2-microfarad, type BB, 7/- (or Ferranti, Hydra).

Condensers, Variable
3—Jackson .0005 - microfarad with slow-motion device, 49/6 (or Ormond, Dubilier).
1—Burton .0001-microfarad, 4/6 (or Bowyer-Lowe, Cyldon Bébé).
2—Peto-Scott neutralising condensers, 11/- (or Jackson, Bulgin).
1—Formodenser, .0003- to .00025-microfarad, type J, 2/- (or Igranic).

Ebonite
1—Becol, 21 in. by 7 in., 8/4 (or Resiston).
2—Becol strips, 5½ in. by 2 in. and 2½ in. by 2 in.

Holders, Valve
5—Lotus anti-microphonic, 6/3 (or Marconiphone, Benjamin).

Plugs
3—Eelex shrouded socket plugs, 1 black and 2 red, (or Clix, Belling-Lee).
4—Eelex plugs with sockets, 2 black and 2 red, (or Clix Belling-Lee).
2—Clix spade tags, black and red, (or Eelex, Belling-Lee).
7—Clix plugs, 3 black and 4 red, (or Belling-Lee, Eelex).

Potentiometer
1—Igranic Megostat, 6/- (or Dubilier).

Resistances, Fixed
1—Ready Radio, 50,000 ohms, with holder, 6/6 (or Dubilier, Igranic).
1—Ready Radio, 100,000 ohms, with holder, 8/6 (or Dubilier, Igranic).
1—Dubilier 3-megohm grid leak, 2/6 (or Keystone, Lissen).

Screens
2—Ready Radio, 7 in. by 6 in., 4/- (or Peto-Scott, Raymond).

Sundries
1—Pair Magnum panel brackets, 2/6 (or Bulgin, Igranic).
Glazite for connecting up.
10 yds. Lewcos rubber-covered flex.
1—Microfuse to carry 100 milliamperes. 2/-.
1—Packet Cortab ivorine tags, 9d.

Switches
1—Pioneer on-off, 1/6 (or Bulgin, Keystone).
1—Wearite three-pole change-over, 4/-.

Transformer, Low-frequency
1—Brown type A, 30/- (or Igranic, Marconiphone).

ACCESSORIES

Batteries
1—Ever Ready 120-volt high-capacity high-tension, 42/6 (or Columbia, Grosvenor).
1—Ever Ready 16-volt grid-bias, 3/6 (or Ediswan, Grosvenor).
1—Exide 2-volt accumulator, type 1CZ6, 17/6 (or Marconiphone, Ediswan).

Cabinet
1—Clarion, with 10-in baseboard (or Pickett, Ready Radio).

Loud-speaker
1—Brown Duplex (or Gecophone, Amplion).

Valves
2—Lissen HL210, 21/- (or Osram HL210, Cossor 210HF).
1—Lissen H210, 10/6 (or Osram H210, Cossor 210RC).
1—Lissen L210, 10/6 (or Osram L210, Cossor 210LF).
1—Osram P240, 12/6 (or Cossor 230XP, Mazda P240).

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

Getting a Laugh Out of Radio!

A SCOT purchased a radio set on the instalment system, and a few days later returned to the dealer to lodge a complaint.

"What is it?" asked the dealer.

"Well, it's aw right to listen to," he replied, "but those valves are nae good to read by. They're too dull."

◆ ◆ ◆

The police found a thief's finger-prints on the receiving set of the house he entered. Those thumb controls again.

◆ ◆ ◆

It is claimed in many parts of Scotland that the inventor of mains supply for receiving sets was a Scotsman.

Quite credible. For who but a Scots radio fan would think of making his wife pay the radio bill as well as the lighting.

Wife, at Cardiff Police Court: "He is a radio fool. Being my second husband, I put up with a good deal from him."

A wireless dealer.

◆ ◆ ◆

"What are you doing?" asked the nurse of John and Mary.

"We're playing a wireless studio," replied John.

"But you should not whisper in a studio," admonished nurse.

"Oh, we're the announcers," said Mary.

◆ ◆ ◆

A Scotsman entered a fine-looking wireless shop to see some receiving sets.

"This," said the dealer, showing a large gramo-radio set, "is worth £80." The Scotsman nodded.

"That is much smaller and is only worth £40." The Scotsman still nodded.

"This, here, is smaller again, but it has no gramo section," continued the dealer. "It's only worth £20."

"Your prices are all right," said the Scotsman, "but your sets are not small enough."

◆ ◆ ◆

A critic assures us that glass-hell accumulators are best.

That explains the crackling noises.

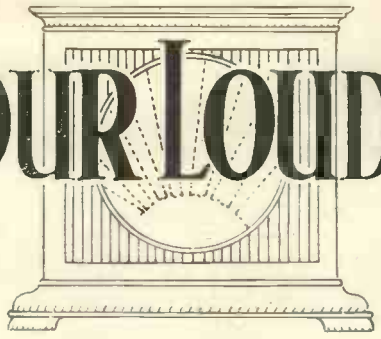
◆ ◆ ◆

Two men had been quarrelling over a receiving set. They appeared at Tottenham Police Court.

Said the defendant: "You could not call it a fight. This fellow was hitting the air. I fell and hit the ground."

The aerial and earth contacts.

INSIDE YOUR LOUD-SPEAKER



In this article W. JAMES explains in simple language the differences between the various types of driving unit employed in modern loud-speakers.

Do you know what type of driving unit is used in your loud-speaker? Read this article and find out how your own instrument works.

THE ordinary reed type of loud-speaker movement looks a very simple piece of electrical apparatus. It comprises a permanent magnet, a pole or poles fitted with coils and an armature or reed. To this reed a driving rod is fitted. A means is usually also provided for adjusting the normal position of the reed with respect to the pole.

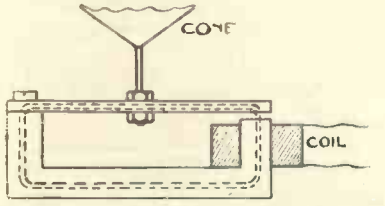


Fig. 1a.—Normal position of armature.

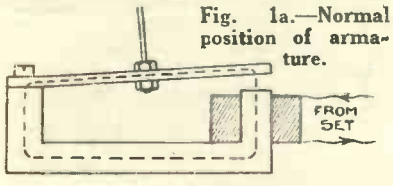


Fig. 1b.—Armature released by opposing magnetic force.

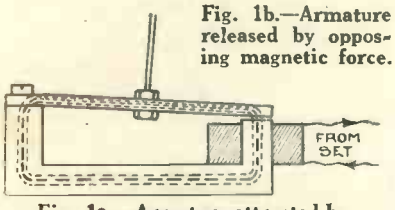


Fig. 1c.—Armature attracted by magnetic force.

Thus there is nothing very much in the ordinary reed movement, although I am bound to add that the design of the parts demands skill and experience.

Grasping Essential Points

Most amateurs know how such a unit drives a cone or diaphragm, and anyone who examines a unit will grasp the essential points. There are really three things to note.

First, that normally there is a short air gap between the end of the pole and the reed shown in Fig. 1. In this position, we will assume the driving rod to be upright. The reed is held in position by two forces; one is its own stiffness and the other is the magnetic pull produced by the magnetic lines of force passing through the reed, pole piece, and magnet.

In the top illustration, two lines of force only are indicated. The second point to note is that when a current passes through the coil of the unit from the receiver to which it is joined, in the direction indicated, the magnetic field is weakened. Therefore the pull exerted is reduced and the reed moves away from the pole.

This is because the current from the receiver is in such a direction that the coil tends to create a magnetic field which opposes that of the permanent magnet, thus reducing the strength of the field in the air gap.

This fact is represented by the single line of force in the second sketch; as the reed is fixed at one end, the driving rod cannot move in a straight line passing through its first position, but tends to tilt over as indicated.

The third point is that when the current from the receiver flows in the reverse direction from that shown in the second sketch the field is strengthened. Therefore the reed is pulled towards the pole.

If the current is a relatively heavy one, corresponding to a strong signal, the reed may be pulled down against the pole, when a click will be heard, or a buzzing sound should the reed be vibrating or chattering as the result of a strong signal.

Such a movement obviously has wave defects. It cannot reproduce without distortion. Much depends upon the characteristics of the cone, of course—its size, shape, weight, stiffness, and method of fixing, but the unit itself distorts and is prone to chatter unless precautions are taken. This type of unit is, therefore, not so suitable for driving a free-edge cone as other types.

The amount of the movement is not proportional to the current flowing through the coil or its frequency Therefore, harmonics are introduced, a form of rectification being set up as the movement one way usually exceeds that in the opposite direction for currents of equal strength.

The sensitivity is only fair. The sounds heard are proportional to the movement of the cone and will, therefore, be greatest when a weak current causes the maximum movement of the reed.

Points for Sensitivity

For sensitivity, the air gap should be short, the magnetic field strong, the reed of suitable proportions and the winding of such a shape and number of turns that the maximum change in the number of magnetic lines of force is produced by a given current.

It is not possible to use a very narrow air gap with such a movement as the reed tends to fall on to the pole; therefore the sensitivity is not so great as in other types, where the construction is such that a shorter air gap may be used.

The actual to-and-fro movement of the reed as the result of the varying currents passing through the coil is very small and the air gap could, therefore, be reduced from this point of view but unfortunately, if the gap is made too fine, chattering results.

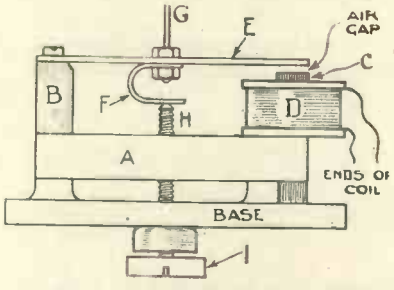


Fig. 2.—Arrangement of simplest reed unit.

In practice, one adjusts the position of the reed with respect to the air

gap whilst receiving, setting the movement for the best quality of the reproduction and the loudest signals.

A typical unit is sketched in Fig. 2. It has a permanent magnet A and a support B to which one end of the reed E is firmly fixed. At the opposite end of the magnet is a pole C fitted with a coil D. The driving rod G is fixed to the reed by nuts as shown, this fixing also holding in position a bent piece of metal F. A screwed rod

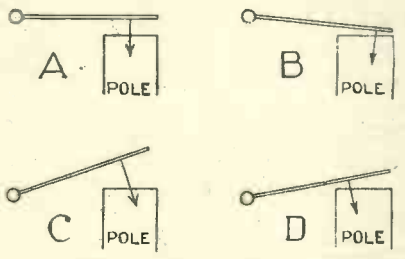


Fig. 3.—Showing how moving force changes with position of armature.

H, having a knob I is provided for the purpose of adjusting the position of the reed.

Typical Construction

As the knob is turned, the flexible piece F is released or pressed, thus allowing the reed to take up a position nearer the pole or further from it. This is a simple form of construction quite typical of the cheaper movements. The reed vibrates, of course, according to the changes in the pull provided by the magnetic field which is created by the magnet and the current passing through the coil from the receiver.

Those who are interested may care to fit reeds of different widths and thicknesses and note the results. It will be found that as the reed is made thinner, the working air gap must be increased. There is also the effect of the natural period of the reed to be noted. Very often, an inexpensive movement may be greatly improved by a little fitting.

Defects Overcome

The defects of the ordinary reed movement as described have been overcome in the Lion type by setting the reed at an angle with the poles. This may be explained by referring to Fig. 3, where sketches A and B show an ordinary unit as it is normally and when pulled down by a signal, and C and D a Lion movement under the same conditions. The diagrams are exaggerated for clearness, of course, but show the principles involved.

In the Lion movement the leverage is decreased as the reed moves towards the pole and, therefore, a signal which strengthens the magnet and so increases the magnetic pull produces the same movement of the driving rod as a decrease in the current does. Thus the air gap may be set very finely and the quality and sensitivity are much better.

A further interesting reed movement is to be seen in the Brown Vee unit. This is shown diagrammatically in Fig. 4, where A is the armature and B the reed of non-magnetic material. The reed obviously travels up and down without moving sideways and therefore provides a more uniform response than is possible with the ordinary reed movement fastened at one end.

A different type of unit, having what is termed a balanced armature, is widely used at the present time and we will therefore see how this type functions and why it may be used with fixed and free-edge cones with success.

A typical unit is illustrated in Fig. 5. There is a powerful permanent of cobalt steel and a pair of stalloy pole pieces, with an armature

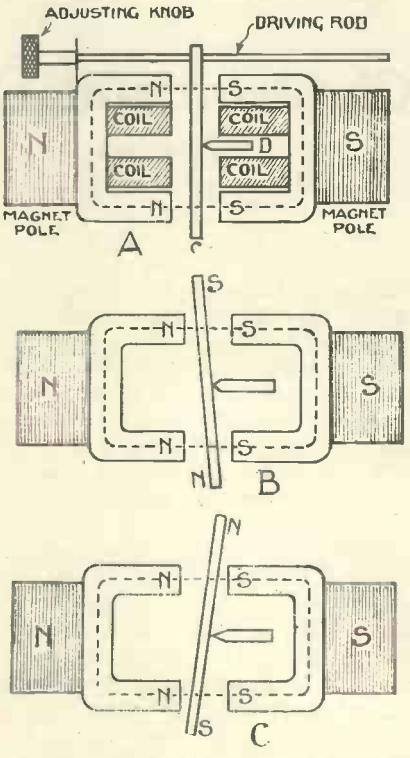


Fig. 5A.—Normal position of balanced armature. Figs. 5B and C.—Operating positions of balanced armature.

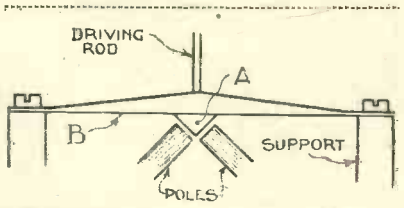


Fig. 4.—Special arrangement of poles in Brown Vee unit.

of soft iron. The armature is balanced on a knife edge D and is therefore free to vibrate between the poles, and in so doing carries the cone driving rod backwards and forwards.

Magnetic Balance

Normally the armature is set in the centre of the poles and is therefore magnetically balanced. The magnetic fields are as represented in Fig. 5A when no signal is being dealt with. But when a current flows through the coils, as in Fig 5B, the armature is magnetised as shown, one end having a north and the other a south pole. It therefore moves to the position indicated.

When, now, a current in the opposite direction passes through the coils from the set, the armature is magnetised in the reverse direction, as in Fig. 5C, and moves to the position indicated. Thus a backwards and forwards motion is imparted to the cone driving rod.

A movement of this type is obviously more sensitive than the simple type of Fig. 1 because the working forces created by the current are greater, but the quality of the reproduction is not necessarily as good as with the corrected movement employed in the Lion unit.

Rectification Effect

Clearly the reed has a sideways movement, although this can be minimised by careful design and manufacture. At the same time the movement is not quite proportional to the current, and therefore the rectification effect occurs.

This form of balanced-armature movement may usually be employed to handle strong signals without chattering, but much depends upon the length of the air gaps and the stiffness of the moving parts. A simple adjustment for setting the armature in its best position may be fitted by extending the driving rod as shown.

The unit sketched is a Watmel and is a good one of its class. The sensitivity is good because of the

Inside Your Loud-speaker—*Continued*

forces which act to drive the rod. Both ends of the armature are acted upon instead of the single end with the type of Fig. 1, and there are actually four poles.

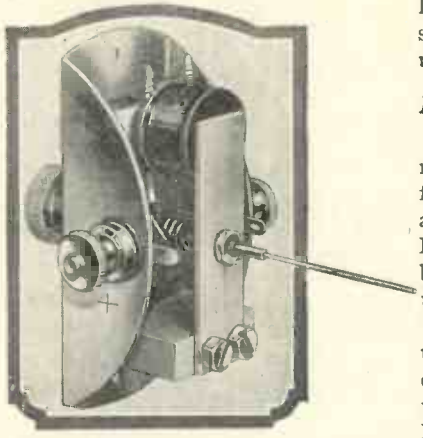
The sketches show how the unit operates, but they are exaggerated for clearness. Although only a few models have been described, the principles are applicable to most of those marketed.

How Sensitivity Is Affected

It is easy to see how one type may be more sensitive than another, as the movement of the armature or reed produced by a given current is proportional to an extent upon the strength of the permanent magnetic field as well as that created by the signal current passing through the coil of the instrument. Usually, the more powerful the magnet the greater the sensitivity and as a strong magnet associated with a movement of normal size must be large, the size of the magnet is some indication of the sensitivity.

The best magnetic materials must be used. Thus the poles are often laminated in order to reduce losses and they may be of special iron in order that the magnetic effect produced by the current passing through the coil shall be the maximum.

The quality of the reproduction



The Gecophone loud-speaker unit has been used in conjunction with the linen loud-speaker described on page 520 and gives excellent results.

actually obtained is, of course, greatly dependent upon the construction of the cone, its mounting and the baffle effect provided, but it must be admitted that the actual design of the unit and its construction is all important.

Rattling, buzzing, and distortion may be produced by fitting an unsuitable cone, perhaps one that is too heavy, and there must be a most suitable type of cone for a particular unit.

Matters for Experiment

These are all matters for experiment, however, but it is hardly fair to judge a unit by fitting it to a cone that happens to be handy. Much better results may be obtained by constructing a cone to suit the unit.

A balanced-armature unit is usually to be preferred for driving a linen-diaphragm type of double cone as the movement is restricted, but even here care is necessary when setting up or buzzing will be produced owing to a one-sided pull on the armature.

The quality of the reproduction to be obtained from a good unit and a suitable cone is such as to be acceptable to most listeners and, indeed, there are those who prefer a first-class instrument of this description to one of the moving-coil type.

A Chat with Clapham and Dwyer (*Continued from page 460*)

First out of the Memorial, so Clapham will insist on dragging Cissie in.

I was told very little about her, for it was a sore subject, but I gathered that she had come into the picture one day at Burford Bridge, and that Clapham had forthwith adopted her. Up to the present, Dwyer appears to have been successful in preventing his partner from leading her up to the studio—although, I will not vouch for this fact, —the former has made sundry attempts to do so.

A Shower of Presents

That Cissie, still modestly remaining in the background, has directly, appealed to the radio public is proved by the fact that presents have been showered upon her. Even well-known firms hearing a casual remark made concerning her health, have posted patent remedies and other veterinary prescriptions to the studio; samples of choice cattle foods have been lavishly submitted, and in fact, I think everything has been done to tempt her into the open.

Once, at Woolwich, Dwyer agreed upon a compromise, namely, that although Cissie was not to appear in public, in flesh and blood, so to speak, he would agree to present a property facsimile of her. On that unique occasion, the audience was disappointed, and the experiment will never again be repeated. Cissie is to remain a myth, and her horns will be used to hang jokes upon.

Do you know, I failed even to ascertain whether she was a Shorthorn, a Fijian, or a dainty Jersey.

There still remains Mr. Spiegel and there, I fancy, Dwyer is liable to meet with trouble. Mr. Spiegel is taboo; he is, I gather, a disreputable friend of Clapham's, whose very name arouses Dwyer's ire. Note how many times an attempt has been made to introduce some story about him into the dialogue, and on every occasion Dwyer, with brutal frankness, has refused to listen to a word.

Perhaps the less said about Spiegel the better, although it is tantalising not to know more about him. However, on one of these evenings, the irrepressible Clapham will let the cat out of the bag and then——

Well, it is the unexpected that pleases in humorous turns and in that respect he will not disappoint us.

Brightening the Programmes

Clapham and Dwyer have created a peculiar form of microphone humour which has deservedly brought them success; it is wholesome fun, frankly spontaneous, and does much to brighten the average wireless programme.

Laugh, and the world laughs with you;
Weep, and you weep alone;
For this brave old Earth must borrow its mirth,
It has troubles enough of its own.

A WORD ABOUT OUR FULL-SIZE BLUEPRINTS

¶ *Do you realise that, except for one or two in a range of nearly 200, all "Wireless Magazine" blueprints are full-scale drawings?* **They are not small-scale drawings which, as you know, are useless as patterns and templates.**

¶ *Do you appreciate the fact that they save much time and trouble in construction, as they can be used as panel and baseboard templates for marking the centres for drilling holes and laying out components?*

¶ *Further than this, do you know that all the connecting wires are numbered separately, so that they can be assembled in the easiest way quite automatically?*

¶ *Remember, also, that a blueprint of any set constructionally described in the "Wireless Magazine" can be obtained for half-price* **during the currency of the issue** *by using the coupon always to be found on page iii of the cover.*

SOME MODERN SETS THAT CAN BE SPECIALLY RECOMMENDED TO CONSTRUCTORS

ONE-VALVE SET

THE A1. Simple set for beginners, with dual-range coil which can be either made at home or bought. Full description on page 29 of August issue. Cost of construction very low. **Blueprint No. WM153, price 1s., post free.**

TWO-VALVE SETS

BROOKMAN'S TWO, designed by W. James. Detector and transformer-coupled low-frequency stage, with 1930 Binowave coil covering both wavebands. Cost of construction approximately £6. Full description on page 340 of November issue. **Blueprint No. WM168, price 1s., post free.**

ETHER RANGER. Will cover every wavelength from 20 to 2,000 (with only a few breaks) by the use of four interchangeable coils. Detector and transformer-coupled low-frequency stage. Cost approximately £7. Spare coils and all batteries are accommodated in cabinet. See page 121 of September issue. **Blueprint No. WM156, price 1s., post free.**

THREE-VALVE SETS

COMMUNITY THREE. Detector and two low-frequency stages, the first resistance coupled and the second transformer coupled. All-wave tuner incorporated and switching provided for use of pick-up. Cost approximately £5. Described on page 355 of November issue. **Blueprint No. WM164, price 1s., post free.**

BROOKMAN'S THREE, designed by W. James. The star set of the Radio Exhibition. Uses the famous 1930 Binowave coils, which give great selectivity and volume. Screened-grid stage, detector, and transformer-coupled low-frequency amplifier. Cost approximately 10 guineas. Constructional article on page 259 of October issue. **Blueprint No. WM161, price 1s., post free.**

FANFARE THREE. Very simple to construct; uses dual-range tuner and can be used for record reproduction. Detector and two transformer-coupled low-frequency valves. All details on page 107 of September issue. **Blueprint No. WM157, price 1s., post free.**

FOUR-VALVE SETS

1930 MONO-DIAL, designed by J. H. Reyner, B.Sc., A.M.I.E.E. Uses two screened-grid high-frequency amplifiers, detector and transformer-coupled low-frequency stage. Dual-range coils controlled by single knob and ganged condensers. Details on page 213 of October issue. **Blueprint No. WM158, price 1s. 6d., post free.**

ELECTRIC FOUR, designed by J. Sieger and D. Sisson Relph. Uses indirectly-heated A.C. mains valves. Screened-grid high-frequency amplifier, detector, resistance-coupled and transformer-coupled low-frequency stages. Needs only a grid-bias battery. Cost, as complete radio gramophone in console-type cabinet, approximately £34. Described on page 285 of October issue. **Blueprint No. WM162, price 1s. 6d., post free.**

1929 CHUMMY, designed by W. James. A most successful dual-range portable, using a screened-grid valve. Transformer-coupled and resistance-coupled low-frequency stages. Cost approximately £14 10s. Fully described on page 411 of June issue. **Blueprint No. WM145, price 1s. 6d., post free.**

FIVE-VALVE SETS

ENCHANTER.—An efficient five-valve portable set, using ordinary three-electrode valves. One-knob tuning and specially large high-tension battery for reliable performance. Completely self-contained with loud-speaker. Described on page 38 of August issue. **Blueprint No. WM150, price 1s. 6d., post free.**

Applications for back copies of the "Wireless Magazine" should be made direct to the Publisher, Bernard Jones Publications, Ltd., 58/61 Fetter Lane, London, E.C.4. All copies are 1s. 3d. each, post free. Applications for blueprints should be addressed to the Blueprint Department. Postage stamps should not be sent as remittances. Note that blueprints of the sets listed above cannot be obtained under the half-price scheme.

EVERYBODY'S GUIDE TO

Moving-coil and Cone Loud-speakers, Loud-speaker Units

Now that almost every listener uses at least one loud-speaker, and sometimes two or more in different rooms of a house, it is a matter of importance to be able to make a choice easily. This is possible by reference to the lists printed below, which embrace no less than thirty-three moving-coil types and seventy-six ordinary cone loud-speakers. Every effort has been made to make this feature representative and all loud-speakers of importance are listed.

MOVING-COIL LOUD-SPEAKERS

Name	Type	Dimensions in inches	Excitation	Resistance in ohms	Price
W.B. (Lodestone)	Chassis Kit	—	6-v. acc. or D.C. mains	—	A.C. £4/4/0 D.C. £4/14/0
Grawor	Chassis	—	Battery or D.C. mains	—	£4/10/0
Hegra	Chassis	—	6-v. acc. or D.C. mains	—	£4/10/0
Epoch	Cabinet	17 high	.05 to 6 amp.	High or Low	Oak £4/15/0 to £10/7/6
Grassman	Chassis	—	6-v.; A.C. and D.C.	2,400	6-v. and D.C. £4/17/6 A.C. £8/5/0
Goodman	Invincible Chassis	—	6-v. ½ amp.	Low	£4/19/6
Zampa	Chassis	11×11×9	6-v. .65 amp.	Low	£5/5/0
Goodman	Invincible A.C. and D.C.	—	D.C. and A.C.	Low	D.C. £5/9/6 A.C. £7/14/6
Webson	Chassis	13 high	D.C. or 6-v. acc.	—	£5/10/0
Zampa	Chassis	11×11×9	D.C. mains 1 amp.	Low	£5/10/0
Baker	Chassis	12×12×9	6-v.; A.C. or D.C.	High or Low	6-v. £5/15/0 A.C. £9/0/0 D.C. £6/0/0
Lissen	Cabinet	—	D.C. mains	Low	Oak £5/15/0 Mah. £6/0/0
Epoch	Oak Cabinet	17 high	Permanent Magnet	High or Low	£6/2/6
Baker	Chassis	12×12×9	Permanent Magnet	High or Low	£6/5/0
Ferranti	Chassis	—	A.C. or D.C. Mains	20	A.C. £10/0/0 D.C. £6/10/0
Epoch	Chassis	—	Permanent Magnet	High or Low	£6/15/0
Marconiphone	Cabinet	—	6-v. .6 amp.	Low	£7/0/0
B.T.H.	R.K. Chassis	13 high	6-v. acc. and D.C. Mains	10–15	£7/7/0
Marconiphone	Cabinet	—	A.C. or D.C. Mains	Low	D.C. £7/10/0 A.C. £12/12/0
Zampa	Chassis	11×11×9	A.C. Mains 9-v 1 amp.	Low	£7/10/0
Magnavox	Chassis	10½ cone	D.C. or A.C. Mains	—	D.C. £8/5/0 A.C. £11/0/0
Lissen	Cabinet	—	Permanent Magnet	Low	Oak £9/10/0 Mah. £9/15/0
Ferranti	Table	18×16×12	A.C. Mains	Low	Chassis £10/0/0 With Cabinet £18/18/0
B.T.H.	R.K. Chassis	14 high	A.C. Mains	10–15	£11/10/0
Brown	Cabinet A	—	Permanent Magnet or 6-v. acc.	—	£15/15/0
M.P.A.	Cabinet	—	Permanent Magnet	—	£15/15/0
Philips	Type 2011 Pedestal	29 high	Permanent Magnet	—	£15/15/0
Brown	Cabinets B and C	—	D.C. or A.C. Mains	—	D.C. £16/10/0 A.C. £21/0/0
Ferranti	Pedestal	48	A.C. or D.C. Mains	Low	A.C. £18/18/0 D.C. £14/18/0
Celestion	Cabinet	40½×24×14	5-v. 1 amp.	High	Oak £24/0/0 Mah. £25/0/0
Celestion	Cabinet	40½×24×14	D.C. and A.C.	High	Oak £24/12/6 Mah. £25/12/6
Burndept	Cabinet	11¾ high	6-v.; A.C. and D.C.	—	Not yet available
Kolster Brandes	KB151	18½×23¼×11½	5-v. .63 amp.	Low	Not yet fixed

CONE LOUD-SPEAKERS

Name	Type	Dimensions in inches	Driving Unit	Resistance in ohms	Price (Mahogany or Oak)
Lissen	Open Cone	—	Adjustable Reed	2,000	19/6

CONE LOUD-SPEAKERS—*Continued*

Name	Type	Dimensions in inches	Driving Unit	Resistance in ohms	Price (Mahogany or Oak)
Amplion	Guinea Cone	13½ dia.	Adjustable Reed	1,000	£1/1/0
Dr. Nesper	Parabol Horn	15 high	Adjustable Diaphragm	High	£1/5/0
M.P.A.	Popular Plaque	—	—	—	£1/5/0
Ridged-Cone	Plaque	13½ high	Reed	2,000	£1/5/0
Amplion	Swan Neck	20 high	Adjustable Diaphragm	2,000	£1/7/6
Lissen	Horn	21¾ high	Adjustable Diaphragm	2,000	£1/7/6
Ormond	Cabinet	12×12×6½	Adjustable Reed	High	£1/9/6
Marconiphone	Plaque	14 high	Adjustable Reed	2,000	£1/10/0
Dr. Nesper	Dragon	17½ high	Adjustable Diaphragm	High	£1/12/6
G.E.C.	Plaque	15 high	Adjustable Reed	Medium	£1/12/6
Grawor	Melodia Cabinet	13½ high	Adjustable Reed	—	£1/12/6
Puravox	Open Cone	17½ high	Adjustable Reed	2,000	£1/12/6
Brown	Duckling	9½ high	Adjustable Reed	2,000	£1/15/0
Dr. Nesper	Horn	25 high	Adjustable Diaphragm	High	£1/16/0
Amplion	Standard Open Cone	16½ dia.	Reed Unit	1,000	£1/19/6
Climax	Cabinet	12 high	Adjustable Reed	2,000	£1/19/6
Dibben	Table	12 high	Two-pole	High	Mah. £2/7/6 Oak £2/2/0
W.B.	Cone	—	Adjustable Reed	—	£2/2/0
B.T.H.	Horn	23 high	Adjustable Diaphragm	—	£2/5/0
Loewe	Cabinet	13×13×5½	Adjustable Two pole	2,000	£2/5/0
M.P.A.	Popular Cabinet	—	—	—	Mah. £2/7/6 Oak £2/5/0
Puravox	Cabinet Cone Oak	15¾×15½×7	Adjustable Reed	2,000	£2/7/6
Burndept	Table	14×15×5	Adjustable Reed	High	Mah. £2/10/0 Oak £2/10/0
G.E.C.	Plaque	17 high	Adjustable Armature	2,500	£2/10/0
Ormond	Cabinet	13½×13½×6½	Adjustable Reed	2,000	£2/10/0
Philips	Plaque	12¾×13×4½	Balanced Armature	2,000	£2/10/0
Amplion	Dragon	19½ high	Adjustable Diaphragm	2,000	£2/12/6
Trix	Cabinet	14½×14½×6½	Adjustable Reed	High	Mah. £3/3/0 Oak £2/12/6
Grawor	Orchestra Cabinet	17 high	Adjustable Four-pole	—	£2/15/0
Lamplugh	Cabinet	13½×13½×6	Adjustable Reed	2,000	£2/15/0
Watmel	Table Cabinet	14×14×8	Balanced Differential Unit	2,000	£2/15/0
Puravox	Cabinet, Mahogany	14×14½×7	Adjustable Reed	2,000	£2/17/6
Amplion	Cabinet Cone	13 high	Adjustable Reed	1,000	Mah. £3/3/0 Oak £3/0/0
B.T.H.	Cone	15 dia.	Balanced Armature	—	£3/0/0
Marconiphone	Cabinet M.60	—	Adjustable Reed	2,000	£3/0/0
Puravox	Cabinet, Oak	15½×15×16½	Adjustable Reed	2,000	£3/2/6
Brown	HQ Horn	20 high	Adjustable Diaphragm	2,000	£3/3/0
Grawor	Choralion Cabinet	16 high	Adjustable Reed	—	£3/5/0

LOUD-SPEAKERS for 1930

and Chassis Arranged on Convenient Price Basis

Many amateurs nowadays prefer to make their own instruments with a suitable unit and chassis, rather than buy a complete loud-speaker. Twenty-two different units are here listed, as well as nineteen types of chassis. If any further particulars are required readers are recommended to get in touch with manufacturers. Should any difficulty arise write to:—"Loud-speaker Guide," WIRELESSS MAGAZINE, 58 61 Fetter Lane, London, E.C.4. See also advertisements

CONE LOUD-SPEAKERS—*Continued*

Name	Type	Dimensions in inches	Driving Unit	Resistance in ohms	Price (Mahogany or Oak)
Lamplugh ..	Plaque ..	20 deep	Balanced Armature Not Adjustable	2,000	£3/15/0
Amplion ..	Dragon ..	20½ high	Adjustable Diaphragm	2,000	Mah. £3/12/6 Oak £3/8/6
Brown ..	Mascot ..	13 high	Adjustable Reed	2,000	£3/10/0
Celestion ..	Cabinet C10	12×12×5	Adjustable Reed	2,000	Mah. £3/17/6 Oak £3/15/0
Dibben ..	Table ..	18 high	Four-pole Balanced Armature	High	£3/15/0
Kolster Brandes	Cabinet, Ellipticon	13×10½×7½	Four-pole Reed Type	1,500	Mah. £3/17/6 Oak £3/17/6
G.E.C. ..	Standard Cabinet	21½×16½	Balanced Armature	High	£4/0/0
Blue Spot ..	Cabinet ..	11½×17½×5	66K	1,500	£4/4/0
Burndept ..	Minstrel ..	14 high	Balanced Armature	High	£4/4/0
Grawor ..	Sectral A. Cabinet	15½ high	Special Unit	2,000	£4/4/0
Puravox ..	Cabinet Cone Mahogany	15×15½×8	Adjustable Reed	2,000	£4/5/0
Wates ..	Cabinet ..	14×14×8½	Star Unit	500	Mah. £4/15/0 Oak £4/10/0
Amplion ..	Cabinet Cone	14 high	Balanced Armature	500, 700 & 1,250	Mah. £4/17/6 Oak £4/10/0
Lamplugh ..	Cabinet ..	20×19×6	Balanced Armature Not Adjustable	2,000	£4/15/0
G.E.C. ..	Screen Model	32½×25×9	Balanced Armature	High	£5/0/0
Donotone ..	Cabinet ..	12 dia.	Balanced Armature	—	£5/5/0
Kolster Brandes	K.B.72 Cabinet	17¼×15⅝×8½	Balanced or Pivoted Armature	760	Mah. £6/6/0 Oak £5/5/0
Philips ..	Double Cone	19×18×4½	Balanced Armature	2,000	£5/5/0
Brown ..	V.10 Duplex	13¾ high	Adjustable reed	1,500	£5/10/0
G.E.C. ..	Cabinet ..	16½×13½×7½	Balanced Armature	High	Mah., £5/10/0 Oak, £5/10/0
Celestion ..	Cabinet C.12	14×14×6	Adjustable Reed	2,000	Mah., £5/17/6 Oak, £5/12/6
Amplion ..	Standard Lion Chassis	17½ high	Adjustable Reed	650	£6/0/0
Blue Spot ..	Cabinet ..	18½×17×9½	66K	1,500	£6/6/0
Dibben ..	Floor type..	29½ high	Four-pole Balanced Armature	High	£6/6/0
Grawor ..	Sectorphone Model A Cabinet	18½	Special Four-pole	2,000	£7/7/0
Kolster Brandes	K.B.135 Cabinet	18¼×23¼×11½	Balanced or Pivoted Armature	760	Mah., £8/8/0 Oak, £7/7/0
Brown ..	V.12 Duplex	16 high	Adjustable Reed	1,500	£7/10/0
Celestion ..	Cabinet Z.20	19½×18×8½	Adjustable Reed	750	Mah., £8/5/0 Oak, £7/15/0
Amplion ..	Lion Cabinet	18⅞ high	Adjustable Reed	650	Mah., £8/15.0 Oak, £8/0/0
Amplion ..	Power Lion	21½ high	Adjustable Reed	650	£8/0/0
Amplion ..	Lion Pedestal	29½ high	Adjustable Reed	650	Mah., £9/15/0 Oak, £9/0/0
Burndept ..	Console ..	18 high	Balanced Armature	High	Mah., £9/9/0 Oak, £9/0/0
Celestion ..	Cabinet C.14	20½×20½×9½	Adjustable Reed	750	Mah., £11/7/6 Oak, £11/0/0
Brown ..	V.15 Duplex	19 high	Balanced Armature	1,500	£12/10/0
Amplion ..	Lion Concert Cabinet	40 high	Adjustable Reed	650	Mah., £16/0/0 Oak, £15/0/0
Celestion ..	Cabinet Z.25	24×24×11½	Adjustable Reed	750	Mah., £15/15/0 Oak, £15/0/0

CONE LOUD-SPEAKERS—*Continued*

Name	Type	Dimensions in inches	Driving Unit	Resistance in ohms	Price (Mahogany or Oak)
Celestion ..	Cabinet C.24	30×47×18	Adjustable Reed	750	Mah., £21/0/0 Oak, £20/0/0

LOUD-SPEAKER UNITS

Name of Unit	Type of Drive	Price
Lissen	Four-pole	12/6
M.P.A.	Adjustable Reed	12/6
Ormond	Four-pole Adjustable Reed	12/6
W.B.	Four-pole Balanced Armature ..	12/6
Grawor	Reed	13/6 and 16/6
Hegra	Balanced Armature	13/6
Loewe	Two-pole	13/6
Dr. Nesper ..	Adjustable Reed	14/0
Ediswan	Balanced Armature	15/0
G.E.C.	Adjustable Reed	15/0
Puravox	Adjustable Reed	15/0
Symphony	Balanced Reed	15/0
Watmel	Balanced Armature	18/6
Watmel	Four-pole Balanced Armature ..	18/6
Grassman	Four-pole Balanced Armature ..	19/6
G.E.C.	Adjustable Armature	£1/1/0
Grawor	Four-pole Balanced Armature ..	£1/1/0
Six Sixty	Adjustable Reed	£1/2/6
Blue Spot	Four-pole	£1/5/0
Brown	Adjustable Reed	£1/5/0
Goodman	Balanced Armature	£1/7/6
Wates	Four-pole	£1/16/0

LOUD-SPEAKER CHASSIS

Name	Max. Diameter of Cone	Max. Depth of Cone	Suitable Units	Price
Ormond ..	9 in.	2⅞ in.	Most Units	7/6
W.B.	—	—	Most	10/6
Zampa ..	6 in.	3 in.	All Types	10/6
Hegra ..	9 in.	—	Most	11/6
Wates ..	14 in.	4½ in.	All Cone Units	12/0
Blue Spot ..	11 in.	2⅝ in.	Blue Spot 66K	12/6
Ediswan ..	12½ in.	3 in.	Most	12/6
Grawor ..	12 in.	3 in.	All Grawor Cone Units	12/6
Watmel ..	10 in.	3½ in.	All Units	12/6
White Spot ..	12¼ in.	4½ in.	Most	12/6
Baker	9 in.	3 in.	All Types	14/0
Blue Spot ..	14¼ in.	7 in.	Blue Spot 66K	15/0
Squire ..	9½ in.	—	All	15/0
Goodman ..	—	—	Most	£1/12/6
Zampa ..	13¾ in.	2⅜ and 1½ in.	All Types	£1/12/6
Kolster Brandes	9⅜ in.	3⅛ in.	Complete Chassis	£2/10/0
Celestion ..	10 in.	3 in.	Unit Incorporated	£3/5/0
Celestion ..	12 in.	3⅜ in.	Unit Incorporated	£4/10/0
Celestion ..	14 in.	4½ in.	Unit Incorporated	£5/17/6

IN THE FOLLOWING PAGES WILL BE FOUND ILLUSTRATIONS OF SEVENTY-ODD LOUD-SPEAKERS, UNITS AND CHASSIS, MANY OF WHICH ARE ACCOMPANIED BY REPORTS ON TESTS ACTUALLY MADE IN THE "WIRELESS MAGAZINE" LABORATORIES.

LAMPLUGH

This Qualkon loud-speaker is of the usual cabinet type. Embodied in the cabinet, which is of good appearance, is a standard cone unit, claimed to be both sensitive and powerful. According to the listener's requirements, this loud-speaker can be supplied in oak or mahogany, for £4 15s.

MARCONIPHONE

Embodying the improved Marconiphone reed system, this model 60 Marconiphone loud-speaker is claimed to be sufficiently sensitive to operate a simple two-valve set. The adjustment of the knob at the back enables this speaker to handle the full output of a powerful four- or five-valve set. Its price is £3.

AMPLION

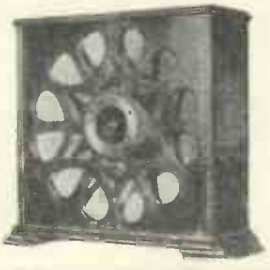
For listeners who prefer the horn type of loud-speaker, the Amplion Dragon shown here can be recommended. The patented construction, it is stated, eliminates metallic resonance. This all-metal model, type AR19, is £2 12s. 6d.

AMPLION ✱

The Amplion Lion was found to be well balanced. It needs plenty of power to work well. It has a good even response, the bass notes being particularly natural. This chassis is £6 for the standard type, L14, and £8 for the power type, L18P.

AMPLION

For those desiring a low-priced cabinet cone loud-speaker of simple design and pleasing appearance, there is the Amplion Junior cabinet cone. Without unduly emphasising either the bass or high notes, this model is claimed as a reproducer of a wide range of frequencies. In oak, it is £3, and in mahogany, 3 guineas.



MARCONIPHONE

The new Marconiphone moving-coil loud-speaker chassis has a built-in step-down transformer. It is available in three types. With a 6-volt accumulator it passes .6 ampere. For D.C. mains, between 100 and 250 volts, the consumption is 60 milliamperes. There is also an A.C. model for 200- to 250-volt mains. The prices range from £7 to 12 guineas.

MARCONIPHONE

Improvements in both sensitivity and tone are embodied in the new Marconiphone Octagon loud-speaker. Its price has been reduced to 30s. Two models are available, one with the familiar flower design and the other with a different fret. Both types can be either hung from the wall or rested on a table.

BAKER

This Super Power 1930 model moving-coil loud-speaker can be worked from either A.C. or D.C. mains. For those without mains, a 6-volt model can be run from an accumulator. All models embody a new centering device and a new light-weight moving coil. The finish is in gun-metal and polished aluminium. Prices vary from £5 15s. for 6-volt model to £9 for 9-volt 2-ampere model.

PHILIPS ✱

A new and ornate moving-coil loud-speaker we have tested and found extremely good. It handles a large amount of power and has an extremely even response. The price with step-down transformer is 15 guineas (8 guineas for unit only without step-down transformer). It is important to note that no external power is required to work this moving-coil loud-speaker, which has a cobalt-steel permanent magnet.

"W.M." Photo

GECOPHONE ✱

A high-class cabinet cone loud-speaker which is claimed to give excellent quality reproduction. The price in mahogany or oak is £5 10s. The appearance is good, harmonising with the average surroundings of the home. We have found this model to be quite sensitive when used with a low-power receiver; the reproduction is a trifle low-pitched.

BAKER

Claimed to give a combination of tonal purity and volume, the Baker 1930 Super model moving-coil loud-speaker is a slightly cheaper loud-speaker than the Super Power models already mentioned. For mains and accumulator working, this speaker is designed to give good results at a moderate price. The cost is £5 for the 6-volt type, rising to £8 7s. 6d. for the 9-volt 2-ampere model.

A star (★) indicates that the loud-speaker has actually been tested in the "W.M." laboratories.

ZAMPA ✱

Another moving-coil loud-speaker that can be used with either mains or an accumulator, the Zampa varies in price from 5 guineas to £7 10s. according to type. It has an adjustable centering device, which we found quite effective in our test of the model submitted. Reproduction we found to be good over the entire range of musical frequencies.

"W.M." Photo

GRAWOR ✱

"W.M." Photo

This loud-speaker has plenty of bass, and the general tone is crisp and pleasing. The model tested was housed in a polished walnut cabinet, price £3 5s. The adjustable unit is quite sensitive, giving good volume on a two-valve set. It does not easily overload when extra volume is put through it.

AMPLION

A de-luxe loud-speaker, the Amplion Lion Concert Cabinet Model is a handsome model that is claimed to do full justice to the good qualities of the Lion mechanism. This loud-speaker embodies the power chassis already mentioned (see opposite page). In oak it is £15, and in mahogany, £16. This loud-speaker is incorporated in a large console-type cabinet.

WATES ✱

"W.M." Photo

In our test of the Wates cone loud-speaker we found it fairly sensitive. It gave clean-cut reproduction; the four coils in the unit justify themselves. It is a good all-round loud-speaker and its price of £4 10s. is reasonable in view of the performance. This loud-speaker is interesting because it has a double construction for the magnet system. The dual adjustment works well.

AMPLION

A handsome piece of furniture is the Amplion Lion Pedestal cabinet model. It has the same movement and cone as the table cabinet model, but as the baffle board effect is greater, bass notes are more pronounced. The price in oak is £9, and in mahogany, £9 15s. As may be expected, the volume of sound available is considerable.

GECOPHONE

An entirely new movement is employed in this Stork loud-speaker, which is of the cone-plaque type. A support is provided so that the speaker can be used as a table model if desired. The price of this Senior plaque is only £2 10s.

AMPLION

Known as "a senior speaker at a junior price," the Amplion Swan-Neck type AR9 at £1 7s. 6d. is useful for working low-power sets. It should give quite pleasing reproduction.

STAR ✱

In our test of the Webson moving-coil loud-speaker, made by the Star Engineering Co., we noted that it was not easily overloaded. It is inclined to be high-pitched for its type. The reproduction is clear. Its price is moderate, being £5 10s.

W.M." Photo

AMPLION

A very popular model, noted for its mellow tone, is the Amplion Dragon with wooden flare. In oak it is £3 8s. 6d., and in mahogany, £3 12s. 6d.

BAKER

Baker's 1930 permanent-magnet moving-coil loud-speaker has been improved in design. It is claimed to give nearly 40 per cent. increased efficiency. It has the characteristic quality of a moving-coil loud-speaker, but requires no external excitation. Price £6 5s.

GECOPHONE

Specially designed to give a high standard of reproduction when the input is small, the Gecophone Junior plaque loud-speaker at £1 12s. 6d. is good value for money. The circular frame and cone are finished in a rich old bronze colour.

A star (★) indicates that the loud-speaker has actually been tested in the "W.M." laboratories.

AMPLION ✱

Another Amplion in the wide range available is the Standard cabinet cone. Alternative values of impedance are available. The attractively designed cabinet is beautifully finished. The balanced-armature unit is noted for its sensitivity. The price in oak is £4 10s., and £4 17s. 6d. in mahogany.

"W.M." Photo

SQUIRE ✱

"W.M." Photo

An extremely flexible loud-speaker chassis is the Squire model, which we tested in conjunction with a Blue Spot unit. The result was very pleasing, but on the high-pitched side. The combination gives a performance which, for the outlay involved, is quite remarkable. The price of the chassis varies according to the size, from 10s. 6d. to 39s. 6d.

WATMEL ✱

A loud-speaker which, when assembled, provides a good all-round reproducer, is offered by Watmel. We found the assembly very sensitive to weak signals. It gave a pleasant all-round reproduction when tried with a standard receiver. It embodies a four-pole balanced - armature unit, price 18s. 6d. The loud-speaker chassis can be had for 12s. 6d.

"W.M." Photo

J.R. WIRELESS ✱

"W.M." Photo

We utilised the J.R. cone assembly in conjunction with a Watmel unit and obtained quite satisfactory results. The cone assembly lends itself to a variety of units. With the unit used the cone appeared to do it justice. This assembly is of special interest to those keen on assembling their own loud-speakers at a minimum cost. This cone need not be supported all round the periphery as is usual with such assemblies.

CLIMAX ✱

One of the most inexpensive cabinet cone loud-speakers available is the Climax Chello. As a result of our tests we can say that it is good value for 39s. 6d. The tone is rather low-pitched, but the absence of "boominess" rules out any objection to the accentuation of the low notes. It is a good all-round speaker of average sensitivity.

"W.M." Photo

KOLSTER BRANDES

Housed in an attractive cabinet this Kolster Brandes KB72 loud-speaker is claimed to give results as good as those from a moving coil. The KB72 is available in a chassis model ready for mounting either in a cabinet or on a baffle board. In oak the cabinet loud-speaker is 5 guineas and in mahogany or walnut 6 guineas. The chassis is £2 10s.

TRIX ✱

A low-priced cabinet cone loud-speaker, the Trix model gives pleasing reproduction of bass notes. The sensitivity is moderate. There is a cut-off on the very high notes. The general reproduction is good for the price. In oak, the price is £2 12s. 6d., and in mahogany or walnut, 3 guineas.

"W.M." Photo

AMPLION ✱

For listeners who require a low-priced reproducer of good tone the Amplion Guinea cone is almost unique. It is designed for hanging from a wall, for which purpose a heavy silk cord is provided.

PHILIPS ✱

In the Philips type 2007 loud-speaker is fitted a large movement which, as our tests showed, enables it to handle a large amount of power without overloading. The switch giving three different impedance values is useful. The price, 5 guineas, is justified.

CELESTION

One of the best-known loud-speakers, the Celestion model C14 incorporates a special magnetic system with a cobalt-steel magnet and a 14-inch diaphragm. The resistance is 750 ohms. In walnut the price is £12, in mahogany £11 7s. 6d., and in oak £11.

KOLSTER BRANDES

Claimed to introduce new principles in winding and armature mounting, the Kolster Brandes KB135 cone loud-speaker is a good-looking model of robust construction. It embodies an input transformer. The price in oak is 7 guineas.

A star (★) indicates that the loud-speaker has actually been tested in the "W.M." laboratories.

AMPLION

One of the best Amplion cone loud-speakers for general use is the Amplion table cabinet model, made of polished oak in a simple but distinctive design. In this model is incorporated the standard Lion chassis, comprising a 14-inch cone diaphragm and a Lion unit. The price is £8.

GECOPHONE ✱

Introduced this season, the Gecophone cabinet model of the Stork cone loud-speaker strikes a new note in design. The front of the loud-speaker is sloped and exposes an ornamental fret backed by an artistic fabric of blue and gold. In mahogany the price is £4, and in oak, £3 15s.

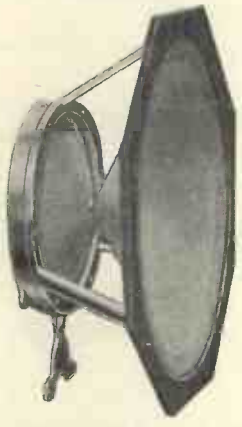
AMPLION

Another of the standard Amplion Lion loud-speakers is the LC41, which, in its cabinet of polished mahogany, is good value for money at £8 15s. It incorporates the standard Lion chassis, comprising a 14-inch cone diaphragm and a Lion unit.

GECOPHONE

An unusual design for a loud-speaker is the Gecophone screen type. The cone is fitted into a walnut-finished fire screen which acts as a baffle. The price is 5 guineas.

SQUIRE



The Squire double-aluminium cradle frame is admirably suited for a Blue Spot unit. The price is 39s. 6d.

PAREX

"W.M." Photo

A novel type of loud-speaker is the Parex dual-purpose loud-speaker clock. A "self-fed" electric clock is combined with a standard cone loud-speaker assembly, in a cabinet of either oak or mahogany. The price is seven guineas.

KOLSTER BRANDES

A Kolster-Brandes moving-coil loud-speaker embodying a step-down transformer is model KB151. This is run from a 6-volt accumulator and not from the mains. Its price has not yet been fixed. Further details will be announced when they are available. Interested readers can, of course, apply direct to the manufacturers.

AMPLION

An easel type loud-speaker, which may also be hung from a picture rail if desired, is the Amplion Standard open cone. The cone is tinted to harmonise with the brown bakelite rim. It is especially useful with low-power sets. Its price, £1 19s. 6d., should make a popular appeal to many listeners of only moderate means.

ZAMPA

Constructed on unusual principles, the Zampa twin-cone speaker unit is of principal interest to constructors. The twin cone is housed in an oxidised or pewter finished circular shell (which forms the cabinet) standing on four ball feet. The price is 35s. Cotton-wool damping is placed round the edges of the cones to prevent metallic resonance.

"W.M." Photo

GECOPHONE ✱

The Gecophone standard cone loud-speaker is finished in a rich coin bronze. It has an adjustable sloping cone, which gives good quality reproduction when used with the average set. The price is £4.

SIX SIXTY

Of interest to those who like constructing their own loud-speakers is the Six-Sixty reed-type loud-speaker unit, which is available complete with cone and felt pad for 22s. 6d. The resistance of the unit is 2,000 ohms and it is claimed to give good results when the cone is suitably suspended. With a properly designed cabinet this assembly completes what should be a useful, effective and inexpensive loud-speaker.

"W.M." Photo

A star (★) indicates that the loud-speaker has actually been tested in the "W.M." laboratories.

PHILIPS ✱

An inexpensive Philips loud-speaker that can be hung on the wall or stood on a table. A dual-tone switch is a useful refinement. Price £2 10s.

M.P.A.

In the M.P.A. range of loud-speakers is a moving-coil model having a permanent magnet. The price complete is 15 guineas. The unit can be bought separately for 12 guineas.

GOODMAN

Known as the dual-cone chassis assembly, the Goodman combined baffle system, price 32s. 6d., has been developed to give perfectly balanced reproduction.

GOODMAN

The Goodman loud-speaker unit is specially good in conjunction with the linen-diaphragm type of loud-speaker. The armature is permanently balanced between four laminated poles. The magnets, pole pieces, armature holder, and bobbins are held in position by a strong die-casting. Its price is 29s. 6d.

BURNDEPT

The Burndept Console loud-speaker is a handsome piece of furniture. It can be obtained in oak for £9, or in mahogany for 9 guineas. The driving unit is a balanced armature of high resistance. It is adjustable. This loud-speaker incorporates the Minstrel double diaphragm.

LOEWE ✱

A good inexpensive loud-speaker is the Loewe, price 45s. On test, we found the tone clean-cut and pleasing. The reproduction tended to be high-pitched, but this was not objectionable. The name on top of the cabinet is rather prominent and would be less offensive if placed elsewhere or removed entirely.

BLUE SPOT ✱

The Blue Spot Goliath loud-speaker impressed us on test. It is sensitive to weak signals and inclined to be high-pitched. It will take considerable power without rattling. The adjustable unit is critical in its setting for best results. The Goliath is an excellent loud-speaker. Used with several different outputs, the results were uniformly satisfactory. The price is 6 guineas.

GOODMAN

The Goodman Invincible moving-coil loud-speaker chassis is designed to give the highest possible standard of reproduction at a low price. There is a 6-volt model at £4 19s. 6d., and models for D.C. and A.C. mains, priced respectively at £5 9s. 6d. and £7 14s. 6d.

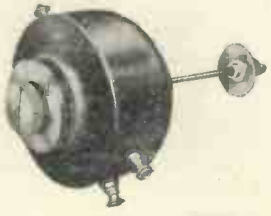
PAREX

An inexpensive model of the new Parex combined electric clock and loud-speaker is available, price £2 10s. This is in a mahogany or oak cabinet. The claims made for this unique instrument are that the clock is perfectly silent in action and will run for many months without attention.

READY RADIO ✱

In our test of the Ready Radio moving-coil loud-speaker chassis we obtained excellent reproduction well up to the standard to be expected from this type of reproducer. At £6, the chassis can be recommended to listeners as an inexpensive proposition.

M.P.A.

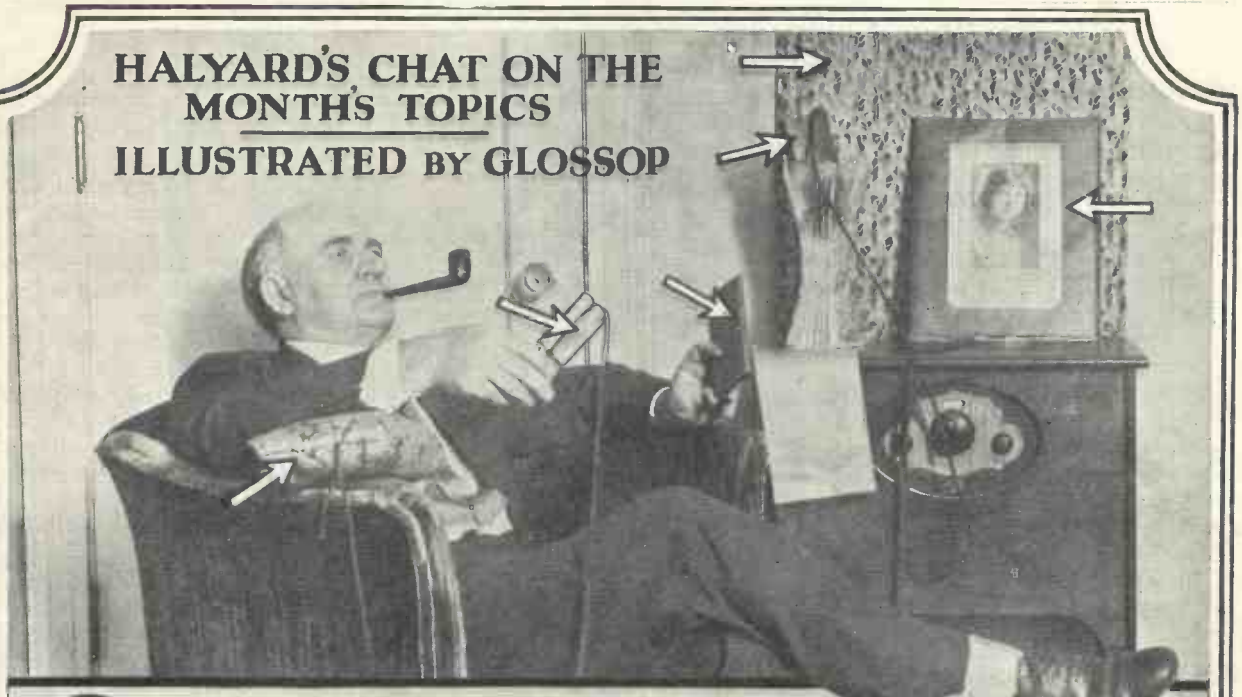


For constructors of loud-speakers, the M.P.A Mark IV unit, price 12s. 6d., should prove attractive. The unit is claimed to be very sensitive and to combine brilliance of tone with even response. A chassis or the unit, with a 14-in. baffle and a 9-in. cone, can be had for 10s.

A star (✱) indicates that the loud-speaker has actually been tested in the "W.M." laboratories.

Continued on page 546.

HALYARD'S CHAT ON THE MONTH'S TOPICS
ILLUSTRATED BY GLOSSOP



Under My Aerial

[*Above you see E. L. Rice, the well-known American experimenter, with a new type of loud-speaker. There are six loud-speakers altogether, as indicated by the arrows.*]

The Height of the Season

GRANTED that there is a wireless listening season during the winter, when would you say that season reaches its height? You know how the holiday season reaches its peak in August. Is there any corresponding month in the winter when the wireless season may be said to reach its highest point of activity?

We have a very well-marked beginning of our winter period of wireless activity. There are the wireless exhibitions at Olympia and Manchester, and there is the change from summer time to winter time. After these events, the winter wireless season goes on placidly, and there appears to be nothing of moment to mark the season's climax.

Still, I should like to pursue the idea of there being a height to our winter wireless season. Can you help me? If you are a short-wave enthusiast, you would be easily able to fix on your height of the wireless season. It would be the period when short-wave stations come tumbling in at astounding strength.

Well-marked beginning

Some of us might be inclined to judge the season according to the way in which the American medium-wave stations come in. These stations begin to make themselves heard more or less in October, and they get better and better until they reach their best—when? At the height of the wireless season?

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Moorside Edge

Do you remember all the pother there was about the pronunciation of Daventry when station 5XX was opened? The local pronunciation was Daintree, but the B.B.C. decided to pronounce the word according to its spelling, and so Dav-en-try has become one of the most familiar place-names in the English language.

It seems rather strange that the B.B.C. should have run up against a similar peck of trouble regarding the Pennine regional station's name. Slaithwaite is the nearest town to the site of the new station, and Slaithwaite had every reason to hope for great wireless fame.

As in the case of Daventry, the B.B.C. could not reconcile itself to the local pronunciation of the place-name. I, for one, am not surprised at this, for Slewit is not in the least comparable with the rejected Daintree, which is rather a pretty word.

Not suitable for broadcasting

Very much to the disappointment of Slaithwaite, the B.B.C. has come to the conclusion that the word Slaithwaite, pronounced according to its spelling, is not suitable for broadcasting, and so the new station is to be known as Moorside Edge.

Under My Aerial—*Continued*

I have been wondering if this choice was partly determined because of the three syllables contained in the double word. Daventry, Brookman's Park, Moorside Edge, 5XX, 5GB, 2LO—there are three syllables in each.

Perhaps the B.B.C. prefers a three-syllable call-name or call-sign.

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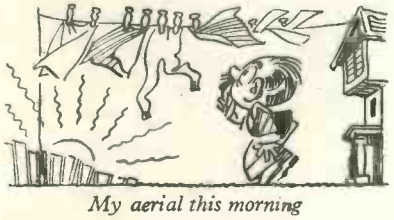
Casualties

Has there been an aerial casualty in your neighbourhood yet this winter? There has been one such casualty in my road, and we are not half-way through November. The worst of it is that the aerial which is down belongs to me.

Funny, isn't it? I've been giving advice for years as to the need for a general overhauling of an aerial in



My aerial this morning

late summer, and here I am with my aerial down because I forgot to act according to my own advice.

You can imagine what my feelings were when I saw my aerial this morning. There was no need to go out and conduct a post-mortem on the spot. It was all too evident that the rope on the aerial mast had snapped near the pulley.

My aerial mast, as you know, is fixed in a tree. To put my aerial wire up again I shall have to climb into the tree, let the mast down to the ground, and then let it fall from a vertical position to a horizontal position.

Then I shall have to put a new rope through the pulley, and then get the mast back into the tree.

I have done all this before, and I like the work; but the trouble is that the weather is so unsettled and I may have to wait days before there is a dry day suitable for climbing trees.

What a lot better it is to carry out the overhauling and repair of an aerial during the warm, dry weather of summer.

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The C.B.C.

Isn't it a great piece of news that Canada is to have a broadcasting

Loyalty to the Old Country

service modelled on our own B.B.C.? I am delighted with the recommendations made by the Royal Commission which has just concluded an investigation into Canada's wireless problems, and I'll tell you why.

Several years ago I paid an extended visit to Canada. My stay in the Dominion lasted over twelve months, and I travelled across the whole Dominion, Atlantic Coast to Pacific Coast, and back. One of the impressions I retained of Canada was that the "old country" was looked upon as a back number in many things.

Loyalty to the old country was there all right, but it seemed to me as if Canadians were rather prone to look upon us with good-humoured tolerance. Hence it is that it is such excellent news to me that Canada has decided to copy the old country in the matter of broadcasting.

There is to be a C.B.C. on the lines of our B.B.C. The money to run the C.B.C. is to be raised by licence fees and from advertisers who broadcast programmes of their own. A chain of seven 50-kilowatt broadcasting stations is to be established across the Dominion.

Considering the vast size of the Dominion, seven seems a small enough number, but no doubt the number will be added to as Canada's population increases.

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Frame Aerials

What is your candid opinion of the frame aerial? You must have had some experience of this collector of wireless energy either in conjunction with your ordinary receiving

One ought to marvel

set or in a portable set with aerial enclosed.

I cannot make up my mind what to think about the frame aerial. One recent writer tells us that frame aerials are better than indoor aerials. Another recent writer tells us just the opposite. So where are we?

Usually I have felt a little disappointed with the results I have obtained with my frame aerials, but that must be because I have expected too much. When you come to look at it, a frame aerial is a small affair, and one ought to marvel, perhaps, that it gives any results at all.

The curious thing about a frame aerial is that it doesn't seem to matter very much how you alter its size or shape within certain limits. The great game is to get as many turns of wire as possible on the frame. Spacing the turns makes a little difference.

My mathematical friend was rather severe with me over my frame aerial the other evening. He said I was expecting too much and, after a little calculation, he told me that my frame aerial was about equivalent to a vertical aerial one foot high, plus an earth connection. Which, to my mind, was equivalent to telling me that my frame aerial was as good as an earth, and that's all.

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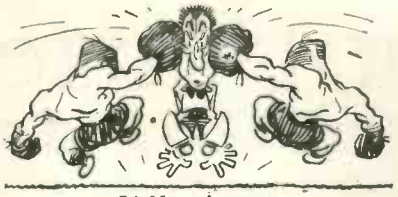
American Methods

It sometimes seems to me very strange that methods of wireless construction in America should so often differ from our methods of construction. Take the important matter of screening, as we know it to-day, for example.

Our usual practice is to employ vertical screens to separate the coils or parts which are liable to interact and so cause trouble. Occasionally we use screening boxes to enclose and isolate complete amplifying stages.

In America it is apparently common practice to screen the coils in a wireless set and to leave the rest of the parts unscreened. Thus you will find a receiver with a number of coils each in its own circular screening box, and the valves all in a neat row at the back of the baseboard with no screening at all. If the variable condensers are screened, they are screened separately.

Halyard's Chat on the Month's Topics



Liable to interact

To mention another point, I do not remember ever seeing an American receiver, or a description of an American receiver, in which the screened-grid valve was placed through a hole in a vertical screen. We are most familiar with this arrangement of the screened-grid valve, even in commercial receivers.

Of course, I realise that conditions in America are vastly different from conditions here in our country, but I should have thought that the best method of screening in a wireless set would have been the same for both countries.

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The Change-over

"Well, George, and what is the latest news regarding the reception of the new regional station at Brookman's Park?" I asked my technical adviser.

"Nothing very exciting," he replied. "Several friends of mine who live in Surrey tell me reception is decidedly better from Brookman's Park than it was from Oxford Street."

"What part of Surrey, George?"

"Oh, just Surrey!"

"One of my wireless friends who lives Wimbledon way is of the opinion that reception has been weaker since the change-over."

"Perhaps he needs a new high-tension battery."

"Have you heard any reports from further afield, George?"

"Several correspondents report greatly improved reception from the west and the north-west. If you want further information, you had better ask the WIRELESS MAGAZINE readers about it. They will know."

Reception has been weaker

"I am sure they will, George."

"I know of one man in the Midlands who is getting ten times as much strength from Brookman's Park as he did from the old 2LO."

"Ten times as much, George! How did he——"

"Simple. He has added an H.F. valve since the change-over."

"What do your many friends in north London think of the change, George?"

"I haven't dared to ask them."

"Perhaps it is just as well not to rub salt in their wireless wounds. By the way, George, have you any idea what they are going to do with the old aerial in Oxford Street?"

"Send it down to the bargain basement, I suppose."

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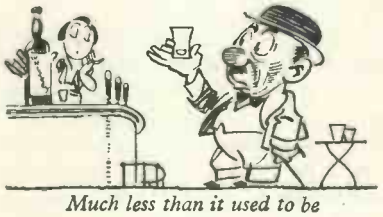
Die Hards

The high-frequency amplifying valve, ordinary type with three electrodes, is the latest wireless part to be doomed by the prophets. Funny, though, isn't it, how these things whose doom is so confidently foretold refuse to pass into wireless oblivion?

First there was the crystal set, then there was the outdoor aerial, then the accumulator, and then the dry battery. Now it is the familiar



Much less than it used to be

H.F. valve which is to vanish from amongst our wireless midst.

Well, the crystal set, the outdoor aerial, the accumulator, and the dry battery are all with us yet! I grant the prophets that the number of crystal sets is much less than it used to be, but the same cannot be said of the outdoor aerial, the accumulator or the dry battery.

When the outdoor aerial was supposedly doomed, the portable set was given as the cause of the doom. Now it is prophesied that the S.G. valve will cause the decease of the poor, little, ordinary H.F. valve with three electrodes.

I don't believe this valve is doomed at all. Nothing that has been doomed yet in wireless has passed out of use completely. Certain types are superseded by more efficient types, that's all that happens. Wireless possesses the grandest set of die-hards in any branch of scientific industry.

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Needs Must

Some years ago it became quite the thing in this neighbourhood to string a lot of corks on your aerial wire in order to prevent the birds from flying into the wire. You can guess the kind of joke which was perpetrated about those corks. More

Buying the bottles

than one cork-aerialist was accused of buying the bottles so as to get the corks for his aerial.

I have been continuing my work on high-frequency amplification and, in order to obtain the screening boxes I required, I have had to do something very similar to what the cork-aerialist was accused of doing years ago.

In fact, I have had to buy a number of a certain kind of tin of biscuits to get my screening boxes. Of course, the biscuits in the tins have not been wasted. They have been placed in other tins and put away for future use.

It is not only on the grounds of expense that I use one particular kind of biscuit tin for screening purposes. The chief reason is that this particular tin happens to be just the right size for my work. Another reason is that the tin has a lid which fits tightly and which can be easily taken off. A third reason is that the tin is thin enough for me to make holes through it without trouble.

Perhaps I should do better with the regulation screening box of the manufacturer, but I have never found my dealer with screening boxes in stock, and I have never wanted to wait for him to get them. You see, when I am engaged on a wireless problem delay is dangerous.

Munich's Radio House

The large studio at Munich, equipped with an electro-pneumatic organ

In this article our special German correspondent, Dr. ALFRED GRADENWITZ, describes the layout of the Munich station, which was arranged by Prof. G. Baumgartner

THE headquarters of the Bavarian Broadcasting Company have been removed to a new building of beautiful architecture, accommodating the whole of the amplifying plant, all the offices and studios, and embodying all that is best in modern radio engineering practice.

Three Main Studios

The main offices and rehearsing rooms are located in a four-storey front wing. The rear part of the building comprises two courtyards separated by the transmitter house. Of the three main studios, the two largest are destined for musical and dramatic transmissions. The third studio is used for talks. All are arranged around a courtyard.

The machinery plant of the main amplifiers, the transformer station, where the three-phase current supplied by the municipal electricity works is stepped down from 5,000 volts to the operating tension of 220 volts, and sundry other accessory rooms, have been housed in the basement.

Acoustic Insulation

A special feature of the new radio house is the exceptionally efficient arrangement for securing an acoustic insulation of the sensitive studios, and mutual insulation of the various rooms.

It should be borne in mind that in installing an up-to-date studio for broadcast transmission, four acoustic phenomena, namely echo, interference, "after-sounds," and resonance, have to be accounted for. While any echo and interference should be disposed of completely, "after-sounds" should be allowed within certain limits of intensity, as well as resonance phenomena in certain musical ranges.

One of the reception rooms at the Munich station

Inasmuch as there is no audience absorbing sounds in the studios, special provision for this effect had to be made. After comprehensive calculations and preliminary tests on small models of the hall and ceiling, the best solution was found to be based on a thorough sectionalisation of the walls and ceiling.

Moreover, the floor was covered with sound-absorbing insulators and fabric. This is how any echo or interference is done away with, while "after-sounds" are reduced to a shortened period of vibration. In order, in spite of these damping devices, to secure the required acoustic resonance of the room, the various parts of the wood panelling were tuned to different fundamental notes.

"Tuning" the Ceiling

Thus the lower notes are reinforced in the microphone. There is also a means of regulating both "after-sounds" and resonance by altering the removable insulation of, and load on, the wooden ceiling, thus controlling within wide limits its vibrating capacity.

The large studio is insulated from street noises in the following manner: Street noises are eliminated by providing double windows of very substantial glass. This is quite sufficient, the main studio being insulated from the street by the main building and two inner courtyards.

Noises in Building

Preventing the passage of noises from other parts of the building proved a much more difficult task, particularly because of water, heating and ventilating pipes and ducts, traversing the whole of the house.

All water and heating pipes, engines, blowers, lifts and other mechanical installations were further insulated from the studios by means of ducts and sound-damping devices. A sound-damping layer on the floor (cork-linoleum and rubber) in the rooms adjoining the studios, as well as in all corridors and on all stairs, serve the same purpose.

The guiding principle in connection with all these schemes was an attempt to localise or reduce any noises at their origin.

Small Studio Linings

In the case of the smaller studios no thorough sectionalisation of the walls and ceilings could be effected. Lining these rooms with sound-absorbing material (special cork plates and cork tapestry) and sectioning the ceilings were the principal means by which insulation and adequate "after-sound" and resonance effects could be produced.

The amplifier plant is subdivided into two groups, the first of which comprises the input amplifiers. The second group raises microphone currents to their full intensity, distributing them to the various lines of conductors.

On the ground-floor (at the level of the studios), there is located the switch-room, whence a sound-proof cabin with large windows affords a good view of the large studio. Another sound-proof window enables the second studio to be inspected. The switch-room contains the central switching cabinet, controlling the whole of the amplifier plant and enabling all microphones to be fed and regulated.

This cabinet is subdivided into four panels, of which the two central ones are receiving, leaving room for a table accommodating several switches. The first panel comprises fifteen microphone amplifiers, fourteen of which are used permanently. The whole of the building includes about twenty-five connections for microphones and three for gramophones. Three microphones can be installed and operated simultaneously both in Studio I and Studio II, the latter being connected to an adjustable echo room.

Duplicate Amplifiers

Fifteen input amplifiers have been accommodated on the second panel of the switching cabinet, pressure on a lever being sufficient to insert each microphone and input amplifier in circuit. A duplicate amplifier can be fitted at a moment's notice in the event of any one of the amplifiers being disabled.

The third panel carries the acoustic and mixing devices behind the input amplifier. These enable the performances in any one of four studios to be combined with one another. Another switch enables an instantaneous change-over from one studio to any other to be made. A controlling instrument clearly shows the degree of modulation of the amplifiers.

On the fourth panel, there are switches for actuating the starting signal and pause signal in each studio and for lighting the danger signs in each room. There are also in the switch-room a microphone for the announcer and a loud-speaker for listening to performances. As the announcer's microphone is switched in, the loud-speaker is thrown out of circuit automatically.

The amplifier room proper is in the basement, and comprises, on a frame, two main amplifiers (each of six line amplifiers which can be changed over by means of a few easy manipulations); and a further two "listening" amplifiers, each of which can be connected up to twenty or thirty loud-speakers in various parts of the house. Moreover, there is a special amplifier for the loud-speaker in the echo-room, and another amplifier for two loud-speakers used during rehearsals to give orders from the sound-proof listening-in cabin to the large studio.

On one of the walls of the amplifier room there is the switchboard for the current supply of amplifiers, which is sub-divided into eight panels controlling all the machines and batteries, as well as the amplifier feeds. The switchboard also comprises an automatic switch which, in the event of any breakdown of the three-phase current supply, switches in an emergency supply, so that there is never a break in transmitting.

Check Receiver

In the amplifier room there is installed a set for listening-in through the ether, a chronometer, arrangements for broadcasting meteorological reports, and the starting time signal.

Current required for the amplifiers is derived from batteries provided in duplicate. Voltages of 6, 20, 300 and 600 volts are required. A special room has been provided for these batteries. Machine transformers are used to charge the batteries. Each of the larger sets (for 20-volt batteries) has an input of twenty-five horse-power.

TURN TO PAGE 486 for JAY COOTE'S "LEAVES FROM A LISTENER'S LOG"

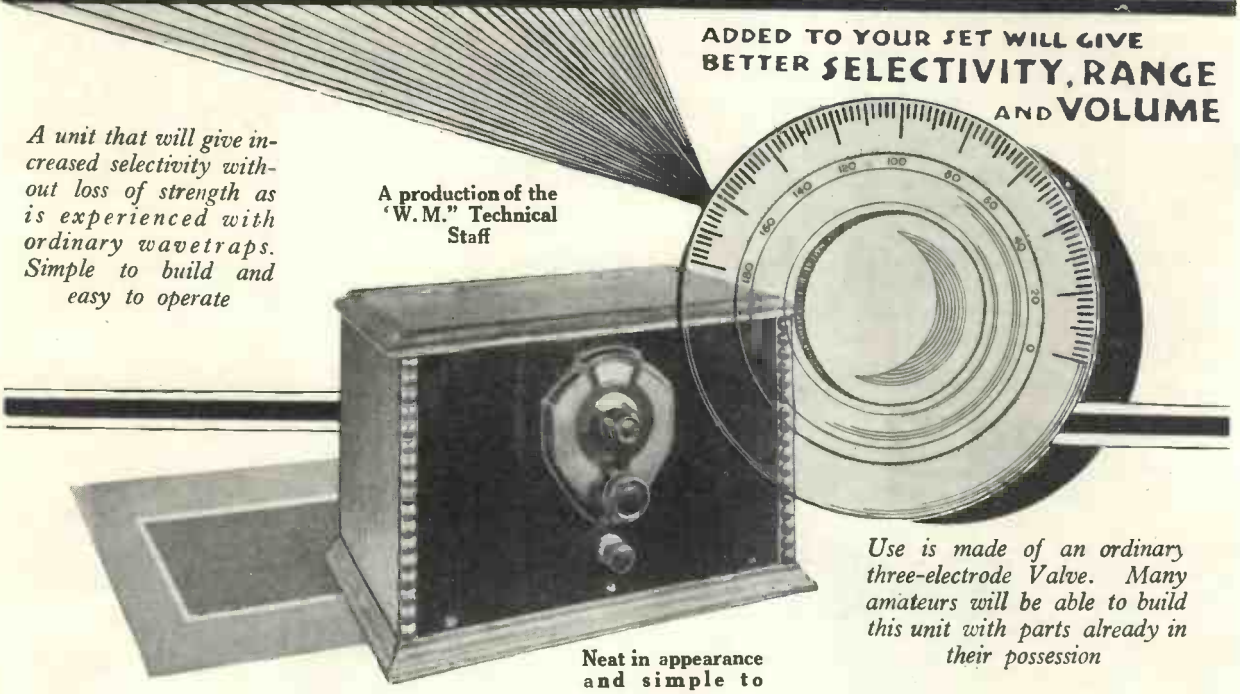
Studio III at Munich is tastefully furnished

Modern German decoration is well illustrated by this staircase in Munich's new radio station

The CONCENTRATOR

ADDED TO YOUR SET WILL GIVE BETTER SELECTIVITY, RANGE AND VOLUME

A unit that will give increased selectivity without loss of strength as is experienced with ordinary wavetraps. Simple to build and easy to operate



A production of the 'W. M." Technical Staff

Neat in appearance and simple to operate

Use is made of an ordinary three-electrode Valve. Many amateurs will be able to build this unit with parts already in their possession

AT this time of the year many listeners think seriously of rebuilding their old sets into something more up to date; but in many cases it is quite sufficient to overhaul the old receiver and carry out only slight alterations to make it conform with modern standards of performance.

For the benefit of readers whose sets are satisfactory but not *quite* good enough to cope with modern conditions, the WIRELESS MAGAZINE offers details of a simple unit called the Concentrator, which will increase the range and selectivity of any set to which it is attached.

Amplifying Unit

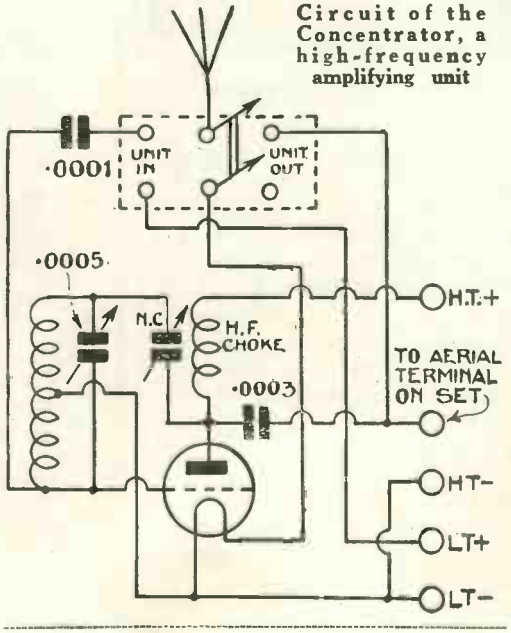
So that there may be no misunderstanding, it can be stated at once that the Concentrator is nothing more than a simple high-frequency amplifying unit —nothing more, but enough to transform an old and none-too-efficient set into one that will meet the most exacting demands.

It is often assumed by listeners with only a slight technical knowledge that the more valves a set has the more unselective it must be because of its greater "power."

This is by no means true, for in the case of high-frequency valves, every additional stage means (normally) an extra tuning circuit. The more tuning circuits there are in a set the more selective it is

The greatest benefit of the Concentrator as regards selectivity will be experienced with sets that have no high-frequency amplification incorporated. The single tuning circuit associated with the detector valve may not be very selective, and the range will be more or less restricted.

Circuit of the Concentrator, a high-frequency amplifying unit



The addition of the Concentrator to such a receiver will greatly improve the selectivity, although the tuning will be a little more complicated until the manipulation of the two circuits is mastered.

Added Range

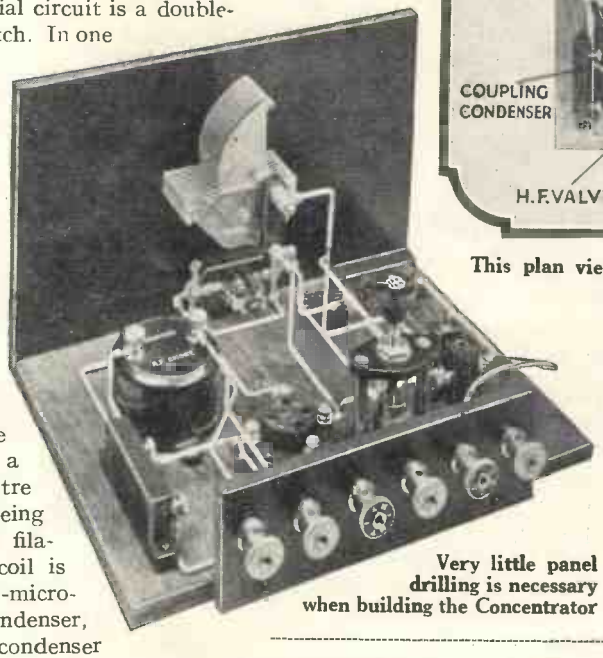
Unlike all forms of wavetrap, which always decrease signal strength slightly, the Concentrator will add range. It should be noted that distant stations will, in effect, be amplified to a greater extent than "local" transmissions.

The unit has been deliberately designed to make use of such parts as the constructor of a two- or three-year-old set might be expected to have on hand. A similar unit using a screened-grid valve was described in the

WIRELESS MAGAZINE for March, 1929, under the title of "The Signal Booster."

The Concentrator uses an ordinary three-electrode valve for high-frequency amplification, such as large numbers of listeners already have in their possession. In such cases the cost of construction will be low, especially if the reader also has a few plug-in coils, fixed and variable condensers, etc.

Those who can read a circuit diagram will be interested in that on page 482, which shows the theoretical arrangement of the unit. In the aerial circuit is a double-pole change-over switch. In one position this connects the Concentrator to the main set and switches on the high-frequency amplifying valve. In the other position the unit is switched off and the aerial is connected direct to the main receiver.



Very little panel drilling is necessary when building the Concentrator

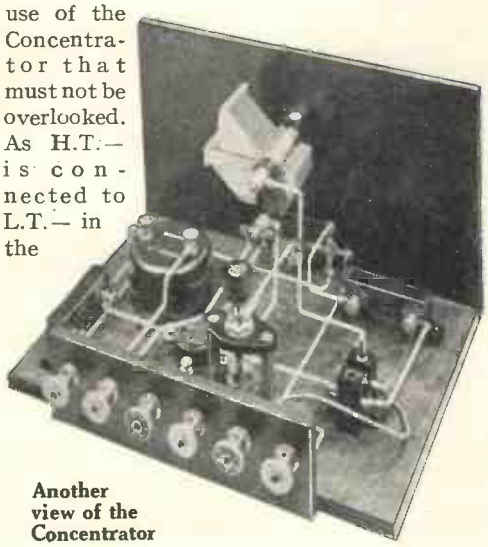
L.T. Coil

Across the grid and anode of the valve is connected a tuning coil, the centre tapping of this being taken to the valve filament. The whole coil is tuned with a .0005-microfarad variable condenser, while a neutralising condenser is connected between the valve anode and one end of the coil.

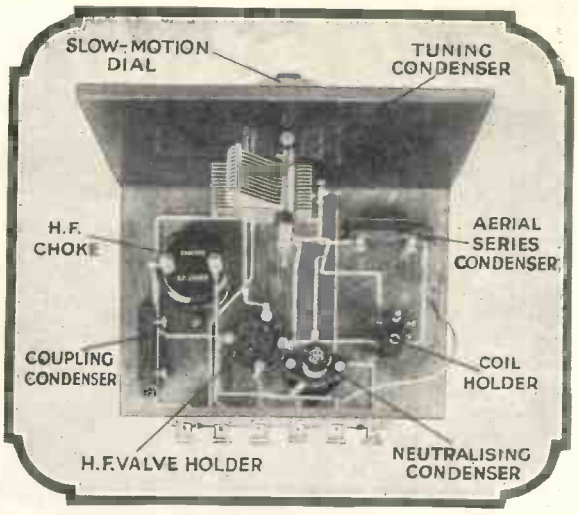
Anode Circuit Components

In the anode circuit of the valve there is also a high-frequency choke and a coupling condenser of .0003-microfarad capacity. There are five terminals to be connected up, one for the aerial and two each for high tension and low tension respectively.

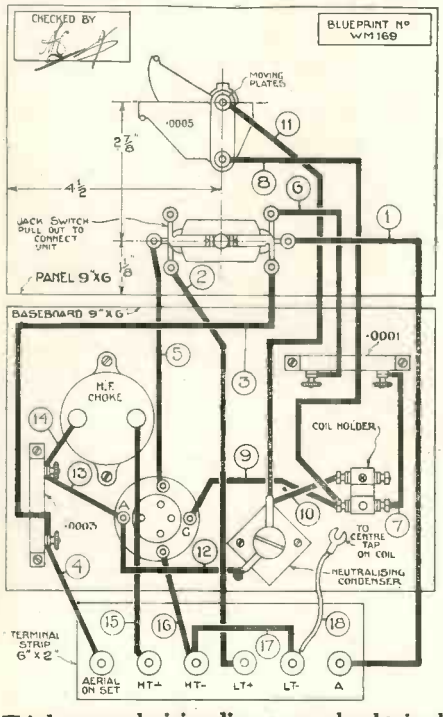
There is one important point about the use of the Concentrator that must not be overlooked. As H.T.— is connected to L.T.— in the unit, these connections must also be the same in the main receiver. If H.T.— is connected to L.T.+ in the main set and the Concentrator is then connected to the latter, the low-tension supply will be short-circuited.



Another view of the Concentrator



This plan view of the Concentrator clearly shows the arrangements of the parts



This layout and wiring diagram can be obtained as a full-size blueprint for half-price (that is, 6d., post free), if the coupon on page iii of the cover is used by December 31. Ask for No. W.M.169

Before Connecting Up

Make certain before connecting up the Concentrator to a set that H.T.— is connected to L.T.— in both cases.

The construction of the unit is within the capabilities of any listener who has a few simple tools at his disposal. All the essential details will be found in these pages, but those who desire one can obtain a full-size blueprint for half price, that is, 6d., post free, if the coupon on page iii of the cover is used by December 31.

Where to Send

Address your inquiry to Blueprint Department, WIRELESS MAGAZINE, 58-61 Fetter Lane, E.C.4, and ask for blueprint No. W.M.169.

An extension of time for obtaining half-price blueprints will be made in the case of overseas readers.

The photographs reproduced in these pages, consulted in conjunction with the blueprint or the reduced reproduction alongside, will show clearly the construction of the

The Concentrator—*Continued*

The Concentrator wired up all ready for use, with valve and coil in position

units and the positions of all the component parts.

In the construction of the unit almost any parts of equivalent values to those used in the original unit can be used and satisfactory results obtained. Many readers will already have in their possession a number of suitable two-pin plug-in coils; it will be noticed that these must be provided with a centre tapping.

Wiring Simplicity

When all the parts have been firmly fixed in position, the wiring up can be undertaken. No difficulty at all will be experienced if the wiring diagram is used. It will be seen that on this every wire is numbered separately in order of assembly.

Thus, to wire up, first place wire No. 1 in position and connect up both ends; then cross through this number on the diagram. Carry on with wire No. 2, and so on to No. 18, which is a short length of flex for connection to the centre-tap of the coil.

Choice of Suitable Valve

The choice of a suitable valve for use in the Concentrator is not a difficult matter. It should be what is known generally as the "H.F." type, with an impedance between 20,000 and about 40,000 ohms. A number of suitable types will be found in the list at the beginning of this issue.

It will normally be the most convenient practice to use a valve with a filament of the same voltage as those used in the main receiver, although, of course, this is not absolutely essential.

To connect up the Concentrator, remove the aerial lead from the main set and take it to the aerial terminal on the extreme right of the unit (from the back). Then connect the second aerial terminal on the unit, at the extreme left on the terminal strip, to the aerial terminal of the main set.

To the L.T. terminals connect an accumulator of the appropriate voltage for the valve to be used; this can be the same accumulator as used for the main set, provided a valve requiring the same filament voltage is used.

The best high-tension voltage will vary with different types of valve, but 80 volts should be tried at first.

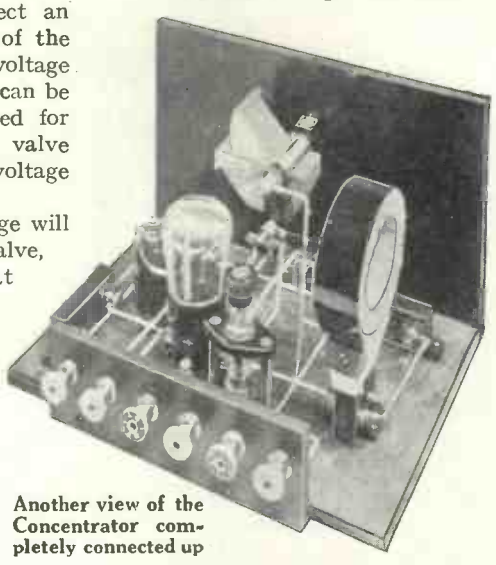
When the unit is not needed, the knob of the switch on the panel should be kept in, when the aerial will be connected straight through to the main set.

To operate the unit, tune in the local station on the main set. Then pull out the knob of the switch on the Concentrator. Use a No. 60 centre-tapped coil for medium waves and a No. 200 or 250 centre-tapped coil for long waves.

It may happen that the signal completely disappears. If so, retune the main set until it is heard and then adjust the condenser on the unit until the greatest volume is obtained.

Better Range and Selectivity

After a little practice no difficulty will be found in manipulating the controls of the main set and the Concentrator in unison; a great increase in range will be noted and the whole installation will be very much more selective than it was previously.



Another view of the Concentrator completely connected up

COMPONENTS REQUIRED FOR THE CONCENTRATOR

Choke, High-frequency
1—Ormond type R/150, 7/6 (or Ready Radio, Wearite).

Coils
2—Atlas Nos. 60 and 250, centre-tapped, 4/3 and 6/6 (or Igranic, Lewcos).

Condensers, Fixed
1—Lissen .0001-microfarad, 1/- (or Ormond, T.C.C.).
1—Lissen .0003-microfarad, 1/- (or Ormond, T.C.C.).

Condensers, Variable
1—Formo .0005-microfarad, 4/6 (or Lotus, Ormond).
1—Jackson neutralising condenser, 3/6 (or Peto-Scott, Bulgin).

Dial, Slow-motion
1—Brownie, 2/6 (or Formo, Lissen).

Ebonite
1—Raymond panel, 9 in. by 6 in., 2/6 (or Parfait, Pilot).
1—Raymond terminal strip, 6 in. by 2 in., 1/-.

Holder, Coil
1—Magnum, baseboard type, 1/6 (or Wearite, Edison-Bell).

Holder, Valve
1—Trix Bob-brown, 1/- (or Marconiphone, Magnum).

Switch
1—Lotus jack type No. 8, 3/6.

Terminals
6—Eelex, marked: Aerial (2), L.T.+, L.T.−, H T.+, H.T.−, 2/3 (or Burton, Belling-Lee).

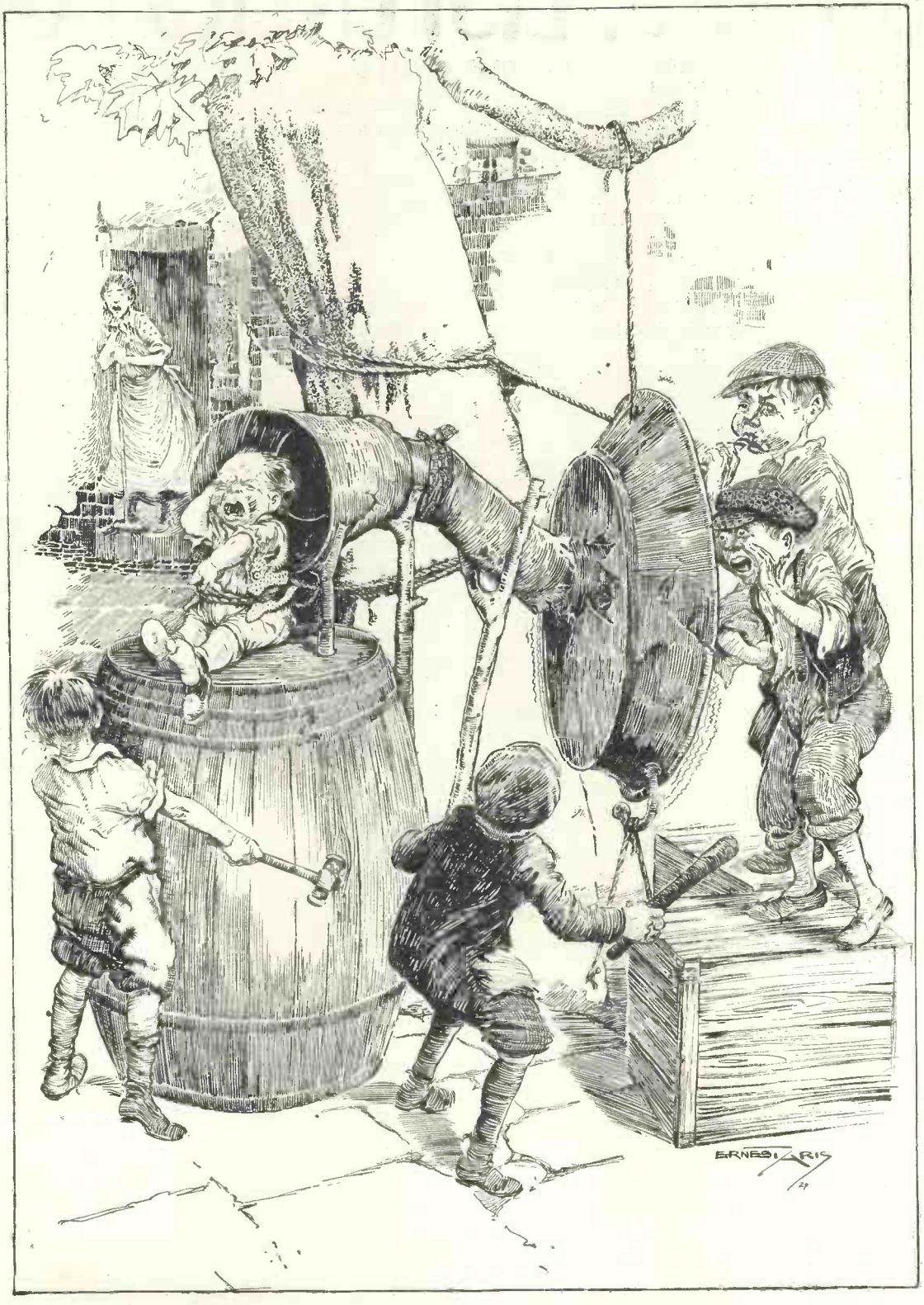
RECOMMENDED ACCESSORIES

Cabinet
1—Pickett (or Camco, Ready Radio).

Valve
1—Cossor HF210, 10/6 (or Mazda 210HF, Marconi HL210).

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

TOO HELL-O!



DISTANT VOICE: "Alf, whatever's the matter with young Bill?"
ALF: "'Sorlrite, Mum, we're playin' broadcastin' an' Bill's listenin'-in."

LEAVES from A LISTENER'S LOG

By JAY COOTE

EACH month appears to bring with it at least one additional transmitter to the broadcast band, and if comparison be made with the same period a year ago, it will be found that Europe's stations have increased both in number and strength.

The latest additions to date are Luxemburg and Algiers, two cities which up to the present have been beyond our horizon. For some time now, the little Grand Duchy which is wedged in between Germany and Belgium has been playing with a privately-operated toy broadcasting station which failed to give satisfaction to even strictly local listeners.

A Big Effort

Tired of being compelled to turn to Germany or France for their wireless fare, the Luxembourgeois have made a big effort; they have raised the sum of three million francs, created the Compagnie Nationale de Radiodiffusion, and installed a slap-bang up-to-date 3-kilowatt transmitter on the summit of the Kohlenberg, a hill in the vicinity of Césange-Luxemburg. From October 1, the broadcasts on 223 metres have been of daily occurrence, and gradually the programmes are being extended.

Now, the Grand Duchy is one of these little frontier or buffer States blessed—or cursed !—with two different languages, and a popular dialect, and the male announcer who officiates in the studio is compelled to give the call in all three. You will hear him regularly in both French and German, and from time to time in Luxemburgisch.

Alarm-clock Signal

As an interval signal between items, I have heard a sound which might emanate from an alarm clock; the ticking is not quite that of the ordinary metronome. When closing down the National Anthem is played, a patriotic song bearing the dialect title of *Ons Heemecht* (Our Fatherland).

The power of the signals is such that there should be no difficulty in picking them up in any part of the United Kingdom. Give your condenser a slight twirl away from Cologne, and you should tune in Radio Luxemburg without interference, for the transmitter is very stable on its wavelength.

◆ ◆ ◆

To all appearances 1930 is to provide a further crop of high-power broadcasters and gradually, it seems, the small stations will be thrown into the background.

If the schemes put forward by the different broadcasting authorities are studied, you will find that the average listener within the next month or so will possess a log of much smaller dimensions than at present, but that as a compensation it will be possible to rely nightly on a choice selection of foreign programmes, more easily captured and no doubt held without difficulty.

From Belgium, for instance, if Brussels is not always available, we have as an alternative Radio Louvain, broadcasting with at least 8 kilowatts in the aerial, whose initiative should furnish many novelties in the way of entertainment.

New Radio Bill

As regards France, possibly—although there still remains a strong doubt—the new Radio Bill may become law, in which case some considerable reorganisation of the whole system will take place, and in that quarter we may expect to see some hefty developments.

In the meantime, however, Strasburg will be endowed with a 12-kilowatt transmitter, and simultaneously programmes from Ecole Supérieure, Paris, should be captured at greater volume.

As regards the fate of such private stations as Petit Parisien, Radio LL, Vitus, and other numerous "one-horse" installations, it is not easy to forecast what will actually happen.

Such threats as the closing down of Nice-Juan-les-Pins, as a protest against the continual breaking of promises made by the state authorities to give this region an effective service, are to be withdrawn, for now I am given to understand that after a resting period of some three months Juan-les-Pins is to blossom out as a worth-while transmitter.

With the number of stations in its broadcasting net, France may experience considerable difficulty in allotting the wavelengths given to her, and for some time to come she may still prove a disturbing factor in the general European scheme.

Most Continental states are anxious to possess super-installations, and amongst the probables are Spain, with Madrid (20 kilowatts), and Barcelona (10 kilowatts). Italy contemplates a 50-kilowatt transmitter for Rome, another of 20 kilowatts for Milan, and an increase in the power of Naples.

A 60-kilowatt Station

The new Czecho-Slovakian programme also comprises a 60-kilowatt transmitter for the capital Prague, and the raising of Brunn to 35 kilowatts; Sweden, as is well known, has a giant under construction and Norway with its Oslo transmitter should by now be giving a regular programme.

But this is not all, as the Polish broadcasting organisation is to be entirely remodelled on the British B.B.C. plan with a view to providing alternative entertainments over a greater portion of the country. The scheme calls for one 120-kilowatt transmitter, and two high-power regional stations at Lemberg and Vilna, of at least 16 kilowatts aerial input; mention is also made of some three or four local relays to work on a common wavelength. The new super transmitter will be operated in addition to the station now working, which is already heard over a great part of Europe.

Added to these we must bear in mind that Switzerland shortly intends to carry out sweeping changes, and Russia with its 1930-32 programme cannot be ignored.

Less Time in Searching

If we take these various plans into consideration, I think we are safe in saying that in the very near future we shall not, as we have done up to the present, spend so much of our time in searching for weak distant transmissions emanating from the European continent, for most of the programmes of any note are bound to be broadcast through the high-power stations.

Tests of the New Season's Best Sets

BROWN THREE-VALVE KIT SET

Name of Set: Type A Brown Three-valve Screened-grid Receiver.

Maker: S. G. Brown, Ltd.

Price: £12. (Other types and prices on application.)

Valve Combination: Screened-grid high-frequency amplifier, detector, and low-frequency amplifier.

WITH the introduction of the Brown models, the ever-increasing range of kit sets has been notably augmented. This new kit set is made in four models; the A and AM models include a Brown loud-speaker, built into the cabinet of the receiver; the B and BM models do not.

Battery or Mains Operation

Both distinct models are available for either battery or mains operation. The Brown kit set, therefore, has a wide application of uses, which should appeal to all classes of listener.

The Brown three-valve set with self-contained loud-speaker

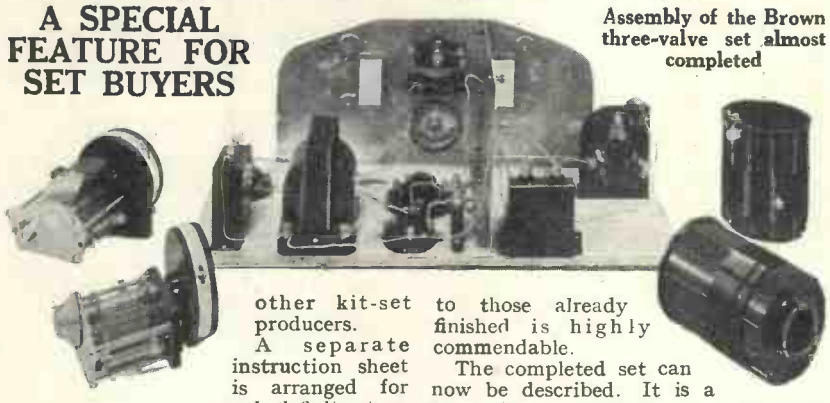
We have recently completed the assembly of a Brown type A kit set, which has also been put through our routine laboratory tests as a complete broadcast receiver. We are able to say that the kit completely fulfils the first requirement of its species, in being extremely simple to assemble.

Favourable Comparison

In its completed form the Brown kit set compares favourably with factory-built sets employing a similar combination of valves.

The instruction sheets are well produced. They are almost an inducement to build the set, so carefully are they arranged. The makers seem to have profited by the combined experience of other kit-set producers.

A SPECIAL FEATURE FOR SET BUYERS



Assembly of the Brown three-valve set almost completed

A separate instruction sheet is arranged for each definite stage in the assembly. In Stage 1, for example, all the necessary instructions are given for the mounting of the components on the baseboard. We found this part of the assembly perfectly simple and absolutely above criticism.

Confusion is avoided at this stage by the thoughtful provision of a baseboard accurately stencilled with the shapes of the baseboard components. This good idea appealed to us very much, for it shows that the makers are not relying on the constructor's theoretical knowledge to augment their instructions.

Even the screws for the components are carefully packeted and marked, so as to avoid the confusion that might possibly arise from one box of assorted nuts, bolts, and screws.

In Stage 2, the constructor is shown how to connect together the components he has mounted on the baseboard. The picture of these first seventeen wires is so clear that this part of the assembly could be carried out without reference to the wiring key. The length of each wire is given in this key and each wire has a simple reference number.

Referring to our notes, we see that some of the wire lengths were on the long side, but this is preferable to being too short.

Stage 3, the assembly of the front panel, and the connection of three further wires, brings the constructor to a most interesting stage. All the previous seventeen wires now "take a back seat" by being printed in red instead of black as before. Now only the next three wires are shown in black, and, as a result of this clever idea, the constructor at wire 18 is no more confused than he was at wire number one.

The fixing of the variable condensers to the panel and their connection with the rest of the receiver constitutes Stage 4, and, more or less, completes the assembly.

In Stage 5, the whole of the actual set wiring is printed in red, but around each terminal to which a battery lead has to be connected are placed lettered black rings. This idea of making the connections to be done stand out in contrast to those already finished is highly commendable.

The completed set can now be described. It is a three-valver employing one screened-grid valve for high-frequency amplification, a detector valve, and a transformer-coupled power valve for low-frequency amplification. The main controls are the tuning condensers, for aerial tuning and screened-grid valve tuning.

Distortionless Volume Control

Subsidiary controls are the reaction condenser, the volume control and the on-off switch. Volume is varied by adjusting the filament voltage of the screened-grid valve. It is therefore a pre-detector control and introduces no distortion in its variation.

Although they were not embodied in the original models, all-wave tuning coils are now fitted as standard in the Brown kit sets. Our first tests were made with

SETS WE CAN RECOMMEND

from personal experience under both normal operating and special laboratory conditions only are reviewed in these pages. This month we report on the following complete receivers, kit sets and mains units:—

Also, on page 504, there is a list of more than 170 sets arranged in convenient price groups and an article on "Choosing A Set from the 'W.M.' Buyers' Guide."

Tests of the New Season's Best Sets—*Continued*

Every set of which a report appears in this regular feature has reached a certain standard of efficiency in our new testing laboratory. No reports will be given on receivers that do not reach this standard; it will be understood, though, that only a limited number of the good sets actually tested can be discussed in each issue.

the medium-wave coils originally produced and we were able to make an interesting comparison.

These coils are somewhat bulky: the alteration of wavelength range is brought about by means of a small rotary switch conveniently mounted on each coil. The lid of the set has to be lifted to change wavelength bands.

Pleasant Surprise

These all-wave coils do not appreciably reduce efficiency when compared with the old coils. This was rather a pleasant surprise for us. The makers were wise, we think, in altering their coils, for the convenience of all-wave coils is now demanded by almost every listener.

The tuning dials are pleasantly smooth in operation, the slow-motion device being good. We found the volume control effective in reducing the strength of stations received at great intensity. Reaction is rather fierce and is inclined to paralyse the action of the set unless carefully applied. As a fact, we did not often have to use much reaction, because the set is really sensitive.

As might be expected from the Brown low-frequency transformer and the Brown loud-speaker chassis, quality of reproduction is of a high order. There is plenty of base, but no "boominess." A pentode output valve, which was not stipulated by the makers, imparts a pleasing crispness to the tone.

Great Selectivity

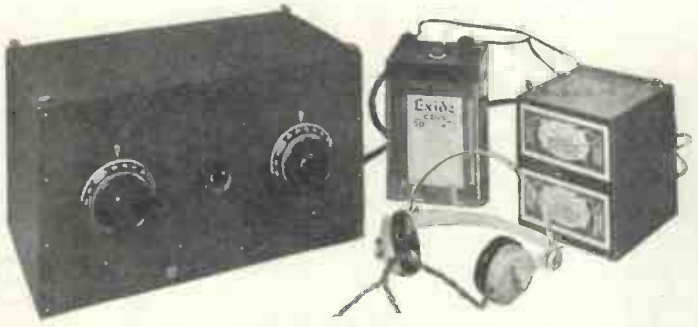
Brookman's Park was in the designers' eyes before the Brown sets were produced; as a result of their foresight, the Brown sets have a degree of selectivity that, although not at present universal, will soon have to be when regional transmissions make unselective sets useless.

Selectivity in the set tested was of the kind that makes it quite difficult to find even the local stations until the correct dial readings are obtained. We are, therefore, glad to see that approximate dial readings for the principal European stations are included in the instruction sheet.

When completed, the Brown A type kit set is a self-contained radio installation, requiring only the addition of an aerial and earth. Ample space is available behind the loud-speaker for both high-tension and low-tension batteries.

The convenience of this type of set, which does away with untidy battery leads, is becoming more and more generally appreciated by discriminating listeners.

THOSE OF YOUR FRIENDS WHO ARE THINKING OF BUYING NEW SETS BEFORE CHRISTMAS WILL BE GLAD TO KNOW OF THESE SPECIAL "W.M." REPORTS



Gecophone short-wave three-valver connected up ready for use

GECOPHONE SHORT-WAVE SET

Name of Set: Gecophone Screened-grid Short-wave Receiver.

Maker: The General Electric Co., Ltd.

Price: Which includes valves, £15.

Valve Combination: Screened-grid high-frequency amplifier, detector, and transformer-coupled low-frequency amplifier.

TO don a pair of headphones and, holding one's very breath for fear of interruption, wrestle with dials that only just hold the faintest whisper of a sound borne through 10,000 miles of the ether of space—that might well have been a frequent experience of a short-wave fan of a few years ago.

But, to-day, the more sophisticated broadcast listener insists upon something more tangible—if less glamorous—before he will forsake the familiar broadcasting wavelengths between 200 and 2,000 metres.

If we take it that the only argument in favour of short-wave reception likely to influence the broadcast listener is a widening of his present reception facilities, we are on much surer ground now than we were a few years ago.

A glance through a list of short-wave stations will show what the short waves have to offer; New York can be heard every night, and quite frequently Australia; Kenya, Java, and Madeira—the list covers almost every point on the globe.

Unique Possibilities

We are trying to show that here, in this country, short-wave reception is almost as worth while as, presumably, it is in the Dominions; the sale of short-wave sets in this country, for home use, would be considerably increased, we think, if the manufacturers concerned were to make more of the unique reception possibilities of such sets.

The General Electric Co., Ltd., as one of the "big noises" in the electrical industry of this country, quite naturally thinks in terms of Empire when designing radio sets for sale throughout its far-flung organisation; and in the production of the Gecophone short-wave set we have another gratifying example of a firm that is, at last, really getting down to the business of establishing a British pre-eminence in radio that some of us believe is possible.

We have had the Gecophone short-wave set, which has just been introduced by the G.E.C., on test for several weeks past, and our varied experience of it enables us to recommend it with a whole-heartedness that is not always possible without reservation.

One of the most interesting reception feats of which the set is capable was the daily tuning-in of Australia. On about 29 metres we received loud speech from an amateur of some importance, who frequently got into touch with the English relations of settlers in Australia. We tuned in 2XAF, the American broadcasting station on 31 metres, as a matter of course.

Astonishing Ranges

The variety of languages to be heard during an evening at the dials of the Gecophone short-wave set would astonish those with quite powerful broadcast receivers. The extraordinary range of low-power amateur telephony stations provides some unexpected surprises to the newcomer to short waves.

We heard an amateur in Elsinore calling as clearly as we heard one in southern Italy, and neither were appreciably less strong than a local amateur in London.

Complete Three-valve Sets, Kit and Chassis

The Gecophone short-waver is a three-valve set completely enclosed in a compact metal box Removal of the lid by undoing four screws reveals a simplicity of layout characteristic of short-wave sets. The three valve holders are arranged in a row at the back of the box, with the coil holder conveniently mounted between the screened-grid valve holder and the detector-valve holder.

Ease of Control

With the valves and coils in position, ample space is left for the variable reaction and tuning condensers. These, together with the potentiometer, are mounted on the metal panel, which forms one side of the box. Both variable condensers have widely spaced vanes; taken in conjunction with the well-known Gecophone slow-motion device, this robust construction assists in the ease of control of the set.

Some may object at having to undo four screws to remove the lid every time one of the plug-in coils needs to be changed. But we do not think this is a very fair criticism, since one of three available coils will be in use more than the other two in any given locality; we are thinking of the world now and not of a district in England !

One little thing we do not quite understand has to do with the battery cord which we note only provides connections for the high-tension and low-tension batteries; for the grid-bias battery connections separate leads have to be provided—why ?

Robust Low-loss Coils

The coils are typical short-wave inductances, robustly constructed on low-loss principles. Tuning and reaction windings are brought out to four pins mounted on a strip of insulating material underneath each coil.

The operation of the Gecophone short-wave set is interesting. It should be explained that the screened-grid valve incorporated in this set is as much a stabiliser of tuning and reaction as it is an effective amplifier.

A screened-grid valve eliminates a lot of the hazard in short-wave tuning. It has the additional advantage that easy oscillation of the detector valve is rendered possible right down to the low wavelength of 19 metres, even when the aerial is an inefficient one. Down to about 25 metres, tuning is not at all "knife-edge."

Reaction is delightfully smooth with this set, provided that a logical use is made of the potentiometer control. As it is not expounded at length in the instruction book, we take it upon ourselves to point out that the potentiometer is an almost indispensable adjunct to the reaction control. At first, the knob of the potentiometer should be turned to its maximum position, in a clockwise direction. So placed, reaction will be found so smooth that, when the detector valve begins to oscillate, it will hardly be noticed.

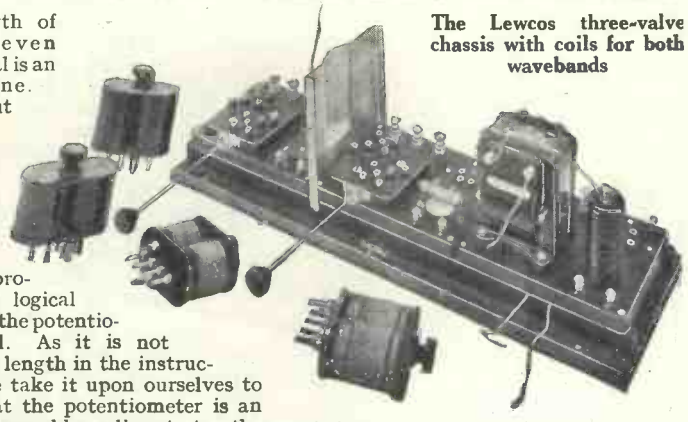
Having tuned in a station and reduced reaction to a point just below oscillation, the potentiometer knob should be turned in an anti-clockwise direction, until an appreciable increase in volume is noted. An increase in reaction will then, in all probability, produce an unpleasant "plop."

It is the operator's task to effect a compromise between the adjustment of the "pot" control and the reaction control. More especially on signals of weak intensity, it is advisable to increase the strength by reaction, rather than by the potentiometer. So with weak signals the rule should be to keep the potentiometer in such a position that really smooth reaction is maintained.

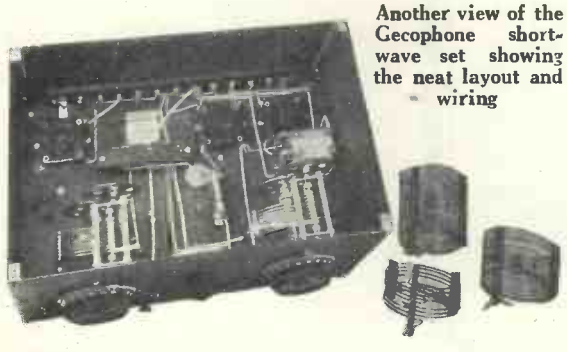
Of the three coils provided, the middle-sized one was found most useful, since it covers a wavelength range of approximately 32 to 65 metres. The smallest coil tuned right down to about 19 metres and up to 40 metres, and it was with this coil that the 31-metre American broadcasting station was tuned in. The largest coil goes right up to 105 metres and is quite useful for the reception of local amateurs.

We understand that a coil can be obtained covering approximately 12 to 19 metres. Those who consider a short-wave set somewhat of a luxury can receive the local station on the broadcast band with still another coil covering 270 to 550 metres. These are "extras" that normally are not required.

We found the condenser-dial calibrations for the three coils extremely useful and quite accurate when compared with our standard short-wave wave-meter. These calibrations, when used in conjunction with the list of short-wave stations also included in the instruction book, make it perfectly easy for the novice to "find" himself on the short waves.



The Lewcos three-valve chassis with coils for both wavebands



Another view of the Gecophone short-wave set showing the neat layout and wiring

Good Loud-speaker Strength

For most of our tests with this set we used headphones, but for those whose only interest is in loud-speaker reception, it is interesting to record that, on an indoor aerial, the American broadcasting station was received at good loud-speaker strength.

LEWCOS THREE-VALVE CHASSIS

Name of Set : Lewcos Chassis.

Maker : London Electric Wire Co., Ltd

Price : £7.

Valve Combination : Screened-grid high-frequency amplifier, detector, transformer-coupled low-frequency amplifier.

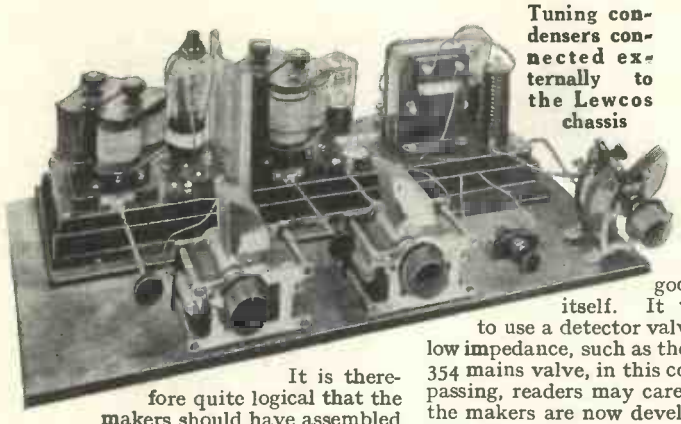
WE have recently been experimenting with an unorthodox piece of radio apparatus, which for want of a more accurate definition, we may call the Lewcos three-valve "chassis." As implied, this Lewcos product forms the basis of a complete three-valve set. It *is* a three-valve set, except for variable condensers, reaction condenser, on-off switch, panel and cabinet.

Efficient Components

Lewcos coils of all types are well known to WIRELESS MAGAZINE readers, as is the Lewcos high-frequency choke. These well-tried accessories, in conjunction with a new Lewcos product, the Lewcos low-frequency transformer, can form the basis of an efficient three-valve set.

AS FAR AS POSSIBLE WE SHALL ENDEAVOUR TO GIVE REPORTS ON SETS WHICH PARTICULARLY INTEREST OUR READERS—SO JUST DROP US A LINE

Tests of the New Season's Best Sets—*Continued*



Tuning condensers connected externally to the Lewcos chassis

It is therefore quite logical that the makers should have assembled their high- and low-frequency coupling devices on a baseboard which also accommodates three valve holders and the necessary terminals for batteries and external components.

External Connections

Before we could test the chassis, it was necessary to connect up to appropriate terminals two .0005-microfarad variable condensers and a .0002-microfarad reaction condenser, as well as a simple on-off switch. The photograph shows how these simple additions were made.

On the side of the unit near the aerial and earth terminals is a small metal link which, according to its position left or right of a central contact, makes the set suitable for directly- or indirectly-heated filament valves. The makers had in mind the fact that when A.C. valves with indirectly-heated filaments are employed in an all-mains set, the filament circuit is a modification of that involved in a normal battery-operated set. The thoughtful provision of this filament link is commendable.

There are four Lewcos coil units included in the Lewcos chassis, two pairs being placed one on each side of a small vertical screen separating the screened-grid valve from the detector valve.

The aerial coils are the normal BAC5 and BAC20 types, and those for the screened-grid valves are the more recently-introduced BSG5 and BSG20 transformers. The use of these transformers enables the screening to be reduced to a minimum and good amplification to be obtained from the screened-grid valve. Each pair of coils is movable on a special base controlled by knobs fitted to the end of spindles projecting from the bases.

Wave-Change Device

By this push-pull action, a dual range of wavelengths is available; by pulling the knobs away from the panel, the medium wavelength coils are put into circuit and by pushing these knobs towards the panel the almost equally useful long waves are available.

Connected up with a batch of Osram valves and the usual 120-volt battery for high tension, the Lewcos chassis behaved well. There was no trace of instability on either long or short waves and the amplification of weak signals was good.

As part of an all-electric set, the Lewcos chassis also gave a good account of itself. It was necessary to use a detector valve with a fairly low impedance, such as the Mullard type 354 mains valve, in this connection. In passing, readers may care to know that the makers are now developing a power unit which will convert the Lewcos chassis to a complete all-mains receiver.

In noting the quality of reproduction, we were particularly interested to see how the new Lewcos low-frequency transformer worked. This coupling device is sturdily built and appears to have plenty of wire and iron in it. Anyway, it gave extra good quality with an "H.L." type of valve as detector. We think it is a good transformer.

DO NOT OVERLOOK THE LIST OF SETS—ARRANGED ON A PRICE BASIS—WHICH APPEARS ON PAGE 504 OF THIS ISSUE.

This Regentone W1C mains Unit gives high tension of 120 volts at 20 milliamperes

For A.C. mains only

HOW OLD READERS CAN HELP US.

This new feature is of particular value to listeners who normally have no particular need for a radio paper of any kind. Old readers will be doing their friends a service by bringiug it to their notice—and the more readers we have the better we shall be able to cater for all radio interests.

REGENTONE MAINS UNITS

Name of Units: Regentone De-Luxe D.C. Model; Regentone W1C A.C. Model.
Maker: Regent Radio Supply Co.
Prices: £3 18s. for D.C. Model; £3 15s. for A.C. Model.

FROM the wide range of Regentone mains units we have selected two of the most useful for test in the WIRELESS MAGAZINE laboratory. To gain a general idea of the Regentone units, we have tried one for A.C., and another for D.C. supply.

Both units tested are, in our opinion, very reasonably priced, and should meet the needs of the listener with an average three-valve set.

Voltage Allowance

The first unit tested was the W1C, which was connected to a 205-volt A.C. supply. In connecting up, we noted that near the flexible lead coming from the mains unit is an insulated block, having two sockets to make allowance for the wide variations in A.C. voltages of supply. One socket is for 200- to 220-volt mains and the other for 230- to 250-volt mains.

To take an average condition, we connected the unit to a three-valve set employing a screened-grid valve, a detector, and a small power valve. The common high-tension positive terminal of the set was taken to the terminal marked "P" on the unit. The screened-grid terminal from the set was taken to the unit terminal marked "Var." A lead between the high-tension negative terminals of the unit and set completed the connections. The valves used in the set were Marconi types S215, HL210, and DEP215.

As a preliminary test, we noted that absolutely no hum was audible, even when listening a few inches from the loud-speaker. No appreciable hum was noted when the oscillation point was approached. This is usually a good test of the smoothing of a mains unit, which in this one appears to be excellent. Loud, clear-cut signals, characteristic of a mains-operated set, were readily obtainable.

No Crackling Noises

The best position of the knob varying the screened-grid voltage was easily found. During the rotation of this knob no crackling noises developed. The new

Short-wave Set: D.C. & A.C. Mains H.T. Units

Regentstat voltage-adjuster controlled by this knob on the unit works very silently.

The measurements taken with Ferranti meters gave a useful index to the general utility of the unit. With an anode-current consumption of 14 milliamperes, the maximum voltage at terminal "P" of the unit was found to be 125 volts. The voltage variation at terminal "Var" was from zero to 115 volts. This is a useful variation for a screened-grid valve set.

With a super-power valve in place of the small power valve, the anode-current consumption increased to 20 milliamperes; but the maximum voltage derived from the unit was as before.

OUR FREE SERVICE OF ADVICE TO 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

The makers rating for the W1C unit is 120 volts at 18 milliamperes. Our tests show that this rating is, if anything, conservative. We can safely say that up to a load of 20 milliamperes the maximum voltage will certainly not be less than 120 volts.

Well-finished Case

In its general construction, the unit is excellent. It is well protected by a pleasingly-finished metal case. It is quite compact, being only 8½ in. by 6 in. by 2¾ in. We note that, in common with other makers of mains units, the Regent Radio Supply Co., fit their flexible leads with lamp-socket plugs. Personally, we should imagine that there is more demand for a two-pin plug, but we understand that this firm will, if requested, make the alteration without extra charge.

Although it is not a serious fault, we think the terminals on the unit are placed rather too close together and too close to the knob of the Regentstat.

A big advantage in this type of unit is the inclusion of a Westinghouse metal rectifier, which should be almost everlasting. The makers have had a wide experience of this type of rectifier and, as our tests of this unit show, that experience is clearly evident in the excellence of its performance.

A rather larger unit is the Regentone De-Luxe D.C. model, which is provided with two variable high-tension tappings, as well as a maximum-voltage power-supply tap. This unit was connected to a three-valve set employing four-volt screened-grid, detector, and pentode valves. The total anode-current consumption was 30 milliamperes.

This Regentone De Luxe D.C. unit gives 160 volts at 40 milliamperes

For D.C. Mains

The voltage at terminal "Power" was found to be 155 volts. Voltage variation possible at "Var" was between 10 and 140 volts. Voltage variation possible at terminal "Screen" was similar.

These readings compare quite favourably with the maker's rating, which is, 160 volts at 50 milliamperes, with variations between zero and 140 volts for the other supplies. A low-melting point fuse is a thoughtful inclusion in the flexible lead from the unit to the mains plug. When using such a D.C. unit it is, of course, necessary to connect the earth wire to the set through a large fixed condenser.

To those with a D.C. supply and a big set requiring several different high-tension voltages, we can heartily recommend the Regentone De-Luxe model, which is not only well made, but has its knobs and terminals conveniently arranged.

EKCO-LECTRIC SGP3 (D.C.)

Name of Set: Ekco-Lectric SGP3.
Maker: E. K. Cole, Ltd.
Price: £21.
Valve Combination: Screened-grid high-frequency amplifier, detector, and pentode (five-electrode) output valve.

As we said last month, the large proportion of D.C.-mains supplies in this country appears to have been neglected by some makers of all-mains sets. In fact, the concentration on all-A.C. sets has been one of the few concerted actions on the part of radio manufacturers.

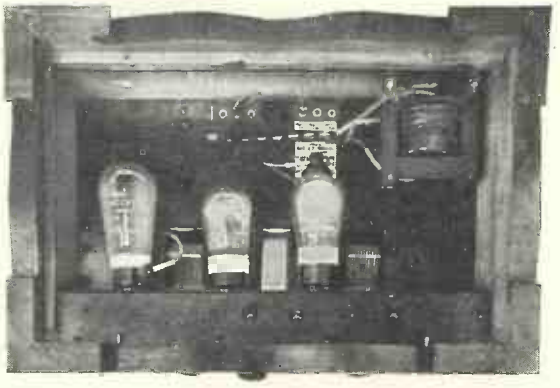
As a result the comparatively few firms offering reliable D.C.-mains sets are now experiencing a big demand for their products. E. K. Cole, Limited, as pioneers of D.C.- and A.C.-mains units, have, we understand, found it difficult to cope with orders for their SGP3 sets, which are made for either A.C. *or* D.C. supplies. We have only recently been able to test the latter.

Housed in a distinctive cabinet, designed on modernistic lines, the Ekco SGP3 is an interesting example of an all-D.C.-mains set. From an examination of its exterior, the set certainly does not lack in variety of controls. To one side of the escutcheon plate is what might be termed the main control, this being the knob that rotates the gang condenser and dial.

To the left and right of this are two subsidiary control knobs. That on the left is a "compensator" for the main tuning and has not always to be operated. The reaction knob on the right is more frequently used, especially when the incoming signals are weak. Beneath the escutcheon plate is a fourth knob, but as this is for changing the wavelength band, here, again, it is not a real complication.

On the left of the cabinet is fitted a sturdy make-and-break switch, which is used for connecting or disconnecting the mains supply. Close to this is still another knob, which serves the dual purpose of controlling the volume and selectivity obtained from the set.

In considering the control of the SGP3, it is obvious that the makers have not sacrificed efficiency by eliminat-



Underneath view of the Ekco-Lectric SGP3, showing the horizontal mounting of the valves

BEFORE BUYING A SET OR MAINS UNIT

read through the WIRELESS MAGAZINE *reports of new sets, which are quite unbiased, authoritative and based on actual operating experience.*

★ ★ ★

Now that there are so many receivers from which to choose it is more than ever necessary for the prospective buyer to have an impartial opinion before making a purchase.

★ ★ ★

Up to the present the following sets have passed through the WIRELESS MAGAZINE *laboratories and can be recommended from every point of view :—*

OCTOBER

Pye No. 360 Receiver (Three-valver)

Lissen Radio Gramophone

Ferranti Screen-grid Three

Oldham Auto Power Units (H.T. and L.T.)

NOVEMBER

Philips Model 2511 (Four-valver)

Aero Short-wave Converter

Marconiphone Model 44 (Four-valver)

Kolster Brandes Portable

Gecophone A.C. Three

Gambrell All-electric Three

Climax D.C. Mains H.T. Unit

★ ★ ★

A limited number of copies of these issues is available at 1s. 3d. *each, post free, on application to the Publisher,* WIRELESS MAGAZINE, 58-61 *Fetter Lane, E.C.*4.

Tests of the New Season's Best Sets—*Continued*

ing controls that are really desirable. They have given the listener what is practically one-dial tuning; but because aerials differ so greatly, the additional compensating control of tuning has been fitted. Sensitivity should be equally good on all aerials. As this is only a three-valve set, reaction, even though the valves are extraordinarily sensitive, is still a necessity. And no set without dual-range-wavelength facilities can be considered complete to-day.

Important Asset

The advent of Brookman's Park and the near possibility of further regional stations makes selectivity an important asset of a set. We are, therefore, glad to see that the makers have made provision for increasing the selectivity, should it be necessary.

The bottom of the set can be removed in a second or so to expose part of the neat layout. The three valve holders are conveniently placed in this sub-section of the set. The makers recommend a batch of three Mullard valves, these being the PM14 screened-grid valve, PM4DX detector valve, and PM24 pentode valve. All these are 4-volters. In inserting these valves into the valve holders flexible leads for the screened-grid and pentode valves have also to be connected to the auxiliary terminals.

A plug and socket arrangement provides for a wide variation in the D.C.-supply voltage. The three tappings are marked "200/210," "220/230," and "240/250." As our voltage of supply is 205 volts, we inserted the wander-plug in the first socket. Next to this socket arrangement is a similar one, whereby three alternative smoothing connections may be made, according to the characteristics of the mains used.

In our tests, using the specified valves, we could not detect any difference in performance when each of these alternative smoothing connections were tried in turn. Rotation of the main tuning knob soon brought in Brookman's Park and 5GB. We were impressed with the good quality of reproduction, as delivered by a number of our standard test loud-speakers. No background of hum was audible, except when the oscillation point was approached, when a slight, but not objectionable, noise developed. The set appears to be extremely sensitive, and in the evening a number of stations were brought in at good loud-speaker strength, with a minimum of tuning difficulty. We found the tuning compensator, when carefully adjusted, brought up the strength of some of the distant stations very appreciably.

Reaction was not required for the more powerful stations. Its smoothness made it a pleasure to use on the weaker stations, the strength of which it greatly increased.

These remarks apply to both wavelength bands. The performance appears to be about equal on both.

Good Selectivity Control

The selectivity control on the side of the receiver was tried with interest. We found that by first tuning in a fairly weak station at its maximum volume, we could reduce the interference from Brookman's Park without altering the tuning. A slight diminution in the signal strength of the distant station was then noted. We are of opinion that this selectivity control will prove valuable to those residing within the "wipe-out" areas of regional stations. As a volume control we are not so impressed with the knob at the side of the set. We found it better to reduce reaction to a minimum and slightly to detune with the compensator.

Provision is made for the use of a gramophone pick-up. The leads from the pick-up, when plugged into two clearly-marked sockets, are connected to the last two valves of the receiver. The electrical reproduction of gramophone records in this way was good. An external volume control must be used with the pick-up. The volume of sound without this additional control is too great. As when used as a radio set, the quality of the reproduction when the SGP3 is a gramophone amplifier is very good.

Note the neat case of the Ekco-Lectric SGP3.

Apart from very infrequent renewals of valves, the maintenance of this set is not likely to be troublesome. The makers give some interesting figures for the power consumption of their set. The running cost for 1,000 hours at, say, sixpence per unit, works out at 20s. In view of the convenience and efficiency of mains operation, this cannot be considered excessive.

A.C. Model Also

The SGP3 is also available for A.C. mains at the same price; in the near future we hope to be able to review it. Meanwhile, to those with D.C. mains, we heartily recommend the D.C. model, which has given a good account of itself in our tests.

Radio Evolution

In this article QUEUE explains how members of the "W.M." Technical Staff sometimes "discuss" advance commercial designs with manufacturers!

A manufacturer's "mystery" portable undergoing tests by a member of the "W.M." Staff

STALE news, I am told, is never wanted. And yet I have a piece of news, the origin of which dates back to last Show time, which I think will interest readers. In particular it will interest a small group of manufacturers who . . . but I am beginning at the wrong end of the story.

The story began, as I have said, last Show time. I was pushing my way through the crowd and seeing what I could when I felt a friendly thump on the back. It was the Manufacturer.

"Queue, old man," he said, "I know you are keen on portables. Come over to my stand and have a chat about a really good set!"

I went.

"Queue," he said, "I am bringing out a new portable. The technical department have made up seven sets for trial, but I don't like any of them. I am afraid our technical people are *too* technical. You are an average man. If you wanted a good portable what would you do?"

Buy A Super X Five!

"I should go to the X stand over there," I said, 'and buy a Super X Five."

"Fool," said the manufacturer. "I can't buy up the entire stock of my rival's portables. Besides, I want something bigger, and better——"

He waxed eloquent. The hour grew late, so we postponed the discussion until the next day.

At a reasonable hour of the morning I met him again in the large airy drawing office, which had seen the birth of a number of famous components, and at least two well-known "threes." Here there was no friendly Show atmosphere.

"You see, Queue," he explained, "my sales manager tells me that if we make a portable of any kind, bearing our own name, we are bound to sell at least——. But, as you know, there is a golden opportunity if only we could bring out something unusual. And I want you to suggest something."

Five-Valver for £10?

"Why not make a good set down to a price and sell a five-valver, complete for £10?" I suggested tentatively.

"No," he said, "I admit that we could make a *workable* set for a couple of fivers, but . . . well, just look for yourself.

"The price is £10, you say. If we take off the cost of royalties that leaves about £8 15s. Now assume that I can get a Continental importer to let me have a contract for the valves at 4s. a piece, that brings the price down to £7 15s. My own profit on a set of that selling price is 30s., and if you add to that the factors' profit, the price comes down with a flop to about £4 10s.

"Now what have we to provide out of that? Accumulator and H.T. battery? Yes, about £1 would be right for those two articles, assuming a very cut price. That brings us down to £3 10s. This sum has to provide all the other parts, the case, frame, aerial, loud-speaker, transformer for R.C. units, condensers, dials, switches and so on.

"And on top of that is the cost of assembly and wiring, an easy two hours' work. Assembling and wiring would cost at least 10s., so all the afore-mentioned gadgets would have to be bought for £3. I know where to buy at the right price, but—the quality. I *ask* you! No, my dear Queue, the ten-pounder won't do."

"But," I said, "if you want to put the set out at a cut price, surely your margin of profit of 30s. is excessive?"

"No," he said, "you must remember that from this figure of profit has to be deducted all the overhead expenses, which are big in my little factory. I have to pay, too, for advertising, packing, despatch, and accounts work. Probably only a few pence of that 30s. actually goes into the pockets of my fellow working directors. And even directors must live."

"Well," I replied, "as you have opened your heart to me and told me just what these things do cost, I suggest that you tack the other way, put the price up to £15 and sell a good-quality four-valver. Surely you can do that?"

Specimen Sets for Tests

"Come and see what our technical brains have done," he retorted. A member of the drawing-office searched through drawers for circuit diagrams and blueprints, and, taking these, we went over to a bench on which were displayed seven separate sets, all made up in rough cabinets and apparently ready to work.

"These sets," explained the manufacturer, "are rough hook-ups and not made in every case with the actual type of component we should use if the set were put on the market. For instance, this five-valver would

Radio Evolution—*Continued*

have to be sold with a slightly less expensive accumulator, H.T. battery or set of valves than this three-valver here, provided the retail price were the same."

I examined the sets closely. Two were three-valvers, three were four-valvers and two were five-valvers.

I went into details a little and picked out what to my mind were the most interesting and most "possible" sets. One of the three had one S.G. stage, a detector and a transformer-coupled L.F stage. The other had two transformer-coupled L.F. stages only.

A Motley Group

The "fours" were a motley group. One had two S.G. stages and one transformer-coupled L.F. stage, one was very much the same, but had a pentode in the output stage; the third embodies my favourite circuit, namely one S.G. stage, and one R.C. and one transformer L.F stage.

One of the five-valvers had two aperiodic H.F. valves, and the other had two screened-grid valves and two transformer L.F. valves. I saw the circuits of all these sets and satisfied myself regarding their technical details.

"How do the prices run of all these sets?" I enquired.

"Well," replied the manufacturer, "both the three-valvers are cheaper to manufacture than the four-valvers, but the five-valver with the aperiodic stages costs about the same as the four-valver with the one S.G. stage and what you call the 'R.C. trans.'"

I took another look.

"If," pressed the manufacturer, "you did not know anything about the behind-the-scene cost of these sets which would you pick?"

My Own Choice

"As a matter of fact," I said, "I would pick the two sets you have mentioned, namely, the four-valver with one S.G. stage, and the aperiodic H.F. five-valver. I don't know which I like the better. Without a test I don't think anyone could say."

"A test? My dear Queue, that's just what I want you to do. Take your pick, take 'em both, for a nice week-end trip and let me know which you, my friendly Average Man, think my reputable firm ought to manufacture!"

So the week-end saw me with the set packed at the back of the car, making a trip down in the heart of Sussex.

To convince the manufacturer that I had made my test as fully as possible I took a couple of snapshots of the two "mystery" sets in use, and you will see one of them on the preceding page.

Neither of the sets proved to be ideal for use in the car, but I blame this more on the car than on the sets because of its metal body. I gave both sets a preliminary trial at a café in a centre very well known to motorists, but which, I suppose, I had better keep anonymous.

Here I blessed the five-valver, because of its ease of operation (there was only one tuning dial, for both H.F. stages were aperiodic) and mildly cursed the four-valver, because its H.F. adjustment was rather tricky. I made a pencil note to the effect that if the four-valver were finally chosen the reaction control would have to be improved.

Strength from London and 5GB seemed to be about the same, but when we subsequently tried both sets at our hotel at Angmering, and the mileage had been increased by about 25, the four-valver with its screened-grid stage certainly seemed to have greater powers for reaching out.

As Captain Kettle says, "when seen make note of." And I dutifully did make a careful note of the fact that as one got farther from the local station the aperiodic H.F. set became trickier to adjust if one wanted the same volume as that given by the four-valver.

I had gone rather carefully into the two circuits concerned, and, I was not quite convinced that the "R.C.-trans" arrangement was the best to follow the detector of the four-valver, and I had taken a small transformer in case the test should show that it was needed.

After working the set for one night, right down at the South Coast, my doubts increased to such a point that I took out the R.C. unit and substituted the transformer This made quite a difference to reception but, of course, the valve was not well matched (though I found out afterwards that the makers of this transformer do specify an R.C. valve of a certain type to work with it as a detector).

The five-valver had two transformers and I changed the valves about in an endeavour to produce a better matching of detector valve and transformer in the four-valver. At its best the four worked better than the five.

Without Interference

That is to say it brought in London, 5XX and 5GB fairly free from interference (except spark, which is the bête-noire of the coast dweller) and at a strength great enough to dance to in a closed room. The results on foreign stations were variable, but there were four or five always at really good loud-speaker strength—pleasant to listen to, but not quite good enough for dancing.

The five-valver, on the other hand, brought in the three main stations at about the same strength as the four. Obviously the two aperiodic H.F. valves were working fairly well, though I doubted this at the time. Together, however, they had only the punch of the one screened-grid stage of the four-valve set.

I tried both sets with a short external aerial, using the frame as the tuning coil. This made quite a difference to the performance of the five-valver, but the *only* difference noticeable in the case of the four-valver was that the tuning was altered and broadened. Normally, the tuning of the four was very sharp.

There were snags in both cases. Monday morning saw me back again at the manufacturer's.

Which Shall We Make?

"Well," said that worthy, 'which are we going to push on with?"

"Neither," said I unkindly, 'if you are wise, you'll stick to either the four- or the five-valver, but they both want rebuilding."

"*Rebuilding!* Why, my good Queue, I've got to have the final plans passed within three days from now. What's wrong, anyway?"

I brought out my pencilled list:

Four-valver wants two transformers and anti-motor-boating device, reaction control is tricky and tuning could be ganged if a small neutralising condenser were fitted as a balancer.

(*Continued on page* 507)

On Unknown Wavelengths!

IS it true that a white lobster, caught at Littlehampton, Sussex, was offered the B.B.C. for broadcasting purposes?

1 L Obster.

◆ ◆ ◆

A man who was summonsed for keeping a receiving set without a licence said: "I sold it a year ago. The day before the detective called the buyer brought it back for repairs."

The Inspector: "The common excuse, sir."

Woman at Marylebone Police Court: "I don't object to my neighbour's wireless, because my daughter's young man likes it when he visits us."

◆ ◆ ◆

Tom: "They claim to be connected with some of the best people."

Bill: "Yes, by wireless."

◆ ◆ ◆

It was 6.30 p.m. and the news had just been read from 2LO. A woman listener who wanted to phone the butcher and 2LO got rather muddled with the numbers and when she got 2LO asked:

"Will you have any brains tomorrow?"

◆ ◆ ◆

"It is not a long step from the gramophone to radio."

A foxtrot does it nicely.

◆ ◆ ◆

Man (at Willesden): "He would have struck me, but he saw that I had an H.T. battery in my hand, and he understood what was going on in my mind."

The Magistrate: "And what did you intend doing with the H.T. battery?"

Man: "I had not quite made up my mind about it."

◆ ◆ ◆

A Welsh milkman has discovered a condenser that will revolutionise radio. Evidently his long experience with condensed milk.

◆ ◆ ◆

American SOS announcement: "Elizabeth is nineteen years old and signs her name Queen."

That's why she never married probably.

◆ ◆ ◆

Clerk at Tottenham: "Does your house join the house of the defendant?"

Witness: "No, there is an aerial between."

◆ ◆ ◆

Marjorie: "Lucy has been trying to learn how to manipulate her new radio set for a fortnight."

Tom: "Is the wireless engineer stupid?"

Marjorie: "No, handsome."

◆ ◆ ◆

A schoolboy howler: "Oscillation is what they do to your arm to stop you having small-pox."

◆ ◆ ◆

Burglars broke into a house in Devon and stole a portable wireless set shaped like a portmanteau, which they knew contained money.

They must have heard the notes.

◆ ◆ ◆

There is a new radio gadget which is described as "silent as the Sphinx." Sounds like an H.T. battery after a year's use.

◆ ◆ ◆

Diner: "What pudding was that you gave me?"

Waiter: "Our latest radio pudding, madam."

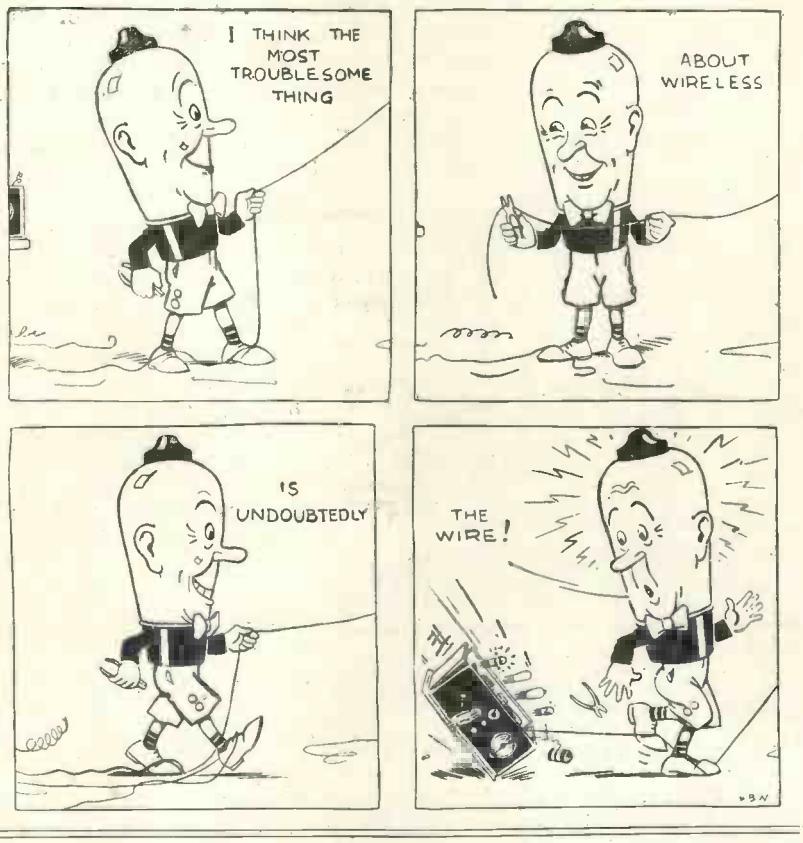
Diner: "I suppose the bits of glass were valves."

◆ ◆ ◆

Willesden Wife: "We had a separation order some months ago. Then he gave me a wireless set, so we lived together again and it squashed it."

Wireless bursts.

The Adventures of Alec Trode



A shop hand left an accumulator on charge for six days.

Result: Discharge.

◆ ◆ ◆

Husband and wife were discussing the merits and demerits of women as broadcasters. The woman had the worst of the argument.

She: "In the battle of tongues a woman can hold her own."

He: "Then why doesn't she?"

Why Signals Fade

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

This article explains in simple language that can be understood by every listener why signals vary in strength

"When one first encounters this problem, one usually makes a hurried dive for the receiver and begins to fiddle with everything possible."

THIS is the time of year when the peculiar phenomenon known as "fading" becomes particularly troublesome. Everyone will have experienced the gradual falling away of a signal until it is a mere whisper, or perhaps may have disappeared altogether.

Fiddling With Everything

Indeed, when one first encounters this problem, one usually makes a hurried dive for the receiver and begins to fiddle with everything possible, it being incredible that the transmitting station itself could have varied in power so enormously.

Yet if this course of action has been taken, one is doomed to disappointment, for no amount of readjustment of the receiver will make any difference to the results. The signal has faded out and that is all there is to it.

When we get a little more experience, we put on a dignified and, we hope, knowing expression and say airily: "Ah, don't you worry; it will come back again in a minute or two." Sure enough, without any alteration to the receiver, the signal comes back, often with renewed vigour, so that it is greater than it was before.

Just "Fading"

We speak to our friends, who are supposed to know these things, having read the WIRELESS MAGAZINE regularly, and they say: "Oh, yes, of course, that is just fading."

"But what," you say, "do you mean by that? Has the sun got at the works of the receiver and caused the condensers to fade, or what?" Whereat they laugh scornfully, but are, nevertheless, unable to give us much assistance.

Fading is certainly a puzzling phenomenon. It is quite beyond the control of listeners, at any rate as long as they confine themselves to the use of one aerial and one receiver and, therefore, it is an evil with which we must be content.

The town-dweller who listens to his local programme is not troubled with fading until he attempts to receive foreign stations, and then he will find that what are often his best programmes are the most liable to be interrupted by this annoying fluctuation of signal strength.

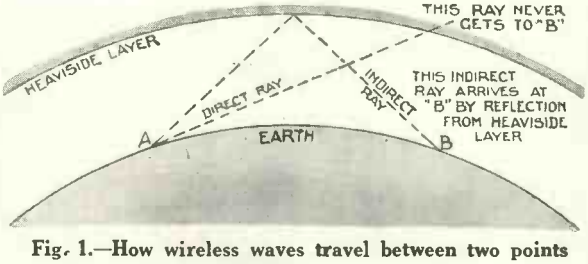


Fig. 1.—How wireless waves travel between two points

The unfortunate dweller in the country, however, is liable to experience fading even on his local programme. He may live a matter of 50 to 100 miles away and fading at such distances is not only possible, but extremely probable. What, then, causes this variation in strength?

In explaining this phenomenon, we must have recourse once more to our old favourite the Heaviside layer. A few brief words of explanation about this will be desirable before we proceed further.

The atoms of the gas which we call air are always in a state of more or less intense ionisation. This means that some of the electrons of which the atoms are composed are free and are shooting about without being definitely attached to their parent atoms so that the molecules of gas which are left are electrified or ionised.

Ultra-violet Light

Ultra-violet light, such as is provided by the sun, has a considerable effect upon the extent to which this ionisation is present while, in addition, the pressure of the atmosphere exerts its influence, for gases may be more easily ionised at reduced pressure. Therefore, as we go farther and farther away from the earth, there is a greater tendency towards ionisation.

The whole of the time, however, the free electrons are re-combining with their atoms so that the ionisation tends to disappear unless it is maintained by some suitable means. During the daylight, the influence of the sun is very powerful, as a result of which the atmosphere at relatively low altitudes is in a state of fairly heavy ionisation.

A Sticky Medium

We thus have the atmosphere electrified as a whole, and the effect of this is that wireless waves which are radiated from a transmitter, on ordinary broadcast wavelengths at any rate, have to force their way through a very sticky medium.

If we have a wireless wave passing through a heavily-electrified atmosphere, all the electrons tend to

oscillate in conformity with the wireless vibrations and this absorbs energy so that wireless waves transmitted up into the atmosphere are rapidly absorbed and get nowhere.

At night-time, the influence of the sun's rays has disappeared and therefore the ionisation near the ground disappears also. As we increase the height above the earth, however, the pressure gets less until a point is reached where the ionisation is always maintained without any external influence. Moreover, it is found that this point of transition from electrified to unelectrified atmosphere is fairly sharp.

At Night-time

Let us consider what happens to a wireless wave, therefore, at night-time. It leaves the transmitter in a slightly upward direction and travels practically unhindered for some considerable distance, for there is now no electrification of the atmosphere to absorb energy. After a time, however it reaches this, more or less, well-defined layer of electrified atmosphere and this is exactly the same as a light wave striking a mirror.

The wireless wave is reflected down to the earth again, some of the energy being lost in the process, but the fact remains that it now comes down to earth some considerable distance away from its starting point.

In Straight Lines

This explains the fact that many signals are received at night-time which cannot be heard during the day. For example, consider two points on the circumference of the earth, as shown in Fig. 1. Wireless waves travel in straight lines, therefore a wave radiated from A can never get to the point B except through the earth, which it will not do.

If the waves radiated from A in an upward direction, however, are capable of being reflected from an upper layer of electrified atmosphere, then it is clearly possible to receive at the point B transmissions radiated from A. This, indeed, is the only means by which B can receive transmissions from A at all.

Let us now turn to the question of fading. This phenomenon is only experienced on such transmissions as do come from the upper atmosphere in the manner just described. There is nothing in what has so far been said, however, which supplies a reason for a periodic variation in the signal strength.

We can, however, devise explanations by making suitable assumptions. Let us suppose, for example, that the Heaviside layer is not uniform, but is undulating in character. Then it is possible to conceive a state of affairs somewhat similar to that shown in Fig. 2, where the point B will receive waves from two different directions, due to the fact that the layer of ionised gas is not uniform, but has a different curvature at two adjacent points. The signal strength received at B will then be the resultant effect of these two individual waves.

Even this will not cause any variation, but suppose we assume that the Heaviside layer is in a state of fluctuation whereby its formation is changing, more or less rapidly. Then it is conceivable that the particular arrangement shown in Fig. 2 may only last for a few seconds, being subsequently replaced by an entirely different arrangement.

In fact, the signals at B may be received instantaneously from one point or from two or three points, and may conceivably never be the same from one second to the next. In such circumstances, the signal strength will fluctuate violently.

What is more, the waves received from one part of the Heaviside layer may be in the opposite phase, or direction, to those received from an adjacent part, so that, instead of the two signals adding up, they cancel out. We can, therefore, receive a number of varying signal strengths between nothing at all and a signal several times as strong as the normal.

Here, therefore, we have a valid explanation of fading. Fluctuations of signal strength on this basis would probably be somewhat rapid in character and actually this class of fading occurs around sunset (and sunrise), and is usually known as "sunset fading."

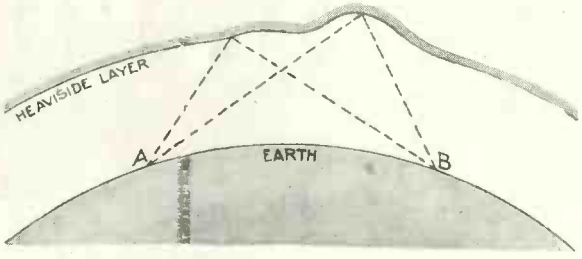


Fig. 2.—Waves arriving at B by two different reflections

When the sun's rays are withdrawn from the particular portion of the earth over which the transmissions take place, the ionisation near the earth rapidly disappears and, while the Heaviside layer is settling down, there is a very violent agitation taking place so that reflections and depressions take place in all sorts of fashions, and signals vary gr. atly.

Layer More Uniform

Later on at night the evidence tends to show that the Heaviside layer is much more uniform and that there are not rapid variations taking place. In such circumstances, our theory of fading is not tenable, and we must look elsewhere to obtain a satisfactory explanation.

This is forthcoming, as a result of a discovery recently made that the Heaviside layer does not reflect the waves exactly as it receives them. It upsets what is known as the polarisation of the wave. In order to understand this, a simple experiment is desirable.

Mechanical Analogy

Take a length of about 10 feet of fairly heavy cord—a clothes line will do very well—and attach the far end to a suitable fixed point. The near end could be held in the hand and if the hand is jerked rapidly up and down a ripple will travel along the rope to the far end. This ripple is a good mechanical analogy of a wireless wave which is only a similar ripple produced in an imaginary rope which we call the ether.

(Continued on page 502)

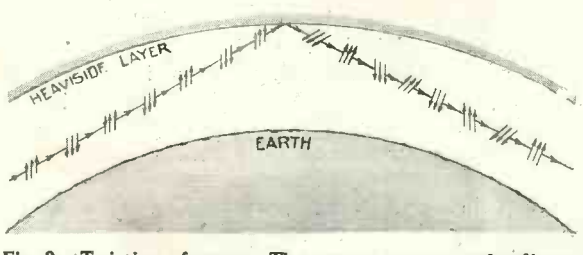


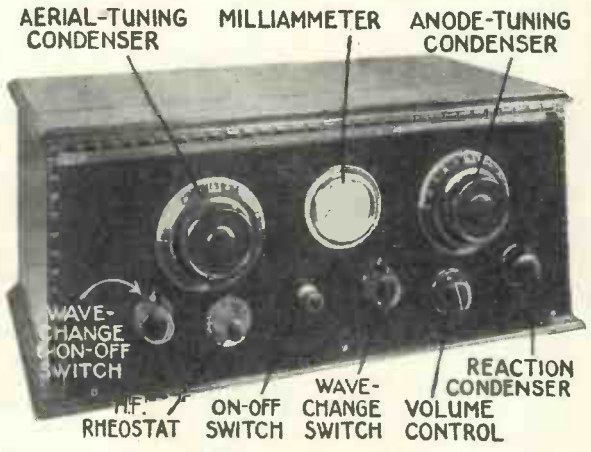
Fig. 3.—Twisting of waves. The arrows represent the directions of the electric fields

This photograph shows the 12,000-volt direct-current generators used at Brookman's Park for supplying the valve anodes

THE BROOKMAN'S PUSH-PULL THREE

A Successor to the Popular Brookman's Three and Brookman's Two, which Were Designed by W. JAMES

This Set Has Been Adapted from the Brookman's Three by the "Wireless Magazine" Technical Staff



Although the controls look complicated, the set is not difficult to operate, as never more than one or two knobs need be used at the same time

AFTER the Brookman's Three and Brookman's Two—now the Brookman's Push-pull Three! Phenomenal is the only word to describe the interest that has been taken in these new sets by W. James, Research Consultant of WIRELESS MAGAZINE.

Solving the Problem

Just at the time when everybody was realising that the advent of Brookman's Park meant the need of super-selective and sensitive sets—and wondering where they were to come from—the WIRELESS MAGAZINE was able to solve the problem by giving readers details of W. James' Brookman's Three in the October issue.

Of this set the designer, who is known by all home-constructors to be most conservative in the claims he makes, said:

The set is sensitive. More than twenty stations have been received in a few minutes with ease. And the quality of reproduction is good. It is a three-valve receiver which will set a new standard, particularly in regard to selectivity.

Those claims have been more than upheld in practice and the set has created a furore in radio circles. The demand for blueprints has been enormous and shows no signs of falling off yet. Many listeners who have been in a state of indecision—wondering whether some other set or kit would give them better satisfaction—have now come to the inevitable conclusion that the Brookman's Three is the best all-round receiver that has yet been put before the home constructor.

Far in Advance

Of course, the secret of success of the Brookman's Three and Brookman's Two (described in the November WIRELESS MAGAZINE) lies in W. James' 1930 Binowave coils, which are far in advance of any other type of dual-range coil yet produced.

This is neither the time nor the place to go into details of the coils, the construction of which was fully described by W. James himself in the previous issue.

Now, having reminded old readers of the supremacy of the "Brookman's" series of receivers and introduced them to new readers, let us explain why we have produced the Brookman's Push-pull Three—which actually uses four valves.

Greater Output

The valve combination of the original Brookman's Three was a screened-grid high-frequency amplifier, detector, and transformer-coupled low-frequency amplifier. The new set is almost identical with the original except that a pair of push-pull amplifying valves is used in place of the single stage utilised before; this arrangement gives greater output and even greater purity of reproduction.

Another feature of the new design is that it is adaptable at the turn of a switch for reproducing gramophone records electrically through the

medium of a pick-up in place of the soundbox on any machine. This is a point that will make an immediate appeal to a large number of listeners.

It should be particularly noted that the components required with this set are almost identical with those for the Brookman's Three, except for the pair of push-pull transformers which is needed instead of a single ordinary type of transformer.

"By Request"

The new set has been designed in response to numerous requests from readers who feel that one low-frequency stage is hardly enough for their requirements.

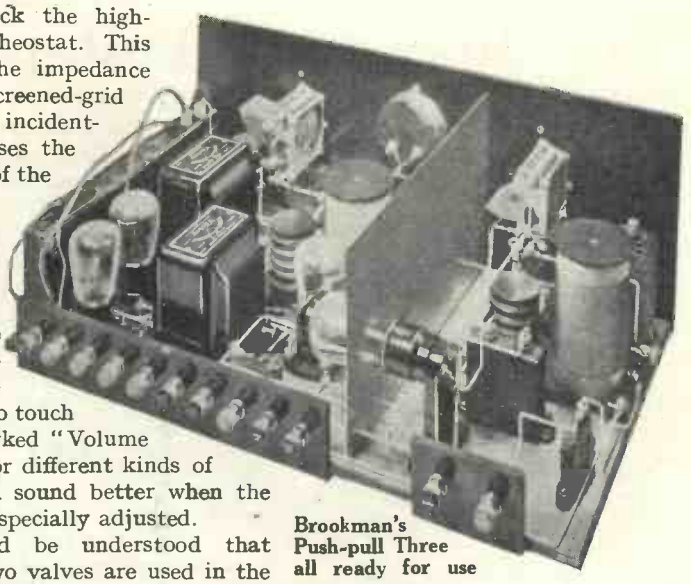
A glance at the photograph forming part of the heading to this article will reveal the arrangement of the controls. There are so many knobs that the inexperienced might suppose that the set is very difficult to operate, but this is by no means the case, for never more than one or two need be manipulated at the same time.

For instance, when receiving radio signals, there is no need to touch the pick-up switch or the knob marked "Volume Control." If the volume happens to be too great, as it undoubtedly will be in many cases, it is reduced by turning back the high-frequency rheostat. This increases the impedance of the screened-grid valve and, incidentally, increases the selectivity of the whole set.

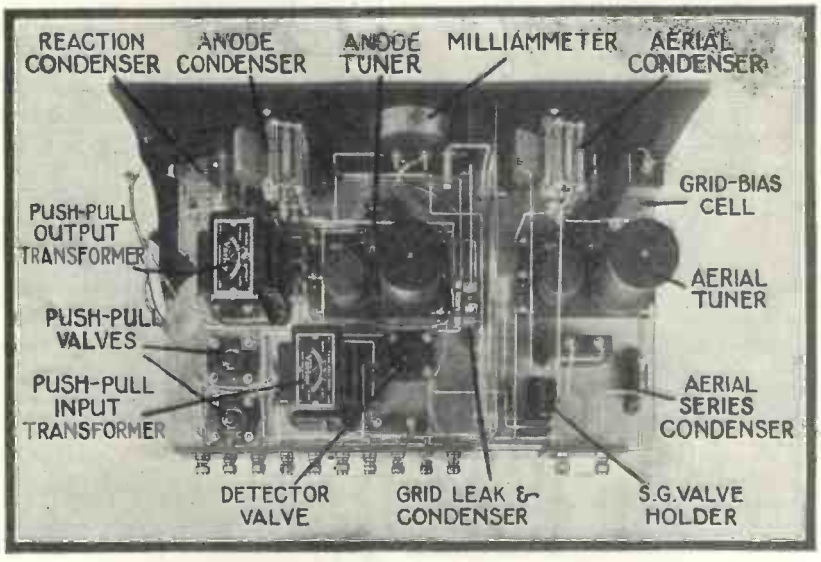
On the other hand, when gramophone records are being reproduced, the only knob to touch is that marked "Volume Control," for different kinds of music often sound better when the strength is specially adjusted.

It should be understood that although two valves are used in the push-pull stage, no greater amplification is actually obtained. The effect is simply that the *input* to the low-frequency section can be greater without any distortion raising.

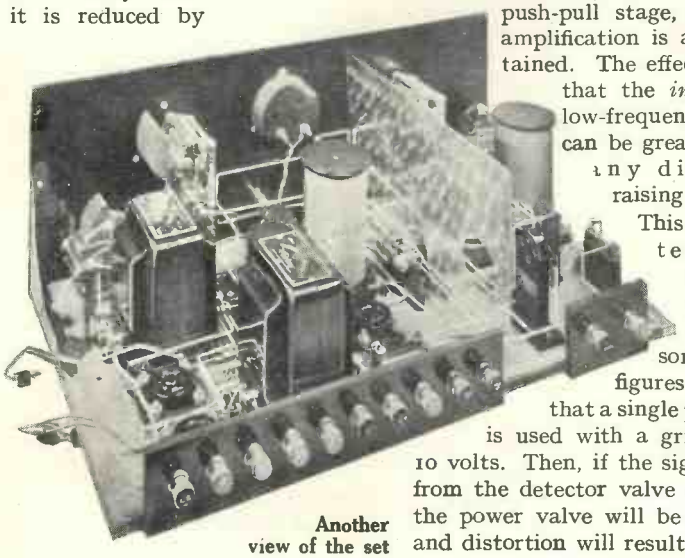
This will be better understood, perhaps, by discussing some arbitrary figures. Suppose that a single power valve is used with a grid swing of 10 volts. Then, if the signal coming from the detector valve is 12 volts, the power valve will be overloaded and distortion will result.



Brookman's Push-pull Three all ready for use



This plan view of the Brookman's Push-pull Three clearly shows how all the parts are arranged on panel and baseboard



Another view of the set

In the case of push-pull, where identical valves *must* be used, the available grid swing is doubled. Thus two power valves, each with a grid swing of 10 volts, used in a push-pull arrangement will result in a total grid swing of 20 volts.

In this way the fullest advantage is taken of strong signals from the high-frequency and detector stages, and no distortion is experienced.

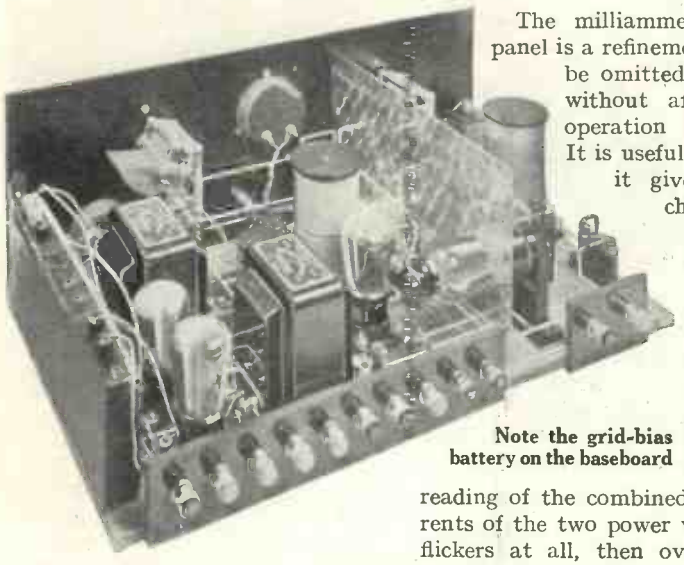
There are a number of interesting points to note about a push-pull circuit. The most important is that two normal types of power valve with a low anode voltage will give results equivalent to a large power valve with 300 or 400 volts on its anode.

Total Impedance of Circuit

It should also be noted that the total impedance of a push-pull arrangement is equal to the addition of both valve impedances. Thus, if two 3,000-ohm valves are used the total impedance will be 6,000 ohms. For this reason identical valves of low impedance should be employed.

The method of arranging the push-pull stage will be clear from the circuit diagram on page 500. It will

The Brookman's Push-pull Three—*Continued*



Note the grid-bias battery on the baseboard

The milliammeter on the panel is a refinement that can be omitted, if desired, without affecting the operation of the set. It is useful in so far as it gives a ready check on the presence of distortion.

If the reproduction is perfect the milliammeter will give a steady reading of the combined anode currents of the two power valves. If it flickers at all, then overloading is occurring, and one or both volume controls should be brought into play.

The milliammeter can also be used to check up the push-pull valves. Remove one and note the reading; then put that valve back and take out the other, again noting the reading. If the readings are not within a very few milliamperes, then the valves are not matched, and one of them should be changed.

Some readers may question the advisability of running a push-pull amplifier direct from a detector valve without any intermediate amplifying stage. The strength obtained from the high-frequency stage, however, is so great that the signal available at the detector is ample for direct input to the push-pull transformer.

"Detector" as Amplifier

In the case of gramophone-record reproduction, the movement of the switch that brings the pick-up into play automatically converts the "detector" into an amplifier, provided with grid bias.

The actual layout of the set need not be discussed, as it will be quite clear from the details reproduced in these pages. If desired, a full-size blueprint can be obtained for half-price (that is, 9d., post free) if the coupon on page iii of the cover is used by December 31.

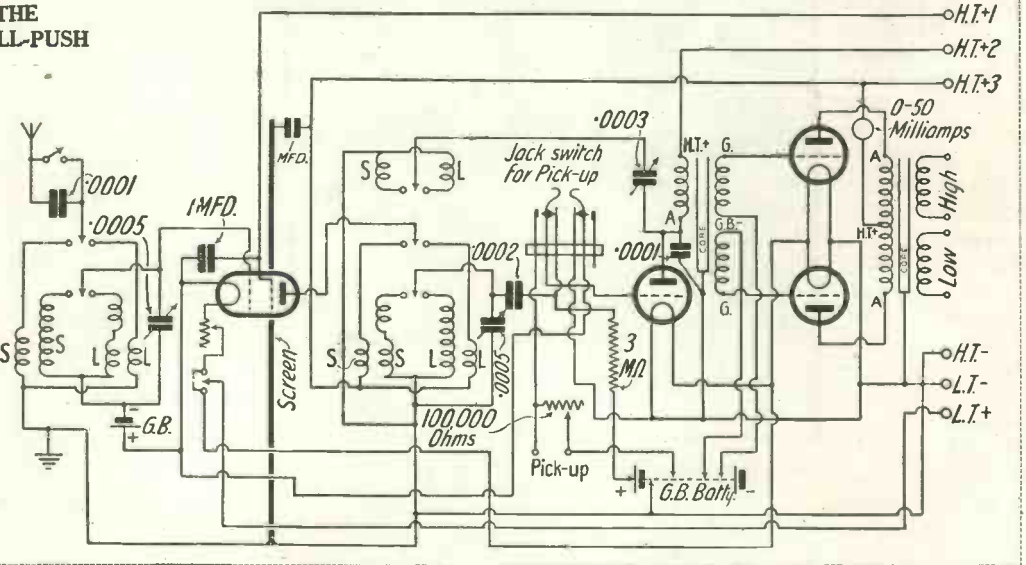
Just address your inquiry to Blueprint Dept., WIRELESS MAGAZINE, 58-61 Fetter Lane, London, E.C.4, and a copy will be sent by return. Ask for No. WM170.

Although there are nearly sixty wires in the set, no difficulty will be

CIRCUIT OF THE BROOKMAN'S PULL-PUSH THREE

The high-frequency and detector portion of this circuit is identical with that of the original Brookman's Three and almost identical components are used.

A very high degree of amplification is obtained from W. James' 1930 Binowave Coils, which are used for tuning the aerial and anode circuits.



be noticed that the secondary of the input transformer is provided with two grid-bias terminals in place of the usual centre-tap.

This has been done with the idea of matching up two slightly dissimilar valves by an alteration in the grid bias so that both give the same anode current. We have shown connections by which advantage can be taken of this scheme if desired.

Use of Matched Valves

We recommend, however, that the two grid-bias terminals be connected directly together so that the same bias is applied to both valves, which should be obtained specially matched.

WHEN YOU HAVE BUILT ONE OF THE "BROOKMAN'S" SERIES OF SETS LET US KNOW WHAT YOU THINK OF IT—AND REMEMBER THAT WE OFFER 10/6 FOR EVERY PHOTOGRAPH PUBLISHED OF A "W.M." SET BUILT BY A READER

Fine Quality from Radio or Records

experienced in connecting up if use is made of the blueprint or the reduced reproduction of it on page 502.

Each wire is numbered in order of assembly, so that the whole wiring is carried out from the baseboard upwards in the most convenient way.

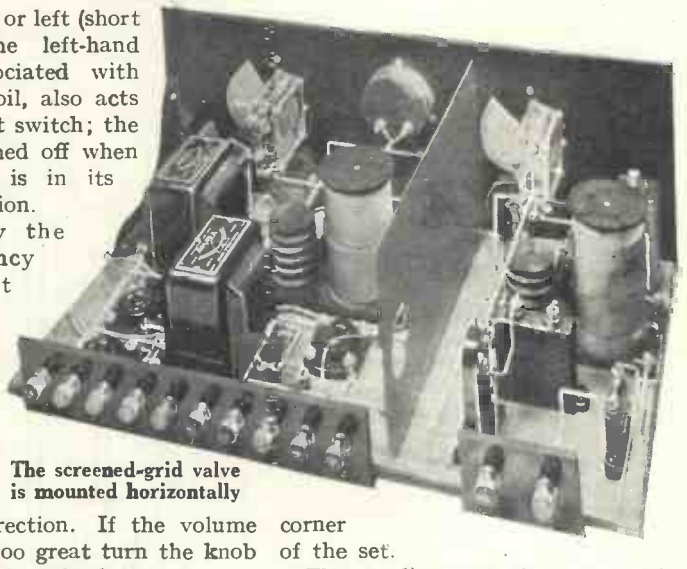
Choice of Valves

The choice of valves for the set will present no difficulty if the list of recommended components and accessories is consulted. This appears at the foot of this page. Although two 105-volt high-tension batteries are recommended, two 60-volt types would give satisfactory results.

Once all the knobs on the panel have been memorised, no difficulty will be experienced in operating the set; a fact that has already been emphasised.

For radio reproduction pull out the knob of the pick-up switch and do not touch the volume-control knob. Turn both switches associated with the Binowave coils either to the right (long waves) or left (short waves). The left-hand switch, associated with the aerial coil, also acts as a filament switch; the set is switched off when this switch is in its central position.

Normally the high-frequency rheostat should be kept fully turned on; that is, the knob should be turned as far as possible in a clockwise direction. If the volume on radio is too great turn the knob back.



The screened-grid valve is mounted horizontally

IN GREAT MEASURE THE INCREASING POPULARITY OF "W.M." SETS IS DUE TO THE CLARITY OF THE FULL-SIZE BLUEPRINTS WHICH ARE PART OF OUR SERVICE TO THE READER—GET ONE OF THIS SET FOR 9d., POST FREE.

Then the only knobs which need be manipulated are the two variable condenser dials tuning the aerial and anode circuits, and the reaction condenser, at the bottom right-hand corner of the set.

The readings of the two main tuning dials will be nearly the same as those given by W. James for the Brookman's Three in his article "Results with the 'Brookman's' Sets," which appeared in the previous issue of WIRELESS MAGAZINE.

Reaction Condenser

It is important to note, by the way, that the reaction condenser must be of .0003-microfarad capacity. Many

COMPONENTS REQUIRED FOR THE BROOKMAN'S PUSH-PULL THREE

Coils
1—Pair Wearite 1930 Binowave coils, types A and B, 34/-.

Condensers, Fixed
2—T.C.C. .0001-microfarad, 3/8 (or Igranic, Marconiphone).
1—T.C.C. .0002-microfarad, type SP, 2/4.
2—T.C.C. 1-microfarad, 5/8 (or Dubilier, Ferranti).

Condensers, Variable
2—Cyldon Junilog .0005-microfarad, 17/6 (or Polar, Keystone).
1—Cyldon Bébé .0003-microfarad, 8/- (or Utility, Bowyer-Lowe).

Dials, Slow-motion
2—Burndept, 12/- (or Bowyer-Lowe, Harlie).

Ebonite
1—Becol, 18 in. by 7 in., 7/7 (or Ripault, Redfern's).
2—Becol strips, 10½ in. by 2 in. and 3 in. by 2 in.

Holders, Valve
3—Benjamin Vibroholders, 4/6 (or Lotus, W.B.).
1—Parex screened-grid, single type, 2/- (or Colvern, Keystone).

Meter
1—Sifam 0-50 milliammeter, 25/-.

Plugs
5—Belling-Lee wander plugs (marked: G.B.+, G.B.+, G.B.—1, G.B.—2, G.B.—2), 1/3.

Potentiometer
1—Centralab 100,000-ohm potentiometer, type P100, 8/6.

Resistance, Fixed
1—Ediswan 3-megohm, 2/6 (or Loewe, Dubilier).

Resistance, Variable
1—Lissen 15-ohm, panel type, 2/6 (or Benjamin, Burton).

Screen
1—Parex vertical screen, 10 in. by 6 in., 2/9 (or Ready Radio, Peto-Scott).

Sundries
1—Pair Pair panel brackets (Ready Radio).
Glazite for connecting up.

Switch
1—Lotus jack, type No. 8, 3/6.

Terminals
12—Belling-Lee, type M (marked: Aerial, Earth, Pick-up (2), L.T.+, L.T.—, H.T.+3, H.T.+2, H.T.+1, H.T.—, L.S.+, L.S.—), 4/6 (or Eelex).

Transformers, Low-frequency
1—Pair Varley push-pull transformers, 46/- (or Ferranti).

ACCESSORIES

Batteries
2—Obeta 105-volt, power type, 33/- (or Siemens, Ever Ready).
1—Siemens 1½-volt grid cell, 1/6 (or Ever Ready).
1—Siemens 16-volt battery (or Ever Ready).
1—C.A.V. 2-volt 60-ampere-hour accumulator, type 2AG11, 15/6 (or Tudor, Lissen).

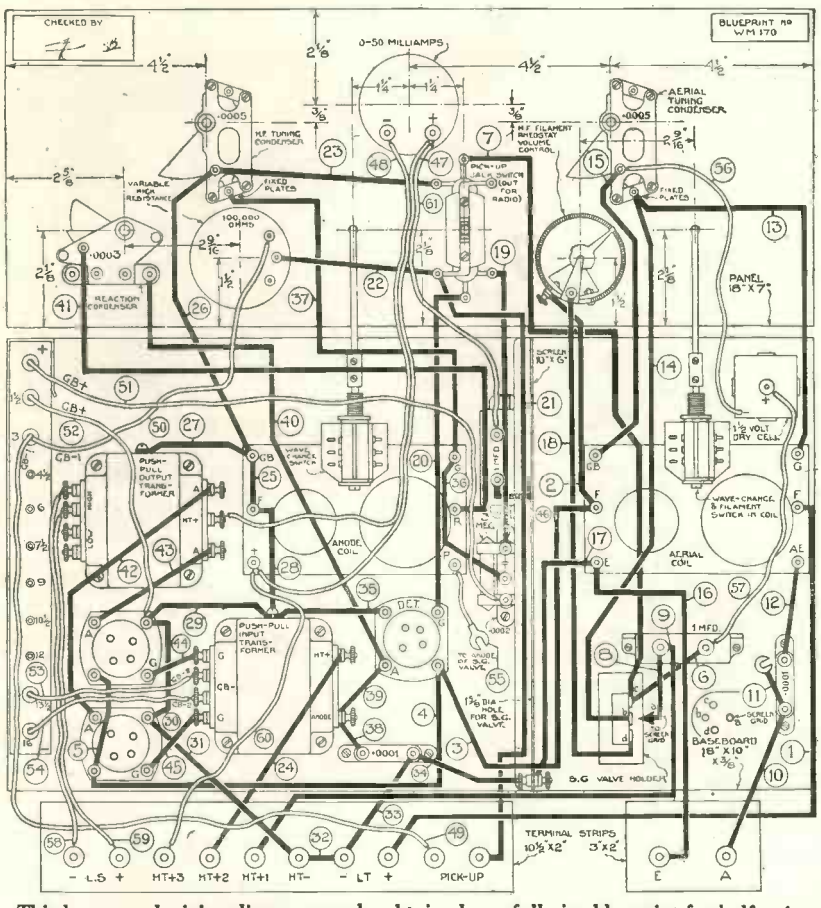
Cabinet
1—Pickett, with 10-in. baseboard, 35/- (or Lock, Camco).

Loud-speaker
1—Celestion, type C10 cone, £3/15/- (or Ediswan, Blue Spot).

Valves
1—Cossor 220SG, 22/6 (or Mazda 215SG, Marconi S215).
1—Cossor 210HF, 10/6 (or Mazda HL210, Marconi HL210).
2—Cossor 230XP, 25/- (or Mazda P240, Marconi, P240).

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

The Brookman's Push-pull Three—*Continued*



This layout and wiring diagram can be obtained as a full-size blueprint for half-price (that is, 9d., post free), if the coupon on page iii of the cover is used by December 31. Ask for No. W.M.170.

listeners seem to think that the value of this component is quite arbitary and that .0001 or .0002 microfarad could be used with equal satisfaction. This is not the case.

To use the set for the reproduction of gramophone records connect a pick-up to the terminals provided and push in the knob of the pick-up switch. Volume is then controlled by the knob marked "Volume Control."

When the pick-up is switched into circuit the screened-grid valve is automatically switched off and the "detector" is biased for amplifying.

Grid-bias Tappings

Actually three grid-bias negative tappings are provided, one G.B.—1 and two G.B.—2. The latter, as previously explained, are to enable the operator to match up two slightly dissimilar power valves in the push-pull stage by giving one more or less bias than the other, so that the anode current from each is the same.

The makers' recommendations regarding anode voltage and grid bias should be adhered to rigidly if the best results are to be obtained.

Other Articles to Read

Prospective constructors of the Brookman's Push-pull Three will find it worth their while to read the following articles, which have appeared in the previous issue of WIRELESS MAGAZINE :—

"Results with the 'Brookman's' Sets," by W. James (November).

"Making the 1930 Binowave Coils," by W. James (November).

Why Signals Fade—*Continued from page 497*

The ripple is actually produced by a movement of each part of the rope up and down in a direction at right angles to the general direction of the rope itself or, in other words, the direction of motion of the wave. If the hand is moved up and down vertically, this motion of the rope is always in a vertical plane.

It is possible to produce an exactly similar phenomenon by shaking the hand horizontally or at some other angle. If we do this we produce a wave similar to the previous one, but having a different "plane of polarisation."

If we fix some device at the far end which would only respond when the rope is jerked vertically, then any horizontal impulse will not affect the device although the phenomenon producing the ripple is of exactly the same character as before.

The same thing happens in a wireless receiver. Wireless waves are normally vertically polarised, and we erect vertical aerials in order to receive the waves. If we place the aerial horizontally it will receive nothing and conversely if we try to receive a horizontally polarised wave on a vertical aerial we also receive nothing.

Probably, by now, the explanation of fading has begun to be clear. The reflection of the wireless waves from the Heaviside layer twists the plane of polarisation so that they are not received as well as they should be on an aerial system intended for a truly vertically polarised wave. The extent of the reception depends upon the amount of twist in the wave, and if the wave has become so twisted that it reaches the earth horizontally polarised, then no signals at all will be received.

Now the evidence goes to show that what actually happens is that, as a result of the reflection from the Heaviside layer, the wireless waves are given a gradual twist. That is to say, as they approach the earth they gradually change their plane of polarisation from vertical to horizontal and back again.

The effect of this on a wireless receiver is that the signal strength gradually falls from normal to nothing and then grows again. This takes place in a more or less well-defined interval.

Are Radio Critics Justified?

In this article ANDREW SOUTAR, the well-known novelist, confesses that he was converted to radio only two years ago and makes a sly suggestion to account for the activities of captious broadcast critics!

Andrew Soutar, the well-known novelist, who was converted to radio only two years ago

"GROUSING" is a prerogative of the Englishman, and if he hasn't anything to grouse about, he grouses about the lack of a grievance. Grousing is a characteristic of the race that is cherished by those who are fond of talking of tradition: they make of grousing a virtue and say, in effect: "We take nothing lying down."

Off His Food

I have known a hard-grained, mahogany-headed man to go off his food because he couldn't think of something that merited his damnation. Broadcasting was a godsend to that fellow!

I read the newspapers assiduously—it is part of my job—because I am supposed to keep in touch with anything that is going on. Frequently, they depress me; I feel the bottom of the world falling out and the roof falling in and hope and ideals stifling in the mud.

But, in my heart, there is a spark of optimism that will never allow itself to be quenched. One of these days, I tell myself, I am going to read a perfectly honest eulogy of the B.B.C. and the radio. Someone is going to write:

"There was a perfect programme broadcast last night from Savoy Hill. We had no asthmatic old gentlemen squeaking their way through an essay on moles, nor any tin-voiced sopranos to make the glass and cutlery dance on the dining-room table with the terrible vibrations of a misunderstood gift.

"There was no nerve-racking wait between the announcement of the weather forecast and the winner of the first race at Kempton Park. None of that torture to a racing man that follows 'sport'—cricket and football results, lawn tennis in Labrador, billiards in Melbourne, shove-ha'-penny in Somerset. That awful soul-tiring enumeration of sports and games that do not interest.

"No, sir. The announcer knew instinctively that our mind was frayed with anxiety. Straightway, after that one word 'sport,' came 'results.' And when we had heard them we turned off the radio so that we might calculate our winnings in peace.

"We had music that *was* music, singing that elevated, light, crisp anecdotes from the stage; we had no political speeches—thank God; no criticisms of anything—thank God, again. We had what we wished—an evening of pure entertainment.

"And, in atonement for all the brutal things we have said about the B.B.C., we ask Savoy Hill to accept this, our sincere apology, for hurting the feelings of the officials. We realise that now they *do* know what the public desire most."

I don't envy the programme selectors their job, although I would give more than I can afford to be allowed to broadcast for one hour with no restrictions on what I might feel inclined to say.

It would be the finest advertisement the radio could ever hope to gain, for publicity, in itself, is advertisement. I might get into gaol because of what I had said but, on the whole, I think it would be worth it.

Change in Our Life

It has wrought a great change in our life, this broadcasting to the people. Looking back, it is almost incredible that the late Lord Northcliffe, the greatest journalist that this or any other country has ever known, had to keep on hammering at the Government for weeks and months before the people were allowed to enjoy similar privileges to those which America had been enjoying for a couple of years.

To-day, there is scarcely a cottage in the country that hasn't some form of wireless. Newspapers carry pages of advertisements of various types of instruments. Wonderful instruments! Wonderful prices! Instruments that you may carry about in a motor-car, keep in the cellar, in the drawing-room, or hang up in a tree.

In A Cottage Pantry

One may give any fancy price and yet the one that I always admire is the collection of accumulators and wires and gadgets arrayed on a deal plank in the pantry of a cottage by the eldest son or the boy of the family who has got his nose into wireless as firmly as a rat gets into a trap.

How he does it, I cannot say, but for an expenditure of about thirty shillings he can give me the joy of listening to a sand-dance down in Alabama when my dignified expensive contraption does no more than grind itself to death in impotent rage.

Here is a phase of listening that has nothing whatever to do with the foregoing. I wonder if others are similarly affected? I cannot tolerate the radio if I am alone in the house! What is it that makes the "loneliness" lonelier still? There is nothing sepulchral about it, nothing eerie: it is just that inexplicable feeling that solitude has been emphasised.

And when there is company

(*Continued on page* 508)

"W.M." Set Buyers' Guide

A LIST OF UP-TO-DATE SETS ARRANGED CONVENIENTLY IN PRICE GROUPS

The 170-odd sets listed below are new models for 1930, and are representative of modern types and prices. Readers will be able to see at a glance average prices of any particular type of set. For portables refer to the May issue.

In the "Name of Set" column, a star (*) indicates that provision is made for connecting a pick-up if desired so that gramophone records can be reproduced electrically.

Where, under "Power Supply," no mention of "Bat." is made, the set must be worked from the mains.

If you want further particulars of any of these sets, write to us and we will forward your inquiries to the manufacturers concerned. There is no charge for this service. Just address the envelope: Set Selection Bureau, WIRELESS MAGAZINE, 58-61 Fetter Lane, London, E.C.4.

Sets which have been actually tested in the "W.M." laboratories and which can be recommended from personal experience are indicated in **bold type**. *This month's test reports will be found on page 487.*

NOT EXCEEDING £10

Maker	Name of Set	Price	Power Supply	Combination
Loewe	*Type O.E.333	£3/3/0	Bat.	Multiple valve
Edison Bell	Bijou	£3/12/6	Bat.	D., L.F.
Lamplugh	Chassirad	£3/15/0	Bat.	D., L.F.
Lamplugh	Popular 2	£4/2/6	Bat.	D., L.F.
Castagnoli	Castaphone ES2	£4/10/0	S.C. Bat.	D., L.F.
Lamplugh	Chassirad	£4/15/0	Bat.	D., L.F.
Lamplugh	Popular 3	£5/7/6	Bat.	D., 2L.F.
Eagle Engin.	Warwick 2	£5/9/9	Bat.	D., L.F.
Automobile Acc.	*Melody 3	£5/10/0	Bat.	D., 2L.F.
Automobile Acc.	*Melodia 3	£5/12/6	Bat.	S.G., D., Pen.
E. J. Baty	Baty 2	£5/15/0	S.C. Bat.	H.F., D.
Castagnoli	Castaphone ES5	£5/15/0	S.C. Bat.	D., 2L.F.
Lamplugh	Standard	£5/17/6	Bat.	D., L.F.
Pye	No. 232	£6/0/0	Bat.	D., P.
E. J. Baty	*Baty 3	£6/0/0	Bat.	D., 2L.F.
Ormond	Two-valve Set	£6/3/0	Bat.	D., L.F.
Edison Bell	Homestead 3	£6/7/6	S.C. Bat.	D., 2L.F.
Bowyer Lowe	*Pentovox 2	£6/8/0	Bat.	D., L.F.
Lamplugh	Standard	£7/2/6	Bat.	D., 2L.F.
Marconiphone	Model 37	£7/2/6	Bat.	D., 2L.F.
Marconiphone	Model 23	£7/5/0	S.C. Bat.	D., L.F.
Edison Bell	*Compact 3	£7/10/0	S.C. Bat.	D., 2L.F.
Kolster Brandes	Brandeset 3a	£7/10/0	Bat.	D., 2L.F.
Automobile Acc.	*Self-contained 3	£7/15/0	S.C. Bat.	D., 2L.F.
E. J. Baty	*Baty 4	£8/0/0	A.C., D.C.	H.F., D., 2L.F.
Lissen	S.G.3	£8/0/0	S.C. Bat.	S.G., D., P.
Eagle Engin.	*Warwick 2 Pedestal	£8/5/0	S.C. Bat.	D., L.F.
Falk, Stadelmann	Wolfe	£8/7/6	Bat.	D., 2L.F.
Eagle Engin.	Junior 3	£8/7/9	Bat.	D., 2L.F.
Burndept	Screened Ethophone	£8/10/0	Bat.	S.G., D., Pen.
Edison Bell	*Maison S.G.3	£8/10/0	S.C. Bat.	S.G., D., Pen
Lamplugh	Chassirad	£8/15/0	Bat.	S.G., D., Pen.
Ormond	Three-valve Set	£8/18/6	Bat.	D., 2L.F.
Edison Bell	*Pedestal 3	£9/12/6	S.C. Bat.	D., 2L.F.
Ediswan	Three	£9/12/6	Bat.	S.G., D., P.
Kolster Brandes	K.B.102	£9/15/0	Bat.	S.G., D., Pen.
Bowyer Lowe	Pentovox 3	£10/0/0	Bat.	S.G., D., Pen.
City & General	*City Super 3	£10/0/0	Bat.	S.G., D., Pen.
Marconiphone	Model 23a	£10/0/0	S.C. Bat.	D., L.F.

BETWEEN £10 AND £20

Maker	Name of Set	Price	Power Supply	Combination
Lamplugh	Screened-grid 3	£10/10/0	Bat.	S.G., D., P.
Kolster Brandes	*K.B.163	£10/15/0	Bat.	S.G., D., P.
Lamplugh	Standard	£11/0/0	Bat.	D., L.F.
Burndept	Screened Ethaphone	£11/8/0	Bat.	S.G., D., Pen.
Burndept	Empire	£11/10/0	Bat.	S.G., D., Pen.
Marconiphone	Model 35	£12/0/0	Bat.	S.G., D., Pen.
Pye	No. 275	£12/0/0	S.C. Bat.	D., P.
Lamplugh	Standard	£12/5/0	Bat.	D., 2L.F.
Philips Lamps	*2502 Type	£12/10/0	Bat.	S.G., D., Pen.
Philips Lamps	*Type 2515	£12/10/0	A.C.	D., Pen.
British Radio	*Craigweil	£12/12/0	S.C. Bat.	D., 2L.F.
Aeonic	*Mains 2	£12/15/0	A.C.	D., L.F.
Lamplugh	Quality 3	£12/15/0	S.C. Bat.	D., 2L.F.
Cole, E. K.	*Ekco Electric P.2	£12/17/6	D.C., A.C.	D., Pen.
Falk, Stadelmann	Repton	£12/17/6	Bat.	S.G., D., L.F.
Gambrell	All-electric Two	£13/15/0	D.C.	D., P.
Lotus	RS70	£13/15/0	Bat.	S.G., D., P.

BETWEEN £10 AND £20 (Continued)

Maker	Name of Set	Price	Power Supply	Combination
Castagnoli	Castaphone Dual Four	£14/14/0	S.C. Bat.	H.F., D., 2L.F.
Lamplugh	S.G.3	£15/12/6	S.C. Bat.	S.G., D., P.
Marconiphone	Model 39	£13/0/0	S.C. Bat.	S.G., D., Pen.
G.E.C.	**Short-waver**	**£15/0/0**	**Bat.**	**S.G., D., P.**
G.E.C.	**Gecophone**	**£15/0/0**	**A.C.**	**D., P.**
Ormond	Screened-grid Three	£15/0/0	S.C. Bat.	S.G., D., Pen.
Pye	Two-valver	£15/0/0	A.C.	D., P.
Eagle Engin.	*Warwick 2	£55/15/0	A.C.	D., P.
Lamplugh	Trans 5	£15/15/0	S.C. Bat.	2H.F., D., 2L.F.
Lamplugh	Straight A.C.2	£15/15/0	A.C.	D., L.F.
Burne Jones	*AC/2 Mains	£16/10/0	A.C.	D., L.F.
E. K. Cole	*Ekco-electric 3 ES2	£16/10/0	D.C., A.C.	D., 2L.F.
Falk, Stadelmann	Waterloo	£16/15/0	Bat.	S.G., D., Pen.
Aeonic	Trans 5	£16/16/0	S.C. Bat.	2H.F., D., 2L.F.
Edison Bell	Console 4	£16/16/0	S.C. Bat.	H.F., D., 2L.F.
Varley	*All-electric	£16/16/0	A.C., D.C.	D., L.F.
G.E.C.	*S.G.3	£17/0/0	S.C. Bat.	S.G., D., P.
Gambrell	All-electric	£17/10/0	A.C.	D., P.
Kolster Brandes	*K.B.161	£17/10/0	D.C., A.C.	S.G., D., Pen.
Pye	No. 275M	£17/10/0	A.C.	D., P.
Burne Jones	Universal 3	£18/0/0	Bat.	S.G., D., Pen.
Trix	*All Mains 3	£18/10/0	A.C.	D., L.F., P.
Lamplugh	Straight A.C.3	£19/10/0	A.C.	D., 2L.F.
Burgoyne	Model A	£18/18/0	S.C. Bat.	2H.F., D., 2L.F.
Burgoyne	Pentod	£19/19/0	S.C. Bat.	2H.F., D., L.F., Pen.
McMichael	*Screened-Dimic 3	£19/19/0	S.C. Bat.	S.G., D., Pen.
Aeonic	Screened 4	£19/9/0	—	—
Pye	No. 460	£19/10/0	S.C. Bat.	S.G., D., 2L.F.
Bowyer Lowe	*Vox Populi 3	£20/0/0	Bat.	S.G., D., Pen.
City & General	*City Super 111	£20/0/0	A.C.	S.G., D., P.
Falk, Stadelmann	Waterloo De Luxe	£20/0/0	S.C. Bat.	S.G., D., Pen.

BETWEEN £20 AND £30

Maker	Name of Set	Price	Power Supply	Combination
Lamplugh	Quality 3	£20/5/0	S.C. Bat.	D., 2L.F.
B.T.H.	4-valver	£21/0/0	Bat.	H.F., D., 2L.F.
E. K. Cole	*Ekco-lectric S.G.P.3	£21/0/0	A.C., D.C.	S.G., D., Pen.
Ediswan	*Mains 3	£21/0/0	A.C., D.C.	S.G., D., P.
Brit. Radio Gramo.	*Craigweil Portable	£21/15/0	S.C. Bat.	2H.F., D., 2L.F.
Lotus	RS80	£21/0/0	A.C.	S.G., D., P.
Gambrell	***All-electric Three**	**£22/10/0**	**D.C.**	**S.G., D., Pen.**
Regent Radio	Regentone	£22/10/0	A.C.	S.G., D., P.
Marconiphone	**Model 44**	**£22/10/0**	**Bat.**	**2S.G., D., Pen.**
Igranic	Neutrosonic Short-waver	£23/0/0	Bat.	S.G., D., L.F., P.
Philips Lamps	*Type 2514	£23/0/0	A.C.	S.G., D., Pen.
Aeonic	*Mains 4	£23/2/0	A.C., D.C.	—
Marconiphone	Model 34	£23/17/6	Bat.	D., 2L.F.
Bowyer Lowe	*Vox Populi 4	£24/0/0	Bat.	S.G., D., L.F., P.
Marconiphone	*Model 47	£24/0/0	A.C.	S.G., D., 2L.F.
Amplion	*Radio Set	£25/0/0	Bat.	H.F., D., 2L.F.
Burndept	*Screened 4	£25/0/0	Bat.	S.G., D., L.F., P.
Falk, Stadelmann	*Waterloo de Luxe	£25/0/0	A.C.	S.G., D., P.

BETWEEN £20 AND £40 (*Continued*)

Maker	Name of Set	Price	Power Supply	Combination
Ferranti	A.C. Set	£25/0/0	A.C.	S.G, D., P.
Gambrell	*All-electric Three	£25/0/0	A.C.	S.G., D., Pen.
G.E.C.	Mains 3	£25/0/0	A.C.	S.G., D., P.
Pye	350A.C.	£25/0/0	A.C.	S.G., D., P.
Burgoyne	Screened 4	£25/4/0	S.C. Bat.	S.G., D., L.F., Pen.
G.E.C.	Four-valver	£26/0/0	S.C. Bat.	S.G., D., 2L.F
Lotus	RS51	£26/5/0	A.C.	S.G., D., Pen.
M.P.A.	*All-electric 3	£26/5/0	A.C.	H.F., D., Pen.
Reproduction	Rhapsody Twin	£26/5/0	S.C. Bat.	2H.F., D., 2L.F.
Varley	*All-electric	£26/5/0	A.C., D.C.	S.G., D., L.F.
Columbia	304H	£27/0/0	S.C. Bat.	3S.G., D., P.
Burne Jones	*AC/3	£27/10/0	A.C.	S.G., D., P.
Lamplugh.	All Mains 3	£27/10/0	A.C.	S.G., ,D. L.F.
Marconiphone	*Model 56	£27/10/0	S.C. Bat.	3D.G., D., Pen.
Regent Radio	Regentone	£27/10/0	A.C.	S.G., D., P.
Burndept	Screened 4	£27/18/6	Bat.	S.G., D., 2L.F.
McMichael	*Screened Dimic 3	£28/0/0	A.C.	S.G., D., P.
Universal	*Home Model	£29/8/0	S.C. Bat.	S.G., D., P.
Lissen	***Lissenola Rad. Gramo.**	**£30/0/0**	**A.C., D.C., Bat.**	**S.G., D., Pen.**
Philips	*Type 2802	£30/0/0	Bat.	S.G., D., L.F., Pen.
R.I.	*All-electric Trans 3	£30/0/0	A.C., D.C.	S.G., D., P.

BETWEEN £30 AND £50

Maker	Name of Set	Price	Power Supply	Combination
Cook's	*Screened-grid 4	**£31/10/0**	S.C. Bat. A.C., D.C.	S.G., D., 2L.F.
Edison Bell	*Radio Gramo.	**£31/10/0**	S.C. Bat.	S.G., D., Pen.
Empire Electric	Metropolis Table Grand	**£31/10/0**	S.C. Bat.	Super-het.
Columbia	Model 304	£33/0/0	A.C., D.C.	3S.G., D., P.
Gambrell	*All-electric Four	£33/0/0	D.C.	S.G., D., Pen.
Bowyer Lowe	*Screened Vox Populi 3	£33/10/0	A.C.	S.G., D., Pen.
Lamplugh	Radio Gramo.	£35/15/0	D.C.	D., 2L.F.
M.P.A.	*All-electric Trans 4	£36/5/0	A.C.	S.G., D., 2L.F.
Brt. Radio Gramo.	*Craigweil 37	£37/10/0	S.C. Bat.	S.G., D., Pen.
Philips	***Type 2511**	**£37/10/0**	**A.C.**	**2S.G., D., Pen.**
Burndept	*A.C. Screened 7	£37/16/0	A.C.	2S.G., D., L.F., P.
Lamplugh	Radio Gramo	£38/0/0	A.C.	D., 2L.F.
Burndept	A.C. Screened	£38/17/0	A.C.	2S.G., D., 3L.F.
Gambrell	*All-electric Four	£39/15/0	A.C.	S.G., D., Pen.
Varley	Radio Gramo.	£40/19/0	A.C., D.C.	D., L.F.
Lamplugh	Radio Gramo.	£41/5/0	D.C.	2H.F., D., 2L.F.

BETWEEN £30 AND £50 (*Continued*)

Maker	Name of Set	Price	Power Supply	Combination
Brit. Radio Gramo.	*Model 42	£42/10/0	D.C.	S.G, D., P.
Lamplugh	Radio Gramo.	£43/10/0	A.C.	2H.F., D., 2L.F.
Cook's	*Radio Gramo.	£45/0/0	S.C. Bat., A.C., D.C.	S.G., D., 2L.F.
Ormond	*Pedestal	£45/0/0	S.C. Bat.	D., 2L.F.
Brit. Radio Gramo.	*Model 45	£45/10/0	A.C.	S.G. D., P.
Burndept	*Ethogram B	£46/0/0	A.C.	2S.G., D., L.F., P.
Lamplugh	All Mains 3	£46/0/0	A.C.	D., 2L.F.
Trix	Radio Gramo.	£47/5/0	A.C.	D., L.F., P.
Universal	*Chubby Model	£49/7/0	S.C. Bat.	S.G., D., P.
Amplion	*Mains Set	£50/0/0	A.C.	S.G., D., 2L.F.
City & General	*Radio Gramo. Amplifier	£50/0/0	A.C., D.C.	—
Ormond	*Console	£50/0/0	S.C. Bat.	D., 2L.F.
Universal	*Truvox	£50/0/0	S.C. Bat.	S.G., D., 2L.F.

OVER £50

Maker	Name of Set	Price	Power Supply	Combination
Marconiphone	Model 61	£51/0/0	Bat.	3S.G., D., 2L.F.
Peto Scott	*All British 6	£51/5/0	A.C., D.C., Bat.	3H.F., D., 2L.F.
Marconiphone	Model 82	£57/0/0	Bat.	Super-het.
Radio Gramo.	*Craigweil Electric Gramo.	£57/15/0	A.C.	D., 3L.F.
Gambrell	*All-electric Radio Gramo.	£59/17/0	D.C.	S.G., D., Pen.
Edison Bell	*Mains Radio Gramo.	£65/0/0	A.C., D.C.	S.G., D., 2L.F.
Universal	*Truvox	£65/0/0	A.C., D.C.	S.G., D., P.
Gambrell	*All-electric Radio Gramo.	£67/4/0	A.C.	S.G., D., Pen.
Varley	Radio Gramo.	£68/5/0	A.C., D.C.	S.G., D., L.F.
Advance	*Radio Console	£75/0/0	A.C.	S.G., D., P.
H.M.V.	Radio Gramo.	£75/0/0	A.C.	S.G., D., 2L.F.
M.P.A.	*Radio Gramo.	£78/15/0	A.C.	S.G., D., 2L.F.
Reproduction	*Chair-Side	£97/13/0	A.C., D.C.	—
Pye Radio	Radio Gramo.	£99/15/0	A.C.	2H.F., D., 2L.F.
Reproduction	*Boudoir	£99/15/0	A.C., D.C.	—
City & General	*Cinema Amplifier	£100/0/0	A.C., D.C.	—
Harlie	Radio Gramo.	£110/2/0 to £152/10/0	A.C., D.C.	H.F., D., 3L.F.
Donophone	*Radio Gramo.	£115/10/0	A.C., D.C.	—
Brit. Radio Gramo.	*Craigweil Radio Gramo.	£120/0/0	A.C.	H.F., D., 2L.F
Reproduction	*Rhapsody Twin	£131/5/0	A.C., D.C.	—
Brit. Radio Gramo.	*Craigweil 165	£160/0/0	A.C.	2H.F., D., L.F.
M.P.A.	*Ethatrope Radio Exchange	£178/10/0	A.C.	2S.G., D., 2P.

Choosing a Set from the "W.M." Buyers' Guide

FURTHER additions are made this month to the WIRELESS MAGAZINE Set Buyers' Guide which, in its present comprehensive form, should give the set buyer a bird's-eye view of the leading radio sets available. It will be seen that sets are grouped according to their price. Inexpensive sets, moderate-priced sets, and the more expensive sets are thus conveniently divided.

Concentrated Information

Most set buyers know beforehand, to a pound or so, how much they want to spend. But, as we wish to show, this information is not quite enough to enable the set buyer to make a good choice. In the WIRELESS MAGAZINE Set Buyers' Guide, concentrated information is available which should greatly assist the set buyer if he understands its real meaning.

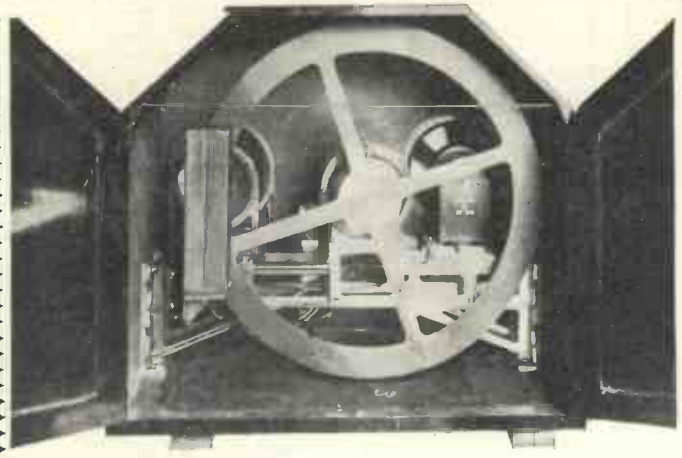
For example, in the column headed "Combination," the high-frequency and low-frequency amplifying capabilities of the set are disclosed. The simplest combination is "D, L.F." This combination is associated with local station receivers. Sets using it require an outside aerial for best results. They can be used with either batteries or mains supply. The Bowyer-Lowe Pentovox Two is a good example of a set making use of this combination. It is battery-operated.

The Philips type 2515 employs a modification of this simple combination. As shown in the table, its combination is D, Pen. All that has been done is to use a pentode valve instead of a small power valve. Where this combination appears in a set it can be taken that, although the set is not more sensitive to weak signals than one embodying the combination D, L.F., it will give louder signals.

The next most straightforward combination of valves is "SG, D, P." A slight variation of this is when H.F. takes the place of S.G. Whenever either H.F. or S.G. precedes D, it can be taken that the set embodying the combination is sensitive to weak signals and that it will give good results from near-by stations, when using an indoor aerial. A good example of a set employing this combination is the Kolster Brandes KB 102, which has both screened-grid and pentode valves. Here, a pentode valve gives stronger signals than the ordinary power valve and the screened-grid valve makes the set more sensitive than would an ordinary high-frequency valve.

Question of Power Supply

An important part to be considered in any set is the power supply. The set-buyer must decide whether he is going to make use of his electric light, if this is available, or whether he is going to use batteries. Many sets are now available that run entirely from the mains. If the set-buyer has a choice he would be advised to choose a mains set in preference to a battery-operated set. If batteries have to be used, or are preferred, they should at least be self-contained. Some sets have not yet developed the self-contained idea to the extent we consider justified.



A TELEVISION RECEIVER

Inside of a large Baird Televisor, complete with moving-coil loud-speaker. The lens, framing mask and neon cowl are seen clearly on the left

Around the Scanning Disc

Televisor Secrets

BY H. J. BARTON CHAPPLE, Wh.Sch., B.Sc. (Hons.)

So far we have confined our attention mainly to a consideration of transmitting details, although no attempt has been made to delve at all deeply into the problems. Generalities are always best to start with, and we can particularise after a working knowledge of the receiving end has been garnered.

Here, of course, it is fairly obvious that we require a wireless receiving set to conform to certain standards and a Baird Televisor. Since the question of the wireless receiver is bound up very largely with the amplification of a suitable kilocycle sideband, together with a question of tuning, which should be as broad as possible, compatible with selectivity, we will defer this until after we have examined the televisor itself.

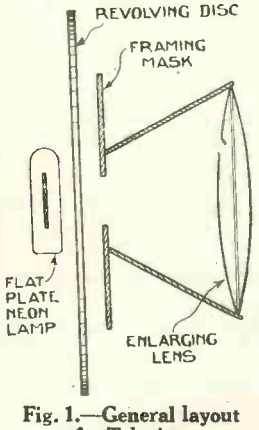


Fig. 1.—General layout of a Televisor

Leading Questions

Now of what does a televisor consist, and is it difficult to operate, and complicated in construction? These three questions are being put to me regularly and can be disposed of quite simply.

The essentials are a disc perforated with a spiral of holes exactly similar, from a proportional point of view, to that at the transmitting station, a neon lamp with or without a cowl, a picture or framing mask, a magnifying lens (optional), a driving motor, and synchronising mechanism.

The motor must be of the shunt-wound type, capable of developing a speed up to about 900 revolutions per minute. The average running speed is 750 revolutions per minute (12½ pictures per second), and, above all, it is necessary for this motor to be able to run at a steady speed for long periods at a stretch.

According to the supply available, the electrical power may be derived from accumulators or electric-light mains and, in the case of the latter, a machine of the universal type (that is, one capable of running from either alternating-current or direct-current mains) has advantages which are self-obvious.

To my mind, apart from the synchronising mechanism, which, of course, is of paramount importance, the secret of a successful televisor lies in the employment of a high-grade motor and too much attention cannot be given to this detail.

A motor which of itself is steady running, that is, free from sporadic tendencies of speed change, throws a much lighter load on the synchronising mechanism and will ensure an entire absence of any "picture hunt" under normal working conditions, and this is very essential.

Layout of a Televisor

A reference to Fig. 1 will give a rough idea of the layout of the televisor. Assuming vertical scanning, we have a long tubular neon lamp with a relatively large flat-plate electrode which glows when the appropriate potential is applied between the positive and negative electrodes.

The intensity of the plate glow is dependent upon the strength of the signals applied to the grid of the last valve in the wireless receiver, the neon, of course, being connected in the output circuit either directly or choke coupled, but of this more later.

Revolving immediately in front of the neon lamp we have the spirally perforated disc, and in front of this again, some form of rectangular framing mask. Depending upon the type of televisor which is in use, a lens can be mounted in front of this again to enlarge the picture, and in the

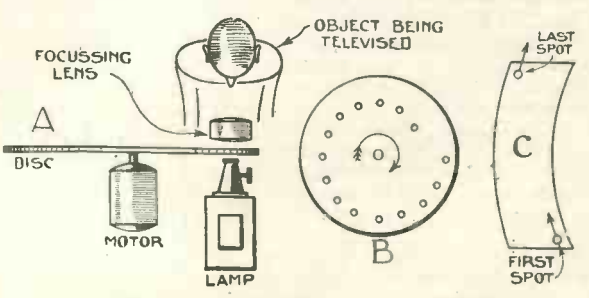


Fig. 2.—Illustrating direction of rotation

accompanying photograph, which shows the back of a large model Baird televisor, we can see the neon cowl, framing mask, and lens on the left of the picture, together with the disc.

As the disc revolves before the glowing neon plate, and provided the transmitter and receiver are in synchronism, at any one instant a perforation in the disc will enable a spot on the neon to be observed.

Light and Shade

This spot will correspond to one at the transmitting end in an exactly similar position and, since the neon glow at that instant is directly proportional to the amount of light reflected from the spot on the televised object, we shall have a degree of light or shade of corresponding intensity.

Spot by spot and strip by strip this process of exposure at the transmitting end, and re-exposure at the receiving end takes place. The resultant effect, therefore, to a person looking into the televisor at the illuminated portion of the disc is to see a succession of strips side by side, exactly as scanned by the spotlight transmitter and picked up by the sensitive photo-electric cells.

Continuous Picture

As in the case of the transmitter, the rapidity of the process does away with the mechanics and the resultant image appears as a continuous whole, rich in detail.

It is advisable to consider one or two important "running" details at this juncture, as they will explain some phenomena which, to the uninitiated, appear rather puzzling.

In the transmissions which are now being sent out every morning by the Baird process *via* the London station, the image, or object, being televised is scanned vertically from right to left and from bottom to top.

With a transmitter arranged so that the driving motor is on the left-hand side of the light source (see Fig. 2A), and viewing the disc from the motor end, the spiral would be as shown in Fig. 2B, and the direction of rotation clockwise.

The focusing lens on the other side of the disc will then reverse the light spot travel, so that it traverses the area as shown in Fig. 2C, that is, starting from the bottom right-hand corner and finishing at the top left-hand corner.

Turning now to the receiver and considering the assembly, illustrated in the photograph and indicated diagrammatically in Fig. 3A, then from the observer's end the disc will be mounted so that its spiral of holes are as shown in Fig. 3B, while the direction of rotation for the disc is anti-clockwise.

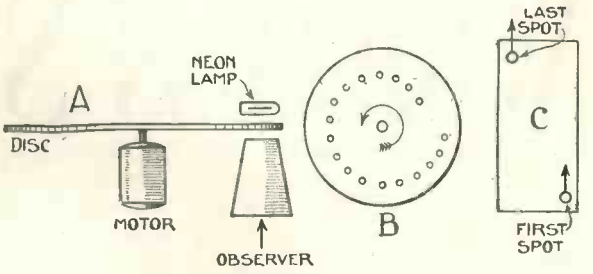


Fig. 3. Arrangement of receiver.

Since we have the glowing neon at the *back* of the disc, this will give a scan or exploration of the plate from the bottom right-hand corner to the top left-hand corner, as shown in Fig. 3C; and this, of course, gives us an identical condition to that at the transmitting end.

Now supposing the disc was mounted so that the spiral was the opposite way round to that of the disc at the transmitting end, what would happen? Why, the image would appear from left to right, instead of from right to left. That is, if a person got into position from the right-hand side at the television studio, it would appear to the observer that he got in from the left-hand side.

Again, the moving printed script which is invariably transmitted daily during the course of the tests, would appear to be moving backwards and look rather uncanny.

Naturally, it is very easy to rectify matters by reversing the disc.

A Lover Down the Ages

In times that are no more, on Christmas Day
A gallant swain, when he lived far away
Would pen a stilted note his Love to greet,
Or come by coach if they had planned to meet.

Last year he phoned "just thought I'd give a ring
To wish you luck, so cheerio! old thing!"
Or landed on her lawn in flying kit,
Vowing his plane was "absolutely 'it'"!

If she is wintering abroad to-day
No doubt he'll greet her in the modern way,
And she will see him too without surprise
Because, of course, they both will "televise!"

LESLIE M. OYLER.

Radio Evolution—*Continued from page* 494

H.T. consumption 17 milliamperes, with the valves tried.

Five-valver generally not so good, nor so selective. L.F. side O.K., H.T. consumption 24 milliamperes, needs external aerial and earth plugs and a better frame aerial tuning arrangement.

General Remarks on Both Sets.—Condensers and valves poor, loud-speaker unit very good, but awkward to adjust, frame aerial awkward to operate and ought to be entirely re-designed, battery leads difficult to disentangle, but general accessibility good.

"Queue," he said, "I can't quite get what you mean by these reports, let's have a talk about the sets."

We talked and talked and then, finally, "Hang it, man, I'll get the four-valver modified to-night and test it out myself all to-morrow."

So I left it at that.

But when I met him three days afterwards, after he had tried to avoid my eye, he told me that the sales manager had bullied him right and left because the aperiodic H.F. set was easy to tune, and would so sell more easily. Also, the retail price of the four, with its refinements, would have to be a guinea more than that of the five-valver.

But his own fancy had changed to one of the three-valvers, so I should not be surprised if, next Show time, I find a nine-valve super-het on his stand!

WIRELESS SUPERSTITIONS

Wireless is in its infancy

THE phrase shouts at you from the columns of your daily paper so often that you doubtless wonder when on earth this Peter Pan of science will attain the dignity of, at least, adolescence.

But, until this happy stage is reached, you must content yourself with signs of this infant's growth. And I have recently made the interesting discovery that superstition is becoming rife among the wireless fraternity. And is not superstition a sign of age?

Take Warning!

And so, to save you innocently falling foul of this wireless bogy, and thus suffering casualites which you might otherwise have avoided, take warning of several things which must never happen, or——.

For instance, the number "thirteen." In wireless, as in other directions, thirteen is decidedly the reverse of fortune. Never have thirteen H.F. valves in your set—it won't work if you do. And if that isn't proof of the potency of thirteen, I should like to know what is. Neither must you have thirteen sets—a certain amount of domestic friction over financial matters is usually the result of disregarding this.

It is very unlucky to paint the wiring of your set green. Or to splash green paint down your loud-speaker. And if the terminals of your L.T. accumulator turn green—well, it's a sure sign that you'll have to buy a new one. So avoid green.

NEXT MONTH!

An Efficient Screened-grid Three-valve Set with One-knob Tuning Control, Which Any Beginner Can Operate with Ease

Never walk under an aerial. Go over it instead. This superstition, by the way, is supposed to have its origin in the unhappy fate of the man who erected an aerial to one of Mr. Heath Robinson's designs, and, when it was finished, stood back to look up at it. He was 39.

At all costs avoid allowing the L.T. and H.T. wiring of your set to cross. This is very unfortunate from your valve's point of view.

Superstition, in wireless, reflects in every way upon the enthusiast's pocket. In other words, if you recklessly disregard these omens, you'll either have the deuce of a row with the wife, or, if you are still sane, with your bank manager.

What Not to Do

Therefore, if your slogan be "peace at all costs," never put a new boot on the diaphragm of your loud-speaker; never spill salt into your variable condensers (should you do so, the correct way to ward off evil is to throw the set over your left shoulder); never light three valves with one H.T.; never have your hairial—sorry, aerial—cut—pardon, lowered—on a Friday, and, above all, never let a glass accumulator fall. That is *most* unlucky—for the accumulator.

In fact, the one way to avoid bad luck in wireless is to use your set only when the moon is green.

W. M. G.

Are Radio Critics Justified?—*Continued from page 503*

present, I prefer to use the earphones while they listen to the sound from the loud-speaker. In their presence, I prefer to be isolated from them. Is it merely a foible of mine? A temperamental eccentricity, shall we say?

Only within the last two years have I taken an interest in wireless. The first time I heard any sound coming through the ether was in 1920 when I was on board the *Mauretania*, heading into the grey of the Atlantic.

My Brutal Suggestion

The captain very kindly invited me into his cabin to listen to a concert that was being broadcast from Colchester. I was brutal enough to say that it suggested a cracked gramophone record.

But, last year, I was lying ill in a New York hotel and Big Boy went out into Broadway and purchased for ten dollars (two pounds), a small set that one could have carried in an attaché case.

The aerial was composed of coated tape which he laced around the sick-room. It looked like a gangway for flies. But when I had fixed the earphones, I was able to lie back on the pillow and listen to concerts and lectures broadcast from several stations. It was better medicine than any the doctor brought me.

I pride myself on being a tolerant man; yet it was a long while before I allowed myself to be inveigled into buying a set. Since then I have joined the great army of grousers. But a friend of mine, who served in the same squadron as myself, and carries into the future with him the reputation for being a champion "moaner," modified my attitude towards Savoy Hill.

In the flood of his vituperation against the daily and nightly programmes, I saw something that enlightened me, tempered my own harshness and swung my sympathies around to the B.B.C. This was about the time I was thinking of having an instrument of my own installed. I had listened to his language for ten minutes, then I asked him a question:

"Do you have to pay anything for this listening-in business?" said I.

He contemplated me with a steel-like eye.

A Sort of Licence!

"Naturally," he said. "You have to pay for a—a—sort of licence."

"How much?" I asked.

"I don't know," he said; "I have never had one."

And, between you and me, that explains probably the weakness of the daily programmes. We do not care who pays for them so long as they are good, but, by George, we want to know what they mean when the programme is bad!

Wireless Magazine GRAMO-RADIO SECTION

THE FIRST SUPPLEMENT OF ITS KIND PUBLISHED BY ANY RADIO PERIODICAL

Notable Dance Records for Christmas

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

DESERVING to be marked with a big M for the interesting writing in the music, with a big P for the quality of the performance, a big V for the fine tone volume, a big B for the balance the recording director has obtained for the various instruments, and a big S for the sweetness (absence of harshness) in the tone, there are just a few dance records among the many I have tried during the last few months that may safely be recommended to those wishing to make up a Christmas programme.

Better Than a Band

I have selected a set all by notable performing units and yet differing from one another as much as possible in style and instrumental quality in order that your friends may acclaim your reproduction as being *better than a band*.

How mediocre even a good band seems to be when one has been listening to it for an hour on end!

I have only one STOMP, "Sensation" on one side and "Whiteman" on the other, played by Paul Whiteman (H.M.V., B5577, 3s.). It is an exhibition number in "hot" work, and one side has good work for the piano.

Two Jolly Records

A single ONE-STEP disc, "Highland Medley" and "Rob Roy Medley," both Scottish selections and very jolly (Parlophone, E6172, 2s. 6d.). Every Hogmanay programme ought to include this.

YALE BLUES.—"I'm a One-man Girl," played by the Kit-Kat Dance Band, comprises a nice piano part (Parlophone, R308, 3s.).

SLOW FOX-TROTS. — "When the Lilac Blooms Again" and "Flower of Love," played by Barnabas von Geczy. These are in the Viennese style and exceptionally rich in tone (Parlophone, R330, 3s.). "Honey," played by Carolina Club, and comprising some good banjo work (Parlophone, R400, 3s.).

"There's a Four-leaf Clover," played by the Manhattan Melodymakers (2s), and "Reaching for Someone" (2s.), played by the same band; both are Broadcast Twelves (long-play), middle distance recordings showing a pretty "hall effect."

TANGOS.—I wish to call especial attention to these because they are so beautiful; they are useful as exhibition records, as well as for dancing to. "In a Little Café" (Pavilion Lescant) and "Pardon, My Lady" (von Geczy) (Parlophone, R411, 3s.). "Michella" and "Love's Banishment Waltz" (Radio 1s. 3d.). "Do You still Love Me" and "In the Twilight" (Radio, 1s. 3d.).

FOR GOOD TONE

The well-known Limit Soundbox, recommended by H. T. Barnett in the article on the next page

Well-sung Refrains

TANGOS (CON CANTO).—These three are all Parlophones, at 3s. each; the vocal refrains are well sung; the constitution of the band and the playing are such as to take one straight over to Buenos Aires in a flash. Each "con canto" has a non-vocal number on the reverse. "Plegaria, Noche de Reyes," "A Media Suzan" are the titles of the vocal sides.

SIX-EIGHTS.—The first disc I have with one of these new dances on each side is H.M.V., B5701, 3s.: "Valentine" and "Dites moi ma Mère" (Innocents of Paris), played by the Rio Grande Band.

Splendid Waltzes

WALTZES.—Splendid double-

(*Continued on page 511*)

H. T. BARNETT,
M.I.E.E.,
Explains for Music Lovers

HOW TO CHOOSE A GRAMOPHONE

IN TIME FOR CHRISTMAS!

The Wonderphone, which was fully described on page 383 of the previous issue

THERE are four considerations that in a general way must be taken into account when setting out to purchase a new machine; the only simple case being that of those who wish to reproduce language or other spoken records only.

Difficult Consonants

This small class may be disposed of initially by recommending the purchase of a small to medium-sized portable for the purpose, for the smaller the amplification of the music or vowels the more clearly will the consonants, always recorded with difficulty, come out.

Two machines of this kind that I think should be heard (tried, of course, with a *spoken* record) against others of equal price are the Edison-Bell at £3 5s. and the Perophone at £3 17s. 6d.; on both of these cheap machines correctitude is approximated as closely as space will allow.

Others who wish to reproduce music must first think of (1) what money is available, (2) the space into which the machine must go, (3) the class of music to be specially favoured (if any) in reproduction, and (4) the acoustic qualities of the music-room.

Good Table Machines

Under the second heading some people will be driven to the conclusion that they *must* have a table model or a portable. Should it not be required for use also out of doors, I should much prefer the former to the latter; and in selecting a table machine, if no more money than £6 is available, I think the mahogany-finish Edison-Bell model at that price should be heard.

Those who can spare £12 should certainly try the new H.M.V. Model 130 in solid mahogany. This machine gives excellent reproduction and also the greatest tone volume I ever heard from a machine of its size.

The Murdoch Trading Co. have just produced a large Jussrite record-filing cabinet on which it stands nicely. For those who wish to have a gramophone and a large number of filed records on a small floor area this is a useful combination.

The H.M.V. model 130 (top) fits nicely on top of a Jussrite filing cabinet (bottom)

A portable for reproducing music should, in my opinion, always be a *large* one; after all, one has to take a lot of heavy records about with it, so that a pound or two extra on the weight of the machine, while it makes but little difference in the total weight to be carried, will greatly improve the quality of the music.

Recommended Portables

Two of these that any dealer will be able to show are the big H.M.V. and the largest size Decca. Should the tone of the latter seem a little hard a Limit soundbox may be tried on it.

Those who have space available for a cabinet pedestal will get the best reproduction and the greatest furnishing value for their money, together with the probability of exactly suiting their own taste in reproduction quality, suiting the class of records they specially favour and the acoustic characteristics of their music-rooms.

Before finally making a purchase, I would say unhesitatingly that if one has an obliging dealer he should be induced to send in *several* machines for trial *side by side* in the music-room, and with the class of records and kind of needles one specially favours.

Qualities of A Room

It is astounding what differences to the reproduction of machines the acoustic qualities of a room will make; in my own house there is one room in which the pungency of a Columbia entirely disappears, while in the other even a Peridulce is brilliant.

People's tastes in tone quality and in reproducing characteristics vary enormously. A lady came

from Littlehampton the other day to hear my Perophone (Model 22), and when I pointed out to her the forwardness of the tone, which most folk delight in, she went up to the machine and closed the doors; she preferred the tone *inside* the case!

I am quite at a loss to know what to recommend in cases of this kind; some of the cabinet makers' assemblies sold by cheap furniture stores might exactly suit.

On the score of the kind of record favoured, those admirers of feeble recording by string quartets will most likely be able to do with the *greatest possible* amplification, even at the cost of a clanging bass from piano records and a generally cavernous quality.

Largest size Decca portable, recommended by H. T. Barnett

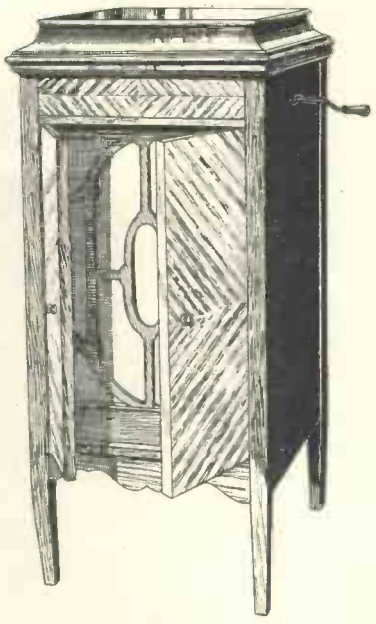
Larger Machines

For those who have just £13 13s. to spend, one of the Edison-Bell reflex horn cabinets in oak—a new and extraordinary production at the price—should be included in the final test. Fortunate people who can afford more should try one of the new Chromogram series Perophones (I prefer the 22) *against all-comers*, irrespective of price.

For a big room the new horn machine, the Wonderphone (£14 14s., with table), a production that defies successfully all our old theories, should be tried. In a dance-hall it is as good as many hundred-guinea electrical reproducers.

Excellent Results

In a drawing-room its appearance might be objected to, but should it be possible to place it behind a curtain, and to use a Romantic soundbox and fine-gauge steel grip needles with it, I can well believe that in many cases (e.g., rooms where good tone is difficult to achieve) it might give more satisfactory results than could be got with the most expensive cabinet.



Perophone 22 machine, which the author prefers "against all-comers." One of these machines is in constant use in the "W.M." laboratories

Notable Dance Records for Christmas—*Continued from p. 509*

sided discs are "Twelve O'clock" and "Anita" (3867), "Just an Old Love Affair" and "Blue Waters" (5015), both Brunswicks at 3s. each. Discs having a fox-trot on the reverse are "I'll Always be in Love with You" (R389), and "One Kiss" (R359), Parlophones, at 3s. each. "Underneath the Russian Moon" (2513), and "Pagan Love Song" (2514), are long-play Broadcast Twelves at 2s. each.

FOX-TROTS.—H.M.V., at 3s. each, are "Dance of the Paper Dolls," with "Ragamuffin," played on two pianos (B3075), "A Love Tale of Alsace-Lorraine," with "House on the Hill Top" (B5628); "Let's Fall in Love" and "The Banjo" (B5622); "Is Izzy Azzy Wozz," with "When I met Connie" (B5666). The last three pairs are all played by Jack Hylton; I like the first pair the best.

An Amusing Pair

Parlophones at 3s. each comprise two discs of Sam Lain's "Now I'm in Love," with "The One I Love Loves Me" (R401); also "The Wedding of the Painted Doll," with "The Toymakers' Dream," a most amusing pair (R276). Reu da Costa has three piano and orchestra pairs: "Glad Rag Doll," with "Old Man Sunshine" (R276), "Laughing Marionette," with "Rag Doll" (R238), and "Fashionette," with "Dancing Shadows" (R335). If I make up a programme, at least half the numbers have a good part for the piano.

TELL YOUR FRIENDS ABOUT THE "W.M." LISTS AND CRITICISMS OF NEW RECORDS—THIS MONTH ON PAGE 514

Electron, the two popular numbers from *Mister Cinders*, "Every Little Moment," with "Spread a Little Happiness" (O284, 3s.).

Brunswick (at 3s. each), Red Nichols (3991) plays "I'm Marching Home," with "I Used to Love Her," Jesse Stafford (3966) plays "A Precious Little Thing," with "Lover, Come Back to Me," and Harry Archer (3922) plays "Thinking of You," with "Up in the Clouds."

Broadcast Twelves (long play), at 2s. each. Teddy Brown gives a couple of xylophone solos that ought to be in every programme: "Glad Rag Doll," with "Wedding of the Painted Doll" (2505). Other combinations play "Wedding Bells," with "Here We are" (2512), and "I Want to be Bad," with "Button up Your Overcoat" (2518)

Wonderful 1s 3d. Records

Radio.—From among many of these wonderful one-and-threepenny 8-in. records I mention "Old Man Sunshine," with "There's a Rainbow" (939), and "Po-kee O-kee Oh!" with "Oh! Arthur" (913). The last is vocal right through, but in dance time.

N. W. McLACHLAN, D.Sc., M.I.E.E., F.Inst.P., Explains How to Get Better

Realism from Your Records

DETAILS OF AN AUTOMATIC COMPENSATOR KNOWN AS THE NOVOTONE

SOME time ago I was invited to a demonstration of sound effects produced from gramophone records. Specially-prepared records of the desired sounds, for example ex-

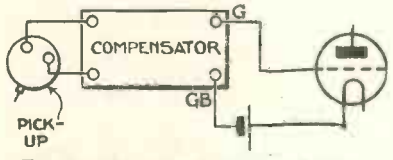


Fig. 1.—Shows method of connecting compensator

haust of motor-car, aeroplane, etc., were used in conjunction with pick-up, amplifier, and moving-coil loud-speaker.

The results were quite devoid of realism. This was due mainly to the gramophone record, although imperfections existed in the pick-up, etc. The possibility of obtaining realistic effects from a modern gramophone record immediately occurred to me.

Inherent Defects

Before dealing with the solution of the problem, let us discuss the inherent defects in the system used for reproducing gramophone records.

1. The pick-up does not give an even response over the entire musical scale. The response of some pick-ups falls away in the upper and lower registers, whilst others have pronounced resonances which accentuate scratch.

2. Although amplifiers which are almost perfect can be designed, the average amplifier is often faulty at each end of the musical scale.

3. For a given loudness the depth of cut in the walls of a record should increase as the pitch of the sound decreases; for example, the cut for the lowest C on the pianoforte should be four times as deep as for middle C.

In an actual record the depth of cut is the same for all notes below middle C. Hence the bass notes are lost in the reproduced version of orchestras, organs, etc. The reasons for limiting the depth of cut are as follows:

The deeper the cut the thicker must be the walls of the record between consecutive grooves. To record the low tones of orchestras, organs, etc., at their proper strength, would require a disc several feet in diameter. With such records the pick-up would jump out of the grooves when playing low notes,

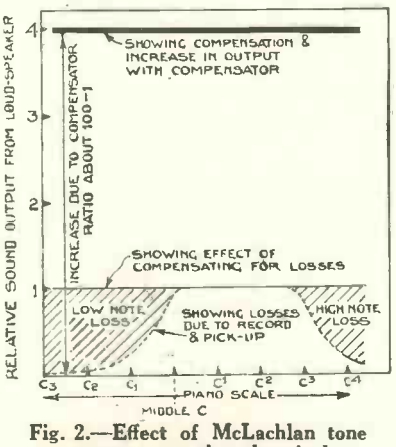


Fig. 2.—Effect of McLachlan tone compensator on the electrical reproduction of records

owing to the excessive sideways motion.

From the preceding, it is clear that the main defect to be remedied is the reduction in output below middle C due to the narrow grooves in the record. The output at low frequencies falls off according to a definite law and it is possible to design apparatus which will give almost exact compensation.

With such a device the bass register is reproduced at its proper strength, that is, by electrical means a record 12 in. in diameter is rendered equal to one several feet in diameter.

When the bass register is reproduced at its proper strength it is often found that the upper register is not sufficiently prominent. This is partly due to the effect of the low tones masking the higher tones.

To solve this problem I have introduced a tone compensator known as the Novotone. As supplied by the manufacturers, it is connected between the pick-up and the amplifier. It can be designed for intervalve coupling, but this is not satisfactory where an amplifier is used for a dual purpose (radio and gramophone), since it puts too much beef into the bass of the radio.

For Talking Pictures

I should like to make it clear, however, that the principles embodied in the Novotone can be applied to any apparatus for sound reproduction, for example, talking pictures, whether film or record. Also, by fitting stud switches, the tone can be controlled over wide limits; the bass or the upper register, or both, can be reduced from full strength to zero by steps.

Fig. 1 illustrates the method of connecting the compensator. The action of the compensator can be

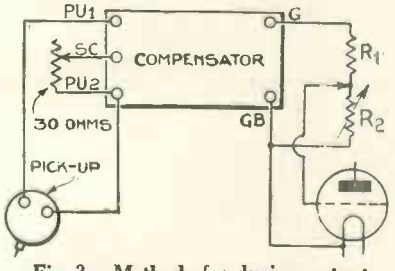


Fig. 3.—Method of reducing output from compensator. R_1 must *not be less* than 2 megohms. R_2 can be a variable megohm used as a potentiometer or merely a variable resistance. The 30-ohm resistance is used as a scratch control. When PU.2 and S.C. are short-circuited the scratch is a minimum.

explained by aid of the diagram shown in Fig. 2. Owing to the amplification of the input from the pick-up, care must be exercised to avoid overloading the first valve and subsequent valves of the amplifier.

Volume Control

It is preferable to have a volume control *in* the amplifier, but it is possible to put one before it. In the latter case the resistance across the input to the valve must not be less than 3 megohms. The arrangement is shown in Fig. 3.

The upper register (scratch) can be controlled by putting a variable resistance of about 30 ohms across the terminals S.C. and P.U.2 (Fig. 3). The maximum reduction occurs when S.C. and P.U.2 are short-circuited. With a B.T.H. pick-up, which has a noticeable resonance at

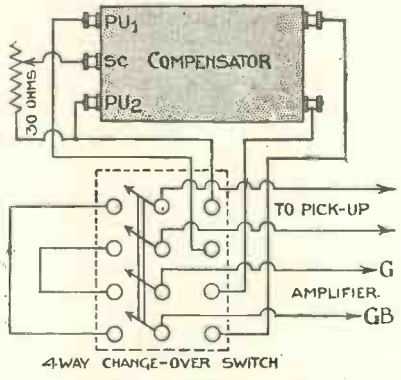


Fig. 4.—Method of switching Novotone for comparative tests.

4,000 cycles, the scratch is pronounced, unless the control is used.

Owing to the great sensitivity of this pick-up, precautions must be taken to avoid overloading the whole amplifier. In fact, with the majority of pick-ups the same argument applies and the experimenter must bear this in mind.

Calibration

The calibration of the Novotone can be conducted in several ways. Those who have special constant-frequency records can readily test the voltage step-up by aid of a four-way change-over switch of the form illustrated in Fig. 4.

When using these special records at frequencies below 150 cycles or thereabouts, it is usually found that the average pick-up will not stay on the record. Personally, using an ordinary pick-up, I have found it impossible to register 50 cycles satisfactorily on a loud-speaker by this means. Accordingly it is necessary to calibrate the Novotone by other methods.

A simple circuit suitable for calibration purposes is shown diagrammatically in Fig. 5. Here a sine-wave generator sends a sine-wave current through the pick-up and the input of the Novotone.* The output terminals of the Novotone are connected to the grid and filament of the first valve of an amplifier, whose performance at all frequencies is known.

Now the first valve of the amplifier has an effect on the Novotone, and this is included in the calibration curve. Accordingly the Novotone is designed to suit the condition obtained with an average amplifier.

During calibration a constant voltage is maintained by the generator but its frequency is varied from 50 to 8,000 cycles. Readings are taken from the output of the amplifier at a number of frequencies.

The result of such a test is shown by curve 1 of Fig. 5. The dotted curve shows the theoretical values for the range of 50 to 250 cycles.

* The Novotone is designed to suit a 2,000-ohm pick-up

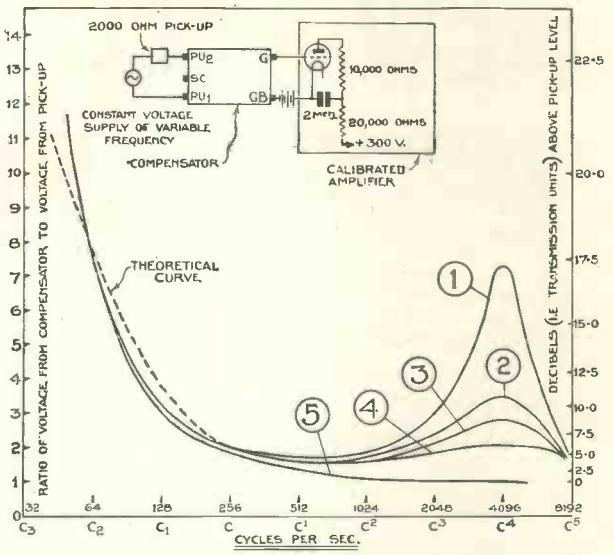


Fig. 5.—Calibration curves of the Novotone. Curves 1 to 5 are with infinity, 50, 30, 15 and zero ohms between P.U.2 and S.C.

The actual curve of the Novotone never departs from this by more than 2 decibels (units of sound), and such an amount *cannot be perceived by the human ear.*

Peak Frequency

The curve rises to 4,000 cycles in the upper register and falls away gradually beyond this. The peak frequency varies to an extent according to the effect of the first valve of the amplifier. During calibration the first value was an

(*Continued on page* 518)

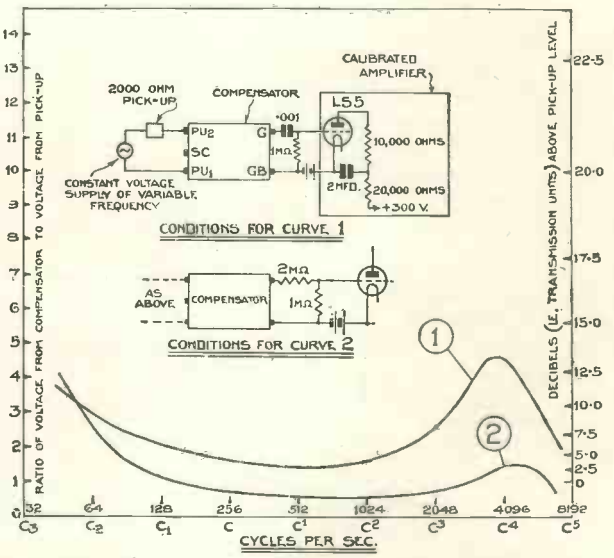


Fig. 6.—Calibration curves with special output circuits. Tests taken with S.C. free.

NEW RECORDS LISTED AND REVIEWED for Your Choice

Below will be found a list of the latest releases of the chief record publishing companies (Broadcast, Decca, Dominion, H.M.V., Parlophone, Piccadilly, Radio and Zonophone). It is arranged alphabetically in groups, and readers will be able to see at a glance what recordings are available of any particular item. Both sides of every record are listed. Criticisms are by C. Whitaker-Wilson, the well-known musician and writer.

VOCAL RECORDS

Abide with Me, Dominion Choir, with organ, 1/3. DOM A200

All going Back, George Formby, Lancashire com., with orch., 1/3. DOM A197

Always the Same Sweet Pal, Bob Fisher Black, singing com., with orch., 3/-. PARLO R442

Amor ti Vieta (Giordano) Guido Volpi, ten, with orch., 1/9. DOM B25

Anvil Chorus ("*Il Trovatore*") (Verdi), Grand Opera Chorus, with orch., 2/-. BRDCST 5107

The band plays excellently in the opening. The precision of the chorus shows careful rehearsal. Get it, for it is Verdi at his best.

Aren't We All? Elsie and Doris Walters, com., with piano, 3/-. PARLO R447

Ava Maria (Bach-Gounod) in Latin, Elsie Suddaby, sop., with piano, 4/6. H.M.V. C1733

Bandolero (Stuart), Manuel Hemingway, bass, with orch., 2/-, BRDCST 5108

This song seems to have had its day. It is, however, so admirably sung here that it is worth having, even only for a memory of the past. The diction of the singer is exceptional.

Bird Songs at Eventide (Eric Coates), Norton Collyer, ten., 2/-. DEC F1522

A pleasant ballad. Mr. Collyer's diction is not perfect—but his tone is excellent.

Blarney Roses, Foster Richardson, bass, with orch., 2/6. ZONO 5415

Breakaway, Maurice Elwin, bar., with orch., 2/6. ZONO 5418

Cast Thy Burden, Tom Burke, ten., with orch., 1/9. DOM B23

Che Gelida Manina (Puccini), Oreste de Bernardi, ten. with orch., 1/9. DOM B24

Christ Who once amongst Us; There's a Friend for little children; All things bright and beautiful; Come, sing with Holy Gladness, Bobby Lemaire, chorister with organ (d.s.) 1/3. BRDCST 457

Cigno Fedel (Wagner), Guido Volpi, with orch., 1/3. DOM B18

I recommend this as being worthy of inclusion in any "Wagner library." Those who have made a study of Wagner should not miss it. Ask to hear it and judge for yourself.

Cobbler, Harry Wulson, yodelling, with orch., 1/3. BRDCST 455

"Je me yodel": "tu te yodel": "*il se yodel*" should be a possible conjugation, with italics for *il se yodel*. For yodel he certainly does!

Come in, Mr. Cummin', Clarkson Rose, com., with orch., 2/6. ZONO 5429

Come on Baby, Stuart Ross and Joe Sargent, American duettists, with orch., 3/-. PARLO R445

Dai Campi Dai Prati (Boito), Guido Volpi, with orch., 1/3. DOM B18

Very well recorded. Guido Volpi's singing is thoughtfully phrased, and his voice is full in tone.

Dear Old Girl, Maurice J. Gunsky, ten., with piano, 2/6. ZONO 5424

Devout Lover (White), Norton Collyer, ten., 2/-. DEC F1522

Very well sung: but is Norton Collyer a *tenor?* The highest note he sings in this record is F. He is a baritone, surely?

Don Juan's Serenade (Tchaikovsky), Roy Henderson, bar., with piano, 2/-. DEC M69

Roy Henderson at his best. What a voice the man has! Tchaikovsky at his best, also, it may be added!

Dream (Massenet) "Manon," Browning Mummery, ten., with orch., 3/-. H.M.V. B3121

E Lucevan Le Stelle (Puccini), Oreste De Bernardi, ten., with orch., 1/3. DOM B16

Sevenpence halfpenny for this work seems too little. The price of 1/3 for this (and *Non Piangere Lin*) with so great an artist as Bernardi singing seems to me ridiculous! Of course, *get it!*

Evening Star, Gwen Henry, with Arthur Rosebery's Dance Band, 3/-. PARLO R439

Excelsior (Balfe), sung by Browning Mummery and Foster Richardson, with orch., 4/-. ZONO A368

Powerful and resonant voices; and diction that could be heard in heaven, one would think!

Faust—Jewel Song (Gounod), Fanny Heldy, sop., with orch. con., by Piero Coppola (d.s.), 6/-. H.M.V. DA1051

Genevieve, Barrington Hooper and Foster Richardson, with orch., 2/6. ZONO 5417

Grand March (*Tannhauser*) (Wagner), Grand Opera Chorus, with orch., 2/-. BRDCST 5107

The tone of the chorus alone makes this worthy of inclusion in any Wagner library. I advise all Wagner-lovers to have this if they have not already acquired a record of the immortal chorus.

He's a good man to have Around, Mabel Marks, com., with orch., 1/3. BRDCST 450

A voice and not a voice: a diction fierce enough to cut through steel: a philosophy pervades this song which makes it amusing—yet pathetic. It is exceedingly clever.

Hollow of the Hill, Norman Blair, bar., with orch., 2/6. ZONO 5419

Hollow of a Hill, Phil Arnold, light ten., with orch., 1/3. DOM A198

Home in Maine, Norman Blair, bar., with orch., 2/6. ZONO 5419

Honey, Mildred Hunt, sop., with orch., 3/-. H.M.V. B3140

Not a good voice, but there is something appealing in the way she does this. I must admit to being attracted by the tune.

Hungry Women (*Whoopee*), Eddie Cantor, com., with orch., 3/-. H.M.V. B3116

I'm Doing what I'm doing for Love, Lily Lapidus, jazz girl with Novelty Orch., 2/-. PARLO R443

I'm in Seventh Heaven, Johnny Marvin, ten., with orch., 3/-. H.M.V. B3119

I'm the last of the Red Hot Mammas, Mabel Marks. com., with orch., 1/3. BRDCST 450

I thought it was a man singing—but I see it is Mabel Marks. She will *make* her *mark;* for her diction if not for her voice. It is an excellent record of its type.

I Must have a Cup of Tea, with Comedy Dance Orch., 3/-. PARLO R446

Indian Love Call, Tom Bailey, with orch., 1/3. BRDCST 452

In the Congo, George Formby, Lancashire com., with orch., 1/3. DOM A197

In the Valley where the Bluebirds, Barrington Hooper and Foster Richardson, with orch., 2/6. ZONO 5417

I Only Met Her on Sunday, Elsie and Doris Walters, com., with piano, 3/-. PARLO R447

L'Anima Stanca (Cilea), Guido Volpi, ten., with orch., 1/9. DOM B25

Let me Dream in Your Arms Again, Solemn and Gay, with orch., 2/6 ZONO 5427

Little Pal (from *Say it With Songs*), Gene Austin, ten., with orch., 3/-. H.M.V. B3113

Gracie Fields, com., with orch., 3/-. H.M.V. B3147

Paul Robeson, bass, with orch., 3/-. H.M.V. B3146

Tom Bailey, with orch., 1/3. BRDCST 451

Rather like *Son of Mine*, but not so strongly atmospheric. Hear it before buying it: you may respond to it—or not. I cannot presume to say.

Lonesome Road, Maurice Elwin, bar., with orch., 2/6. ZONO 5418

Paul Robeson bass, with orch., 3/-. H.M.V. B3146

Louise, Solemn and Gay, with orch., 2/6. ZONO 5428

Love, Your Spell is Everywhere (Goulding), Gloria Swanson, sop., with orch., 3/-. H.M.V. B3168

I feel the same about this record as I do about the Serenade. Miss Swanson's voice is in advance of her choice

Abbreviations Used in These Lists

acc.	Accompaniment	orch.	Orchestra
bar.	Baritone	PARLO.	PARLOPHONE
BRDCST.	BROADCAST	PIC.	PICCADILLY
Com.	Comedian	RAD.	RADIO
con.	Contralto	s.f.	Slow Foxtrot
DEC.	DECCA	sop.	Soprano
DOM.	DOMINION	ten.	Tenor
d.s.	Both Sides	w.	Waltz
f.	Foxtrot	ZONO.	ZONOPHONE

Where a name appears in brackets directly after the title of an item it is that of the composer.

of literature. She should give a little attention to her diction, though.

Lovelight in Your Eyes, Barrington Hooper, ten., with orch., 2/6. ZONO 5416

Makin' Whoopee, Stuart Ross and Joe Sargent, American duettists, with orch., 3/-. PARLO R445

Eddie Cantor, com., with orch., 3/-. H.M.V. B3116

Mastersingers (Wagner). Royal Choral Society, con. by Dr. Malcolm Sargent, with orch., (d.s.), 3/-. H.M.V. B3122

Merry Widow, Vocal Gems, Zono Light Opera Company (d.s.), 4/-. ZONO A367

Old favourites from this excellent opera, which, by the way, is of German origin, appear here. The voices are splendid; the enunciation very fair, but not unassailable. It is a good record from the technical standpoint. Altogether, having listened attentively to both sides, I consider it the best record of selections of this work I have heard. The chorus, I ought to add, is admirable.

Mi Amado, Lupe Velez, con., with orch., 2/6. ZONO 5425

Moon has Raised her Lamp (Benedict), Browning Mummery and Foster Richardson, with orch., 4/-. ZONO A368

I seem to have heard this before! If I had not, I should not mistake a single syllable; these two singers have a fierce diction about them. It is an excellent record of an old favourite.

Mucking About the Garden, Jack Morrison, com., with Bidgood's Broadcasters, 1/3. BRDCST 453

This is excellent. Its classic title is a little startling, but the record is splendid.

Clarkson Rose, com., with orch., 2/6. ZONO 5430

My Dear, Mildred Hunt, sop., with orch., 3/-. H.M.V. B3140

Mildred Hunt is no singer, but she "gets there" every time. I confess to listening to this (and *Honey*, the other side) with some amount of pleasure.

My Heart is Bluer than your Eyes, Cherie, Franklyn Baur, ten., with orch., 2/6. ZONO 5426

The originator of this title must have had some medical knowledge; he seems very certain of his discovery, anyhow! It is quite effective.

My Little Lady, Jimmie Rodgers, yodeller, with guitar, 2/6. ZONO 5423

My Old Shako (Trotere), Manuel Hemingway, bass., with orch, 2/-. BRDCST 5108

Admirably sung! Every word comes through clearly. The orchestral accompaniment is perfectly balanced. An excellent record.

New Moon (Romberg), Light Opera Company, with orch., 4/6. H.M.V. C1734

This is what one might call a "smart" record. It has the flavour of a real, up-to-date opera company.

Non Piangere Liu (Puccini), Oreste De Bernardi, ten., with orch., 1/3. DOM B16

Bernardi sings with perfect tone in this excellent record. The recording also is admirable. I sencerely recommend this record, which would grace any repertory.

No Possible Doubt, Whatever, Dominion Light Opera Company, with orch., 1/3. DOM A194

No, Punchinello, No More (Leoncavallo) (*Pagliacci*) Browning Mummery, ten., with orch., 3/-. H.M.V. B3121

Nothing in General and Less in Particular (Clifford), Stainless Stephen, com., 2/-. DEC F1526

This is extremely funny. Stainless Stephen dictates all his arguments, punctuation included.

Oh! Maggie, What Have You Been up To? Jack Morrison com., with Bidgood's Broadcasters, 1/3. BRDCST 453

Close inquiries into Maggie's behaviour of late are here gone into. It is an admirable record.

Clarkson Rose, com., with orch., 2/6. ZONO 5430

Page Song (Verdi) *Falstaff*, Arthur Fear, bar., with orch., 3/-. H.M.V. B3123

Park yourself Close to Me, Clarkson Rose, com., with orch., 2/6. ZONO 5430

Parted, Solemn and Gay, with orch, 2/6. ZONO 5428

Perfect Day, Barrington Hooper, ten., with orch., 2/6. ZONO 5416

Plantation Song Medley, soloists, chorus and dance band, 1/3 (d.s.) BRDCST 454

I thought the day for plantation songs was passed long ago. It may have passed, but if there are any gramophone enthusiasts who feel inclined to go back to the days of their fathers—here is the opportunity. The songs are well sung.

Ploddin' Along, The Revellers (male voices), with piano, 3/-. H.M.V. B3156

My friend the bass is here excellent. The first tenor has a tone which would crack a gas-globe, but he seems to fit into the picture.

Rose Marie, Vocal Gems, orch. acc. (d.s.), 1/3. DOM A199

Tom Bailey, with orch., 1/3. BRDCST 452

Sarah Jane, North and South with Comedy Dance Orch., 3/-. PARLO R446

Sea Rapture (Coates), Tom Burke, ten., with orch., 1/3. DOM B15

Tom Burke's voice has "grown" since I first heard him, when I chanced to play at the same concert at which he appeared for the first time in England. He sings this admirably. It is worth having.

Serenade (Toselli), Gloria Swanson, sop., with orch., 3/-. H.M.V. B3168

Miss Swanson's voice is clear and sympathetic. She could do worse than sing better music than this for her records.

Silvery Moon, Harry Wulson, yodelling, with orch., 1/3. BRDCST 455

Harry Wulson's vowel-intonation is founded upon a principle with which I am not familiar. As for the yodelling effects, I recommend them to those who appreciate their value. The gentleman possesses considerable technique, I admit.

S'posin', Solemn and Gay, with orch., 2/6. ZONO 5427

Strange Adventure, Dominion Light Opera Company, with orch., 1/3. DOM A194

Talor dal mio Forziers (Puccini) Oreste de Bernardi, ten., with orch., 1/9. DOM B24

Tannhauser (Wagner), Lauritz Melchior, ten., with London Sym. Orch., con. by Albert Coates (d.s.), 6/6. H.M.V. D1675

That's the Good Old Sunny South, Lou Abelardo, light ten., 1/3. DOM A198

There is no Death, Tom Burke, ten., with orch., 1/9. DOM B23

There'll Always be Room for You, Maurice J. Gunsky, ten., with orch., 2/6 ZONO 5424

There's a Girl in Kildare, Foster Richardson, bass, with orch., 2/6. ZONO 5415

This is Heaven, Bob Fisher, black singing com., with orch., 3/-. PARLO R442

Tom Bailey, with orch., 1/3. BRDCST 451

A little sentimental for popular appeal nowadays, but it is well produced. Perhaps the production is worthy a better subject.

Though Reviling Tongues Assail Us (Bach), Elsie Suddaby sop., with orch. 4/6. H.M.V. C1733

To the Forest (Tchaikovsky), Roy Henderson, bar., with piano, 2/-. DEC M69

I have never heard it better sung. What more can I say?

Used to You, Johnny Marvin, ten., with orch., 3/-. H.M.V. B3119

Vesti La Guibba (Leoncavallo), Tom Burke, ten., with orch,. 1/-. DOM B15

A fine rendering. This is well worth getting. Also I hope I shall have the pleasure of reviewing more records by this admirable singer.

Wake up! Chillun, Wake up, Revellers (male voices), with piano, 3/-. H.M.V. B3156

This is an excellent edition of this fascinating tune. The voices are splendid, the bass particularly. The precision and diction is another point. It is a pleasure to hear men sing so well together.

Wanderer's Warning, Bud Billings, ten., with Novelty Trio, 2/6. ZONO 5422

Winnie and the Picture Book, Harry Hemsley, child impersonator, 1/3. DOM A201

Winnie is Told a Story, Harry Hemsley, child impersonator, 1/3. DOM A201

When I Survey, Dominion Choir, with organ, 1/3. DOM A200

When My Dreams come True (Berlin), Franklyn Baur, ten., with orch., 2/6. ZONO 5426

Franklyn Baur *is* a tenor, which is more than can be said for some who thus label themselves. I like the song; it is a good specimen of its type.

When You've Gone, Gwen Henry, with Arthur Rosebery's Dance Band, 3/-. PARLO R439

Where is the Song of Songs for Me? Lupe Velez, con., with orch., 2/6. ZONO 5425

Whoopee, Light Opera Company, with orch., 4/6. H.M.V. C1734

A very smart chorus. This and *The New Moon* give the impression that the chorus has been well drilled. Admirable recording.

Why Can't I be Like You? Lily Lapidus, jazz girl, with Novelty Orch., 2/-. PARLO R443

Why Can't You? Gracie Fields, com., with orch., 3/-. H.M.V. B3147

Gene Austin, ten., with orch., 3/-. H.M.V. B3113

Will the Angels Play their Harps for Me? Bud Collings, ten., with Novelty Trio, 2/6. ZONO 5422

Woo thou thy Snowflake (Sullivan), "Ivanhoe," Arthur Fear, bar., with orch., 3/-. H.M.V. B3123

World is Yours and Mine, Morton Downey, ten., with orch., 3/-. H.M.V. B3138

You and My Old Guitar, Jimmie Rodgers, yodeller, with guitar, 2/6. ZONO 5423

You're Just Another Memory, Morton Downey, ten., with orch., 3/-. H.M.V. B3138

You Surprise Me (Clifford) Stainless Stephen, com., 2/-. DEC F1526

This refers to the other side of the record. The Stainless One has a long conversation with an American. Very amusing.

ORCHESTRAL RECORDS

Artist's Life (Strauss), Vienna Philharmonic Orch. (d.s.), 4/6. H.M.V. C1697

Ballet Egyptien (Luigini), Dominion Orch. (d.s.), 1/3. DOM A202

Belle of New York (Kerker), H.M. Life Guards (d.s.), 2/-. BDCST 5105

If any of my readers make a habit of collecting records of these selections from musical comedies I advise them to have this: it is splendidly played. The recording is fine.

Bitter Sweet, Parlophone Salon Orch., con. Victor Olof (d.s.), 3/-. PARLO R441

Call of the Angelus (Walton) Zono. Salon Orch., 2/6. ZONO 5421

A very taking melody, with musically and pleasing modulations. It is most excellently played and the recording is even.

Cavalleria Rusticana (Mascagni), Marek Weber and His Orch., 4/6 (d.s.). H.M.V. C1736

This is a very good selection: most of the well-known melodies appear. The recording is admirable and the playing all that can be desired.

Chinese Lullaby, Salon Orch., 3/-. H.M.V. B3139

Cock o' the North (Carrie),

New Records Listed and Reviewed—*Continued*

H.M. Life Guards, 1/3. BDCST 456

There is some admirable playing here: the tone of the solo clarinet is practically perfect. An excellent record.

Fairy Tiptoe (Fredericks), Zono Salon Orch., 2/6. ZONO 5421

Quite delicate in construction, as befits the title. It is effectively orchestrated; pleasant counter-themes appear against the main theme—which always pleases me.

Folk Song Suite (Williams) Part 1 (mch.) Decca Military Band, con. by C. Leggett, 2/-. DEC M68

Dr. Vaughan William's delicate touch is well brought out in this excellent fantasia on *Seventeen come Sunday*.

Part 2 (intermezzo). DEC M67

This is *My Bonny Boy*. It is most attractive to anyone who loves English music; the scoring is absolutely fascinating.

Part 3 (mch.). DEC M67

This is a delightful record of four Somerset folk-tunes. The whole record makes one feel that one can only be in England.

Grand Vizier (Ansell), Decca Symphony Orch., con. by John Ansell, 2/-. DEC M66

A melodious and pleasant work, with some careful scoring. It is smartly and clearly played.

Hold Everything (selections), London Orch. (d.s.), 2/6. ZONO 5414

Innisfail (Irish Suite), Decca Symphony Orch., con. by John Ansell, 2/-. Part 1. DEC M65

This is very brisk and very attractive. The orchestral scoring is really admirable. Part 3.—The tone of the full orchestra here is round and full. The work as a whole is well worth having.

Introduction and Allegro for Strings (Elgar), John Barbirolli's Chamber Orch. (d.s.), Parts 1 and 2, 4/6. H.M.V. C1694

Parts 3 and 4, 4/6. H.M.V. C1695

Lead, Kindly Light, Creatore's Band, 4/-. ZONO A369

Londonderry Air, String Orch. with Organ, 2/-. BDCST 5106

Mignon Overture (Thomas), Symphony Orch., Berlin (d.s.), 2/-. BDCST 5104

One of the best orchestral records I have ever heard. It can do no one any harm to get this record for the sake of the pleasure of listening to the tone of the wood-wind. Practically a perfect record.

Nation Emblem (Bagley), H.M. Life Guards, 1/3. BDCST 4556

A typical "Life Guards" production. It is a pleasure to listen to such precision. The tone of the trombones attracted my attention very quickly.

Nearer My God to Thee, Creatore's Band, 4/-. ZONO A369

Old Time Favourites, London Orch. (d.s.), 2/6. ZONO 5413

Onward, Christian Soldiers, Creatore's Band, ZONO A369

Pagan Love Song, Salon Orch., 3/-. H.M.V. B3139

Rose Marie, Parts 1 and 2, Bidgood's Symphonic Dance Band, with soloists and chorus, 2/-. BDCST 5109

This is a thoroughly good record. The soloists have good voices. An excellent duet is a feature of the second portion of the record, which concludes with some good choral singing.

Rose Marie, Tom Bailey, with Orch., 2/-. BDCST 452

New Mayfair Orch. (d.s.), 4/6. H.M.V. C1756

Sacred Hour (Ketelby), String Orch., with organ, 2/-. BDCST 5106

Suite No. 2 in B Minor (Bach), Chicago Symphony Orch. d.s.), H.M.V. D1673

Swan Lake (Tchaikovsky), H.M. Coldstream Guards, con. Capt. R. G. Evans (d.s.), 4/6. H.M.V. C1745

The Coldstream Guards here keep up their great reputation. It seems that no more need be said. I thoroughly recommend the record.

Toccato Marziale (Williams), Decca Military Band, con. by C. Leggett, 2/-. DEC M68

This is an exceedingly clever work. Admirers of Vaughan Williams will thoroughly enjoy it.

Vocal Gems, from *Merry Widow* (Lehar), Zono. Light Opera Co. (d.s.), 4/-. ZONO A367

INSTRUMENTAL RECORDS

Canzonetta (D'Ambrosio), David Wise, violin, 2/6. ZONO 5420

David Wise's phrasing is noteworthy. He plays with feeling, but not with too much sentiment. In a work of this kind that is important. His double-stopping is clear and well in tune.

Finale from Violin Concerto (Mendelssohn), Louis Godowsky, violin, with piano, 1/9. DOM B27

I'll Always be in Love with You, Alex Taylor, organ from Davis' Theatre, Croydon, 2/-. DEC F1525

I'm Still Caring, Leslie Hutchinson, piano, 3/-. PARLO R444

Liebestraume (Liszt), Herman Wasserman, piano, 1/9. DOM B26

Molly on the Shore (Grainger) Herman Wasserman, piano, 1/9. DOM B26

Monk's Dream (Holmes), Sandy Macpherson, Wurlitzer organ, 3/-. H.M.V. B3173

My Mother's Eyes, Alex Taylor, organ from Davis' Theatre, Croydon, 2/-. DEC F1525

My Sin, Leslie Hutchinson, piano, 3/-. PARLO R444

Prelude in E Minor (Mendelssohn), Vladimir dePachmann, piano, 6/-. H.M.V. DA926

There is only *one* Pachmann! I have heard him play this before—actually, I mean—and it brings back memories. His tone is one of the seven wonders of the modern world.

Prelude in B Minor and *Prelude in G Major* (Chopin), Vladimir de Pachmann, piano, 6/-. H.M.V. DA927

No one has ever played Chopin—probably not even Chopin himself—as Pachmann has done. Thanks to the gramophones he will live with us always. This is a *perfect record*.

Scottish Pastorale (Saenger), Yehudi Menuhin, violin, with piano, 8/6. H.M.V. DB1284

Siciliana (Mascagni), David Wise, violin, 2/6. ZONO 5420

A very good rendering of it. Do you know the *Siciliana* of Mascagni? If not, you ought to; and you will not hear it better played than by this same David Wise!

Songs My Mother taught me, Louis Godowsky, violin, with piano, 1/9. DOM P27

Starlight (Brownsmith), Sandy Macpherson, Wurlitzer organ, 3/-. H.M.V. B3173

Tattoo (Grimshaw), Emile Grimshaw's Banjo Quartet, 2/-. DEC F1521

Te Deum, Yehudi Menuhin, violin, with piano, 8/6 (d.s.): H.M.V. DB128

The young violinist gives a good impression of Handel—not always easy to do. His playing is characterised by good phrasing and even tone.

Vienna Blood (Strauss), Schwiller Octet, instrumental, 2/-. DEC F1527

An excellent specimen of the Viennese type of waltz. There is something very distinctive about Viennese waltzes.

Wayside Shrine (Sherwood), Schwiller Octet, instrumental, 2/-. DEC F1527

A very well balanced octet. There is a great deal to be said for small bands for recording bands for recording purposes. The music here is quite attractive.

Wedding Music, from St. Margaret's, Westminster, con. by Stanley Roper, 3/- (d.s.). H.M.V. B3120

DANCE RECORDS

A Little Bungalow (f), Herbert Jaeger and Orch., 2/-. DEC F 1528

Am I Blue? (f.), Arcadians Dance Orch., 2/6, ZONO 5433

Birmingham Bertha (f.), Miff Mole and His Molers, 3/-. PARLO R432

Bitter Sweet (w.), Barnabas Von Geczy and Orch., 3/-. PARLO R440

Broadway Baby Dolls (f.), Jay Wilbur and Orch., 1/3. DOM A189

Building a Nest for Mary (f.), Midnight Merrymakers, 1/3. BDCST 449

This is the second effort I have had to face about a nest. Some people successfully feathered the last one. This is merely a building operation. I was distinctly entertained by it. The words are good: so is the tune.

Button Up Your Overcoat (f., from *Follow Through*), Dorsay Bros. and Orch. with vocal refrain, 3/-. PARLO R385

Ambrose and Orch., 2/- DEC M76

What a rage this tune is! Everyone seems inclined to record it. It is quite worth having—possibly it will be the success of the season. I should not be surprised.

Jack Hylton and His Orch., 3/-. H.M.V. B5703

Jay Wilbur and Orch., 1/3. DOM A186

There is some excellent *advice* in this—beginning with the injunction contained in the title. The advice is worth the 1/3 which you would have to pay for a patent medicine! Buy it, and obey it when you have bought it!

Manhattan Melodymakers, 2/-. BDCST 2518

I have already commented on the words of this song. It is only necessary to say here that this is an excellent record: the vocal refrain is sung with excellent diction.

Chinese Twilight (f.), Arcadians Dance Orch., with vocal refrain, 2/6. ZONO 5432

Come One Baby (f.), Rhythm Maniacs Dance Orch., with Vocal refrain, 2/- DEC F1528

Brooklyn Broadcasters, 1/3. DOM A195

Rhythmic Eight, 2/6. ZONO 5436

Come West, Little Girl, Come West, from "*Whoopee*" (f.), George Olsen and his Music, 3/-. H.M.V. B5683

Dance of the Wooden Dolls (f.), Harry Bidgood and Broadcasters, 1/3. BDCST 447

Dear Little Cafe (f., from *Bitter Sweet*), Ambrose and Orch., 2/-. DEC M75

I understand this to be popular. I think it is deservedly so, and this is certainly a good record of it.

Dites moi ma mere (six-eight, from *Innocents of Paris*), Rio Grande Band, 3/-. H.M.V. B5701

Down Among the Sugar Canes (f.), Midnight Merrymakers, 1/3. BDCST 449

Quite an atmosphere surrounds this. It is a good dance record.

Dream Mother (f.), Harry Bidgood and Broadcasters, 1/3. BDCST 446

A splendid dance-tune, rhythm clearly marked. It is well produced in every way.

Criticisms by C. Whitaker-Wilson

Excuse Me, Lady (f.), (Nicholls), Arcadians Dance Orch., 2/6. ZONO 5431

Fairy on the Clock (f.), Jay Wilbur and Orch., 1/3. DOM A192

Forget-me-Not (slow f.), Herbert Jaeger and Orch., 2/-. DEC F1524

The composer of this attractive dance-tune has realised that good orchestral effects and little contrapuntal melodies are excellent in all music—light or otherwise. It is well written.

Forgive Me (f.) (Egen), Herbert Jaeger and Orch., 2/-. DEC F1524

There is everything to be said for this type of fox-trot. I admire the thoughtful orchestration. The other kind—and unfortunately there are too many—I simply intend to ignore in these columns.

Gotta Feelin' for You (f.), Frankie Trumbauer's Orch. with vocal refrain, 3/-. PARLO R434

Heather Moon (w.), Harry Bidgood and Broadcasters, 1/3. BDCST 446

Those who dance to a gramophone ought to have this for the winter season. Good waltz tunes are always in demand.

He's a Good Man to Have Around (f.), Rhythmic Eight, with vocal refrain, 2/6. ZONO 5434

Hitting the Ceiling (f., from *Broadway*), Ambrose and Orch., 2/-. DEC M70

Our fox-trots are getting ultra-modern! This is rhythmical to almost a startling point. Admirably recorded!

I Don't Know How (f.), Jay Wilbur and Orch., 1/3. DOM A190

I feel at home with You (f.), Jay Wilbur and Orch., 1/3. DOM A190

George Olsen and his Music Dance Orch., 3/-. H.M.V. B5706

This is very well played and is an exceedingly useful dance record. As a composition the work suffers from ordinary progressions, but it has, as I say, a value for the ballroom.

I'm Bringing a Red, Red Rose (f., from *Whoopee*), Ambrose and Orch., 2/-. DEC M75

This is interesting and modern in style. There is a good deal of originality about it.

I'm doing what I'm doing for Love (f.), Harry Bidgood and his Broadcasters, 1/3. BDCST 445

The title left me wondering whether he meant without payment or for the sake of affection: it appears he is something of a philanthropist and a good lover at the same time. It is quite effective.

I'm Feathering a Nest (f.), Harry Bidgood and Broadcasters, 1/3. BDCST 445

Harry and his Broadcasters feather it well between them. These "numbers" are of real value for dance purposes. The vocal refrain is splendid.

I'm Just a Vagabond Lover (f.), Manhattan Melodymakers, 2/-. BDCST 2517

Another well-scored number. The Manhattan Melodymakers, I have come to the conclusion, are quite a safe investment. I hope they will keep up their standard of excellence.

I'm Just in the Mood To-night (f.), Rhythmic Eight, 2/6. ZONO 5436

Indian Love Call (from *Rose Marie*), Thea Phillips and Tom Bailey, with Orch., 2/-. BDCST 452

Al Benny's Broadway Boys, 2/-. BDCST 2515

I Want to be Bad (f., from *Follow Through*), Manhattan Melodymakers, 2/-. BDCST 2518

A certain wildness and abandon characterizes the music here, which, of course, suits the title. The tone of the bass instruments in the orchestra is excellent. I dare not name the instruments—for heaven only knows what one of them is!

Jack Hylton and his Orch. 3/-. H.M.V. B5695

It Wasn't Meant to be (f.), Jay Wilbur and Orch., 1/3 DOM A189

For dance purposes this is to be recommended, but the instruments are a little harsh. If you have it, use a soft needle!

Kansas City Kitty (f.), Rhythmic Eight, 2/6. ZONO 5437

Say the title ten times quickly; it is good exercise. The Rhythmic Eight are what they say they are!

Arthur Rosebery and Band, with vocal refrain, 3/-. PARLO R437

Little Pal (f., fom *Say it with Song*), Rhythm Maniacs Dance Orch., with vocal refrain, 2/-. DEC F1523

A simply constructed tune of the greatest value in a dance room. It is well orchestrated and played cleanly. The vocal refrain is sung sotto-voce and is quite fascinating.

Al Benny's Broadway Boys, 2/-. BDCST 2513

I suggested in the review of it with Tom Bailey—find it, will you?—that you had better hear it before buying. Having heard it *twice* in one morning. I do not know what to suggest now!

Louise (f.), Rhythmic Eight 2/6. ZONO 5437

Rhythm is the hall-mark of this octet, evidently; one cannot imagine them indulging in *rabato*. Excellent for dancing, of course!

Lovable and Sweet (f.), Jack Hylton and Orch., 3/-. H.M.V. B5704

Love Me or Leave Me (f., from *Whoopee*), Jack Hylton and Orch., 3/-. H.M.V. B5702

Ambrose and His Orch., 2/-. DEC M71

Leo Reisman and His Orch., 3/-. H.M.V. B5684

Deauville Dance Orch., 1/3. DOM A188

The title is rather disarming, and I am not sure whether the peculiar tapping rhythm makes me want to be loved—or *left!* The words of the refrain are excellent. It is an attractive record in every way.

Makin' Whoopee (f., from *Whoopee*), Deauville Dance Orch., 1/3. DOM A188

This is quite entertaining, and excellent for dance purposes. There is something original about the whole design of the tune.

George Olsen and Music, 3/-. H.M.V. B5683

Ambrose and his Orch., 2/-. DEC M71

Arthur Rosebery and Band, with vocal refrain, 3/-. PARLO R437

Jack Hylton and Orch., 3/-. H.M.V. B5702

Mean to Me (f.), Arcadians Dance Orch., with vocal refrain, 2/6. ZONO 5433

My Dream Memory (f.), Jack Hylton and Orch., 3/-. H.M.V. B5704

My Lucky Star (f., from *Follow Through*), Jack Hylton and Orch., 3/-. H.M.V. B5703

Arthur Rosebery and Band, with vocal refrain, 3/-. PARLO R436

On Top of the World Alone (f.), Arthur Rosebery and Band, with vocal refrain, 3/-. PARLO R438

Pagan Love Song (w.), Ed Kirkeby Wallace and Orch., with vocal refrain, 3/-. PARLO R432

Al Benny's Broadway Boys, 2/-. BDCST 2514

Very effective, and a good waltz. I am not so sure about its paganism, though. Rather conventional, I thought it.

Reaching for Someone (f.). Brooklyn Broadcasters, 1/3 DOM A193

Rosa (one-step), Humorous Vocal. Midnight Merrymakers, 1/3. BDCST 448

Rosa comes from Italy. Quite amusing. Kisses evidently record well: I was rather interested in this fact.

Rose Marie (f.), All Benny's Broadway Boys, 2/-. BDCST 2515

San Sebastian (f.), Arthur Rosebery and Band, with vocal refrain, 3/-. PARLO R438

Singing in the Rain (f., from *Hollywood Revue*), Dorsey Bros. and Orch., with vocal Refrain, 3/-. PARLO R433

Ambrose and His Orch., 2/-. DEC M70

This is exceedingly clever and admirable for dancing purposes. It has a considerable amount of originality about it.

Jay Wilbur and His Orch. 1/3. DOM A187

The singer hisses his *s*'s as though he had holes in his front teeth! The tune is a good one, though. He is quite amusing.

Sleepy Valley (w., from *Rainbow Man*), Harry Bidgood and Broadcasters, 1/3. BDCST 447

A good waltz. It is well played, and is rhythmical in construction.

Barnabas Von Geczy and His Orch., 3/-. PARLO R440

Some Sweet Day (f.), Carolina Club Orch., with vocal refrain, 3/-. PARLO R435

Manhattan Melodymakers, 2/-. BDCST 2517

There is some effective scoring here—a fact which always incites me to recommend a record of this kind. Poor scoring should be a thing of the past by now!

So the Bluebirds and the Blackbirds got Together (f.), Manhattan Melodymakers, 2/-. BDCST 2516

I expected the *Blue*birds and the *Black*birds to be drinking Stephen's Ink, but I was mistaken. It turns out that it was over a question of the weather that they got together. I enjoyed this record very much indeed: there is something picturesque about it not easy to describe. It is *very* appealing.

Spell of the Blues (f.), Dorsey Bros. and Orch., with vocal refrain, 3/-. PARLO R385

S'posin' (f.), Carolina Club Orch., with vocal refrain 3/-. PARLO R435

Spring it in the Summer (f.), Rhythmic Eight, 2/6. ZONO 5435

This is Heaven (f.), Al Benny's Broadway Boys, 2/-. BDCST 2514

Arcadians Dance Orch., 2/6. ZONO 5431

Brooklyn Broadcasters, 1/3. DOM A195

Thou Swell (f.), Johnny Johnson and Statler Pennsylvanians Dance Orch., 3/-. H.M.V. B5706

An excellent dance number. It is not so much the tune as the clear playing which will make it valuable for dance purposes.

Toymaker's Dream (f.), Jay Wilbur and Orch., 1/3. DOM A192

Underneath the Russian Moon (w.), Al Benny's Broadway Boys, 2/-. BDCST 2513

I like this. There is a pleasant contrapuntal melody played by a violin against an equally pleasant voice. It is well scored.

Until you get Somebody Else (f., from *Whoopee*), George Olsen and his Music, 3/-. H.M.V. B5684

Valentine (six-eight, from *Innocents of Paris*), Rio Grande Band, 3/-. H.M.V. A5701

Wake Up, Chillun' (slow f.), Brooklyn Broadcasters, 1/3. DOM A193

Manhattan Melodymakers, 2/-. BDCST 2516

A good bass voice sings early in the record. At the pitch which the gramophone plays *here* he delivers himself of a few healthy low G flats. The orchestral effects are novel, also.

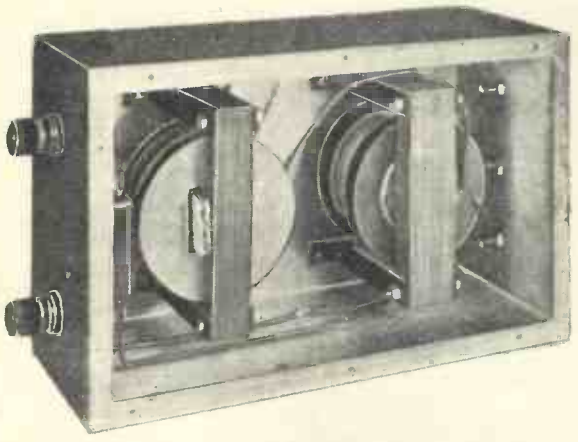
We Toddled up the Hill (f.), Ryhthmic Eight, with vocal refrain, 2/6. ZONO 5434

Who Knows? (f.), Deauville Dance Orch., 1/3. DOM A191

Why Can't You? (f., from *Say it with Song*), Rhythm Maniacs Dance Orch., with vocal refrain, 2/-. DEC F1523

(Continued at foot of next page)

Realism from Your Records—*Continued* *from page* 513



Inside view of the McLachlan Novotone compensator, which has given excellent results in the "W.M." laboratories.

LS5, with 10,000 ohms in its anode circuit. The valve magnification would be about 4. If the magnification had been 16, the curve would probably have had its peak about 3,500 cycles.

Adding Bass

The effect of using resistances of various values across the terminals P.U.2 and S.C. is shown by curves 2, 3, 4, and 5. Obviously the upper register can be kept under complete control by this simple expedient. In fact, if curve 4 is used, the effect of the Novotone is merely to add the bass register.

It was shown above how to reduce the output from the Novotone. The use of resistances of the grid-leak variety leads to curve 2 of Fig. 6. The peak of the upper register is now about 800 cycles higher than before, and is comparatively inconspicuous. The reduction in the peak is due to the combined effect of 2 megohms in series with the effective valve capacity across 1 megohm.

Reducing Upper Register

The result, in practice, is to reduce the upper register. To insert this register in varying degrees, it is merely necessary to put a condenser of .0005 to .001 microfarad across the 2-megohm leak.

By using the .001-microfarad condenser across the *grid and filament of the valve*, the upper register will disappear and leave the bass. This is an interesting experiment to conduct. The experimenter will discover to his surprise that, although power resides in the bass, it is really "quiet" and conversation can be carried on with ease.

Not a few loud-speakers have resonances below 100 cycles. The Novotone may excite these instruments to apparently heroic deeds which are not always welcome. In case it is de ired to curb such unseemly behaviour, I propose to indicate how the lower register of the Novotone can be reduced.

All one does is to substitute a .0005 to .001-microfarad condenser for the 2-meoghm leak, as shown in Fig. 6, curve 1, and this gives an ordinary resistance-capacity coupling. The calibration curve, using a .001-microfarad condenser, is shown in curve 1. By comparison with curve 1 of Fig. 5, it is evident that an appreciable reduction in the lower register has been effected. To obtain a greater reduction it is merely necessary to use a condenser smaller than .001 microfarad.

Wonderful Transformation

In fact, if this condenser is reduced to .0001 microfarad, the lower register will substantially disappear. The upper register will not be "quiet," rather will it be irritating. A lack of body, so to speak, will be apparent. Although neither the upper nor the lower register is "loud" by itself, a wonderful transformation results when the two present a united front.

By combining the schemes set forth above, the experimenter will be able to secure the tonal balance and voltage input which best suits his complete apparatus.

WHEN YOU HAVE A PROBLEM TO SOLVE

Which is more than you can unravel for yourself, whether it be a gramophone or radio matter, do not hesitate to consult the WIRELESS MAGAZINE *Information Bureau.*

The rules are simple, but they must be rigidly observed: (1) *Ask not more than two questions at a time,* (2) *write on one side of the paper only,* (3) *send a stamped addressed envelope for reply,* (4) *and the coupon on page iii of the cover, with a fee of* 1*s.*

Address your inquiries to "Information Bureau, WIRELESS MAGAZINE, *58/61 Fetter Lane, E.C.4." In most cases you will get a satisfactory reply within forty-eight hours.*

New Records Reviewed and Listed for Your Choice

(Continued from preceding page)

This is quite amusing. I think I reviewed it last month (by another publisher).

You Wouldn't Fool me, Would You? (f., from *Follow Through*), Jay Wilbur and Orch., 1/3. DOM A186

It is an old question as presented here, but it makes an excellent dance record. Not at all a bad tune.

Arthur Rosebery and Dance Band, with vocal refrain, 3/-. PARLO R436

Jack Hylton and His Orch., 3/-. H.M.V. B5695

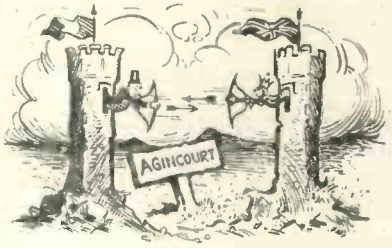
Your Mother and Mine (f.), Dorsey Bros. and Orch., with vocal refrain, 3/-. PARLO R433

You're a Pain in the Heart to Me (f.), Rhythmic Eight, 2/6. ZONO 5435

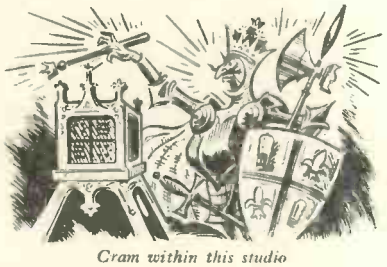
"Henry V" as a Radio Play!

If broadcasting had been in vogue in Shakespeare's time, he might have written "Henry V" as a radio play, in which case the famous prologue would doubtless have been modified somewhat after this fashion:

O, for a wireless Muse, that would ascend
The brightest heaven of invention!
A kingdom for a stage, princes to act,
And monarchs to describe the swelling scene!
Then should the warlike Harry, like himself,
Assume the microphone, and at his heels,
In big armchairs, should all the station staff,



The warlike Harry


Cram within this studio

Await employment. But pardon, gentles all,
The flat unraised spirit that hath dar'd
From this unworthy station to send forth
So great an object; can your earphones hold
The vasty fields of France? or may we cram
Within this studio the very casques
That did affright the air at Agincourt?

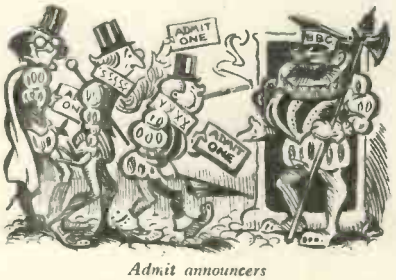
O, pardon! since a crooked figure may
Attest in little place a million;
And let us, ciphere to this great accompt,
On your imaginary forces work.
Suppose within the girdle of these walls
Are now confined two mighty monarchies,
Whose high upreared and abutting fronts


Within the girdle of these walls are now confined two mighty monarchies


Sound of prancing horses

The perilous narrow ocean parts asunder;
Piece out our imperfections with your thoughts;
Into a thousand parts divide one voice,
And make imaginary puissance;
Think, when the "Noise Department" reproduces
The sound of prancing horses, that you see them
Printing their proud hoofs i' the receiving aerial;
For 'tis your thoughts that now must deck our kings,
Carry them here and there; jumping o'er times,
Turning the accomplishment of many years
Into an hour's broadcast; for the which supply
Admit Announcers to this history;
Who, prologue-like, your humble patience pray,
Gently to hear, kindly to judge, our play!

W. OLIVER.



Admit announcers

An Improved Linen Loud-speaker

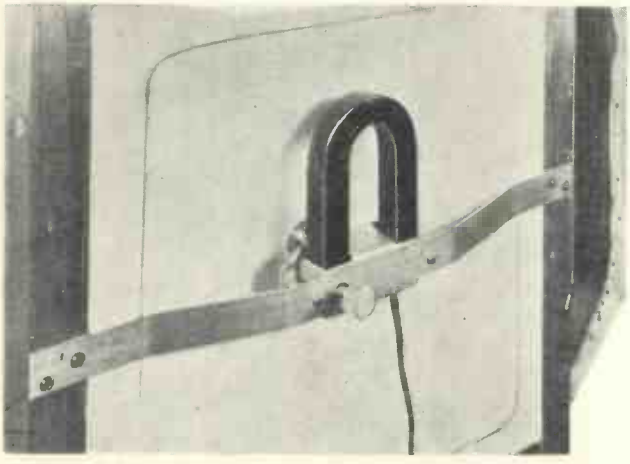
HOW TO BUILD YOUR OWN INSTRUMENT !

AT the beginning of this article, it will be just as well to remind old readers, and inform new readers, that the WIRELESS MAGAZINE was the first radio paper in this country to introduce the now tremendously popular type of linen loud-speaker to listeners.

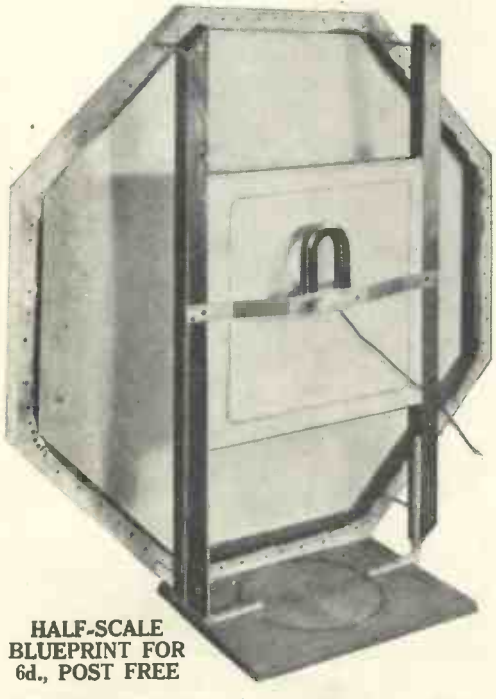
Success Assured

Right from the publication of the first details—in the WIRELESS MAGAZINE for September, 1928—the success of the new type of loud-speaker was assured. During the intervening months various modifications of the original design have appeared in our contemporary, *Amateur Wireless*.

This month we offer readers details of a new loud-speaker which incorporates all the improvements that a year's constant research have proved to be best for the average amateur.



This photograph shows clearly how the Blue Spot unit is held in position by a brass strip. Other units can, of course, be supported in a similar way, but the mounting must be rigid



HALF-SCALE BLUEPRINT FOR 6d., POST FREE

Another view showing how the Blue Spot unit is mounted at the back of the small diaphragm

For the benefit of those readers to whom this type of loud-speaker is quite new, we will briefly explain the fundamental points of its construction.

Two frameworks are prepared, one comparatively much larger than the other, and across each is tightly stretched a piece of linen. The frameworks are held apart by any suitable means, but the centres of the two pieces of linen are drawn together and held in position so that in effect two shallow conical diaphragms are formed. Any suitable driving unit is then attached to the centre points of the two pieces of linen. These features will be clear after a glance at the photographs of the completed loud-speaker.

Reason for Two Diaphragms

The object of providing two diaphragms is simply to get the necessary tension on the linen; there is no method of which we are yet aware by which a single linen diaphragm can be satisfactorily "shaped" to give good reproduction.

Question of Size

If desired, both frames could be made of the same size. The effect of making one larger than the other, as claimed by the original American inventor of the system, is to give a better balance between bass and high-note reproduction.

It is assumed that the vibration that takes place in the linen is radial in character along the diaphragm and that the linen does not move as a whole, which is the case with an ordinary conical diaphragm.

According to the radial theory, therefore, a small diaphragm will give the best high-note reproduction, and a large diaphragm the best bass reproduction.

Superb Results

In practice, a well-constructed linen-diaphragm gives reproduction that is of a very high quality indeed—provided that a suitable driving unit is used. It is found best to use a balanced-armature unit, such as the Blue Spot, which gives superb results.

A single-pole reed-type unit is not found to give first-class reproduction as a rule. Nowadays, however, there is a large number of well-made balanced-armature units available.

The first linen loud-speaker

described in the WIRELESS MAGAZINE used an octagonal framework and this new model is constructed on similar lines, except that it is smaller in size, being 28 in. high and 28 in. across.

In this size there is no need to employ a baffle as the bass is reproduced at good volume; in fact, the balance is excellent for all normal purposes.

Easy Stretching

The large diaphragm is octagonal, because it is easier to stretch the linen on this shape than on to a square or rectangular frame. The smaller diaphragm is stretched on a square frame for simplicity, there is little trouble in putting it on such a small frame.

Arrangements have been made with a number of manufacturers for the supply of wooden frames for this loud-speaker, but for those who prefer to make their own, we have prepared a half-scale blueprint.

This can be obtained for half-price (that is, 6d., post free), if the coupon on page iii of the cover is used by December 31. Ask for No. WM172; and address your inquiry to Blueprint Dept., WIRELESS MAGAZINE, 58-61, Fetter Lane, E.C.4.

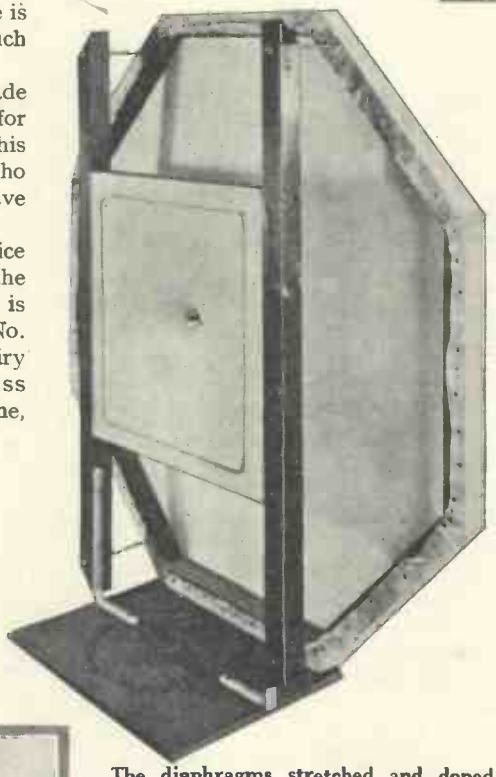
Fixing Joints

One of the photographs reproduced here shows how the joints of the octagonal and square frameworks are held with carpenter's "dogs."

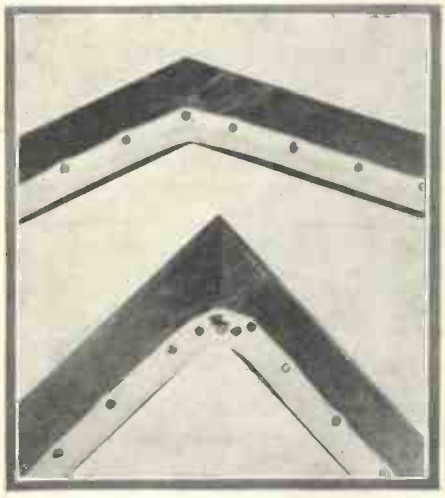
Before beginning the construction, the parts detailed on page 522 should be obtained. The linen actually used for our original model was branded "Webb's Irish Linen," and was obtained from Wallis's of Holborn.

On the face of the octagonal frame is fixed a length of the rubber used for keeping draughts out of windows and doors; the method of fixing it will be clear from the photograph below. The part of circular cross-section should be placed near the inner edge of the frame.

To start the construction, cut out a piece of linen about 5 or 6 in. bigger all round than the octagonal frame. Lay it out on a flat surface and place the frame on top of it, the rubber beading downwards, so that the warp and weft of the weave are at right angles to an opposing pair of sides.



The diaphragms stretched and doped before the fixing of the driving unit



Rubber beading, as sold for excluding draughts from doors and windows, placed round the inner edge of the wooden frameworks

Pull the linen up over the back of the frame and fix it with ordinary tin tacks; these should not be stinted. Now take the linen at the opposite side, pull it as tight as possible and nail it to the opposite side. Carry on in this way until the linen is fixed firmly to all six sides, and is quite evenly stretched.

Next, stretch another piece of linen in a similar way over the small square frame. After this has been done the two supports for the square frame can be screwed into position.

The framework is jointed by means of carpenter's "dogs"

Finding Centres

The next step is to find the centres of each linen diaphragm. This is done by drawing a number of diagonal lines. Where these lines meet, apply a sharp-pointed instrument and carefully *pull aside* the threads of the linen to make a hole large enough to be carefully buttonhole-stitched (a little feminine assistance will be found welcome at this stage !).

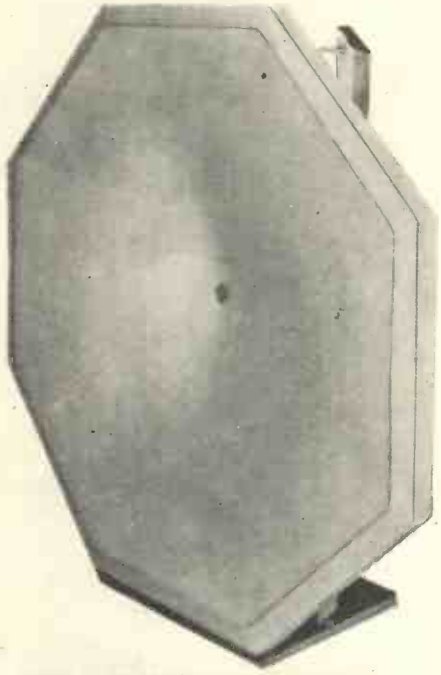
In carrying out this operation, take care only to *pull* the threads apart and *not to break* any of them or the diaphragm will be weakened.

Now place the large frame, (linen downwards) on a table and put the square frame with its supporting strips (linen upwards) on top. At the four points where the supports cross the octagonal frame, drill holes, right through the supports and about ⅛ in. into the octagonal frame. These holes should be large enough to pass a No. 2B.A. rod.

Joining the Centres

Next, place four 4-in. lengths of this threaded rod in position, as indicated by the photograph above with nuts between the frames. Place the nuts so that the frames are almost touching. Now take the special conical washer with a small chuck and join the centres of the diaphragms together, so that the

An Improved Linen Loud-speaker—*Continued*



THE BEST LOUD-SPEAKER for THE HOME-CONSTRUCTOR

A front view of the complete "W.M." linen diaphragm loud-speaker

chuck is on the small square diaphragm side.

The nuts on the four threaded rods should be then screwed up so that the frames are held about 1 in. apart. It is now time to apply the first coating of dope, which should be brushed thoroughly all over the outer surfaces of the linen—out of doors, as the smell of the collodion is likely to cause trouble in the house!

Stretching the Diaphragms

When this coating of dope has thoroughly dried, the nuts should be screwed up to stretch the diaphragms a little more and a second coat of dope applied.

As soon as the second coating has dried the nuts should be carefully screwed up a little at a time, until the linen is under maximum tension.

If each nut is screwed up in turn, the linen will not be torn, and a surprising degree of tension will be attained. Now the third and last coating of dope can be applied.

The fixing of the driving unit can next be undertaken. This is mounted on a strip of brass ¾ in. wide and $\frac{1}{16}$ in. thick. The best way is to screw the threaded rod of the driving unit into the chuck on the square diaphragm before fixing the brass mount.

Note how far the back of the unit projects and carefully bend the brass to the best shape. This will be clear from the photographs on page 520. Drill holes in the brass strip to accommodate the fixing screws on the unit and fix the whole assembly in position.

Care should be taken to keep the linen stretched as tightly as possible. Unsatisfactory results have been traced in a number of instances to constructors not tautening the linen sufficiently. The tension should be so great that a sharp pinging noise is produced when the diaphragms are tapped with the finger-tip.

The desirability of using a balanced-armature type unit has already been emphasised.

J. Sieger, the member of the Wireless Magazine Technical Staff who has been responsible for all the experimental work on linen loud-speakers, has found that the Blue Spot 66K unit gives the best reproduction, although there are a number of other satisfactory units, such as the Gecophone.

Decorating the Linen

Readers with an artistic turn of mind will be able to decorate their instruments by stencilling fancy designs on the linen. This has been done very successfully by more than one constructor and the result is a loud-speaker that is attractive in appearance, as well as satisfactory in reproduction.

It may be mentioned in conclusion that a British firm has obtained the rights of manufacture in this country and that complete instruments can now be bought by those listeners who do not wish to make their own.

PARTS REQUIRED FOR THE IMPROVED LINEN LOUD-SPEAKER

1—Set of wooden frameworks with supports and stand (Pickett, Sewell or Camco).

1½—yd. Webb's Irish linen, approx. 6/-.

1—Pair conical washers with nut and chuck.

2—1-ft. lengths No. 2B.A. threaded brass rod, with 8 nuts and washers.

10—oz. collodion-meth, approx. 3/-, from any chemist.

1½—ft. $\frac{1}{16}$-in. hard brass strip, ¾ in. wide.

4—yd. rubber draught-stopper, approx. 6d. per yard (Hookite).

1—Balanced-armature unit (Blue Spot, Gecophone, or Grassman.).

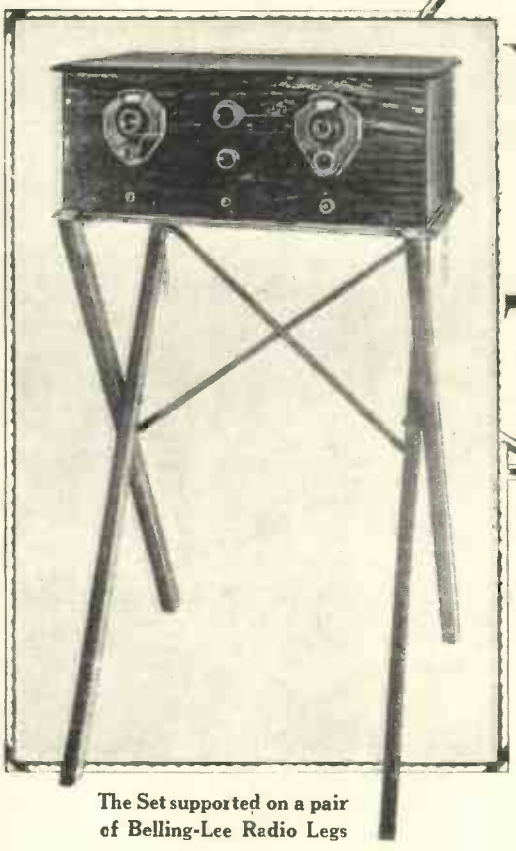
1—Pair panel brackets (Bulgin, Camço or Raymond).

¼ lb. ⅜-in. tin tacks.

Here is a set of unusual interest. Not only does it use two of the new Q coils, which have been greatly improved since last season, but it makes use of a pentode valve as a detector. The advantages of this revolutionary step will be seen by reference to the article itself.

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

The NEW Q THREE



The Set supported on a pair of Belling-Lee Radio Legs

THIS SET HAS BEEN SPECIALLY DESIGNED FOR THE "WIRELESS MAGAZINE" BY THE TECHNICAL EDITOR AT THE FURZEHILL LABORATORIES AND IS AN ENTIRELY NEW DEVELOPMENT THAT WILL CREATE GREAT INTEREST.

BEFORE the advent of Brookman's Park it was often suggested to me that our position at Elstree was much too favourable for the testing of receivers, owing to the distance from 2LO, which gave us quite fictitious ideas of selectivity.

Tables Reversed

This was admittedly so to some extent, but the tables have now been reversed with a vengeance, for we are situated only some six miles from Brookman's Park.

In fact, it is possible to see the Brookman's Park masts from the top of the hill on the side of which the laboratories are situated, so that we now receive a very considerable signal from the local station.

Indeed, the strength here is so great as to give quite misleading results in the reverse direction, for wipe-out effects are not merely a matter of a slight broadening of the tuning. The strong signal introduces a paralysing effect on the detector, which makes the production of really sharp tuning a matter of considerable difficulty.

Saving Expense

The present receiver is the outcome of an attempt to devise a simple three-valve receiver capable of giving really selective results with good signal strength. One can, of course, tackle the problem by devising very efficient coils and transformers, screening, de-coupling and using every modern aid to the production of good results, but the resulting receiver would be expensive and, moreover, would not meet the majority of requirements.

This receiver is the next best thing, giving results which are satisfactory for the great majority of people without undue expense.

The coils in use are the new Q coils. These have been re-designed since last season, with a view to improving the selectivity on the short-wave band. Moreover, the switching system has been considerably simplified, for despite all the precautions which were taken, it was found that difficulties were experienced with the switching on the old pattern.

With the new type, the switching has been reduced to a simple push-pull arrangement and this is much less likely to give any trouble. The connections have been maintained exactly the same as before, but for further information, reference should be made to the article on another page of this issue.

The present receiver was actually constructed before Brookman's Park started operations. Owing to the astatic properties of the Q coils, it was felt that relatively simple screening would be all that would be necessary, and this proved to be the case. A very simple layout was all that was necessary, and the receiver tuned in thirty or forty stations on the loud-speaker without any difficulty whatever, and gave evidence of being particularly selective.

London (the old 2LO) could be tuned in and out at Elstree within 3 degrees, which appeared to be a very creditable performance in view of the use of dual-range coils, which need not be changed on going from the long to the short wavelengths.

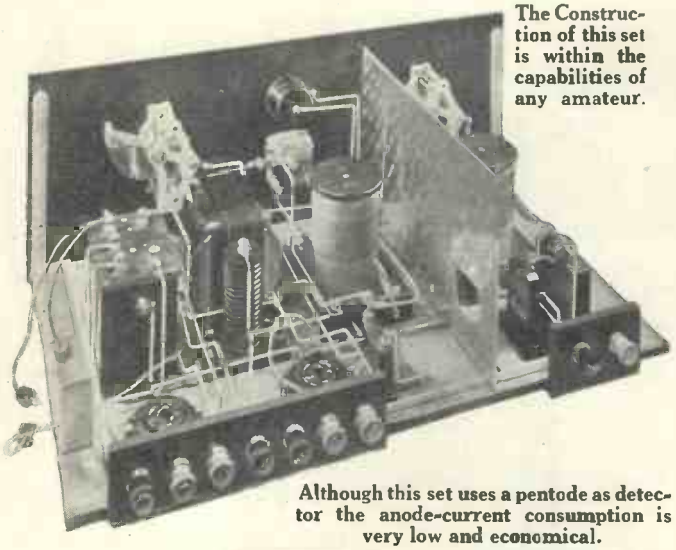
My impression, indeed, was that the new Q coils were the most selective dual-range coils with which I had come in contact.

Severe Wipe-out Effects

The receiver was deliberately put on one side, however, until Brookman's Park had begun operations, and it was then re-tested. The results were distinctly disappointing. Wipe-out effects were so severe that it was barely possible to get within 100 metres of 2LO's wavelength, although a detector, using a Q coil, with a wave-trap got within 50 metres.

The tests which had been made on the coils showed that these coils were

The New Q Three—*Continued*



The Construction of this set is within the capabilities of any amateur.

Although this set uses a pentode as detector the anode-current consumption is very low and economical.

not the root of the matter and, after a little investigation, it became clear that the detector stage itself was being paralysed, owing to the amplification resulting from the H.F. stage in use. Whether the results were due to an increased detector damping, or to some more obscure action was not clear, but it was obvious that the influence of a really heavy signal, such as is obtained from the local station at close range, was sufficient to render the receiver of little use.

Anode-bend Rectification

Attention was turned to anode-bend rectification and, although this improved the selectivity, the signal strength suffered to an extent which was considered inadvisable. Concurrently with the tests on this receiver, however, some experiments had been made on the use of a pentode valve as a detector and, based on these tests, an attempt was made to use a pentode in this set.

The results obtained proved very encouraging, and after a little extra experimental work, the receiver was finally completed, utilising this form of detector valve.

It was found that, properly utilised, the pentode gave approximately the same order of signal strength as a grid detector with the selectivity of the anode-bend arrangement. It was possible to tune-in a station (with a certain background from 2LO which could be heard when the foreign stations ceased to modulate), at a separation of 30 metres only.

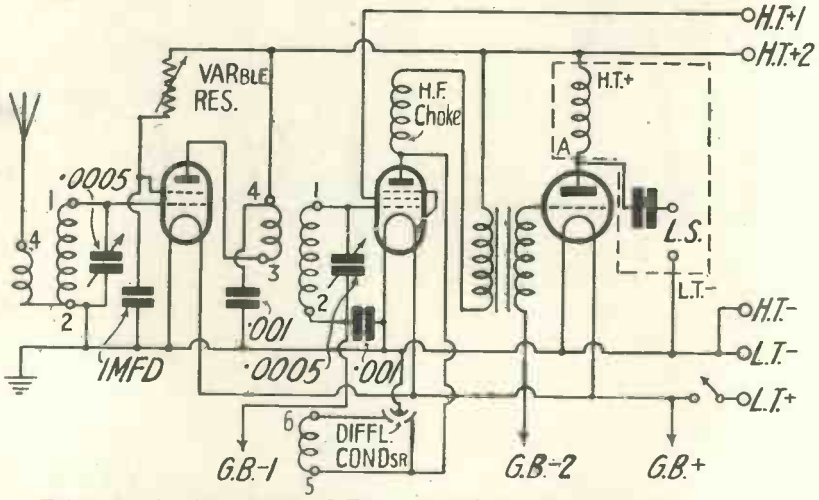
This is definitely better than the detector-cum-wavetrap set just referred to, with which it had only been possible to get 50 metres away from London's wavelength. In all cases, the circuits used were of an average character, and were not specially selective, but it became clear that the use of a pentode-detector was giving results distinctly out of the ordinary.

Low Priming-grid Voltage

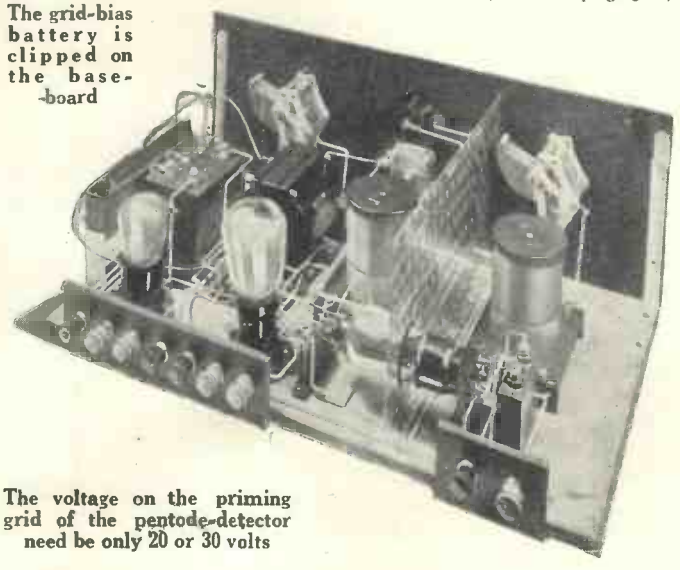
The use of the pentode as a detector sounds rather curious, but, in reality, it is quite simple. The valve was biased with a negative bias on the grid in the same way as an anode-bend rectifier. At the same time, the voltage on the priming grid is reduced to a low value, between 20 and 30 volts, in order to arrange the working point on the curve at a suitable point.

The valve then behaves as an anode-bend rectifier with the important advantage that we have a distinctly higher amplification factor than is possible with the customary H.F. valve, so that our rectification efficiency is correspondingly increased.

The old (*Cont. on page* 526)



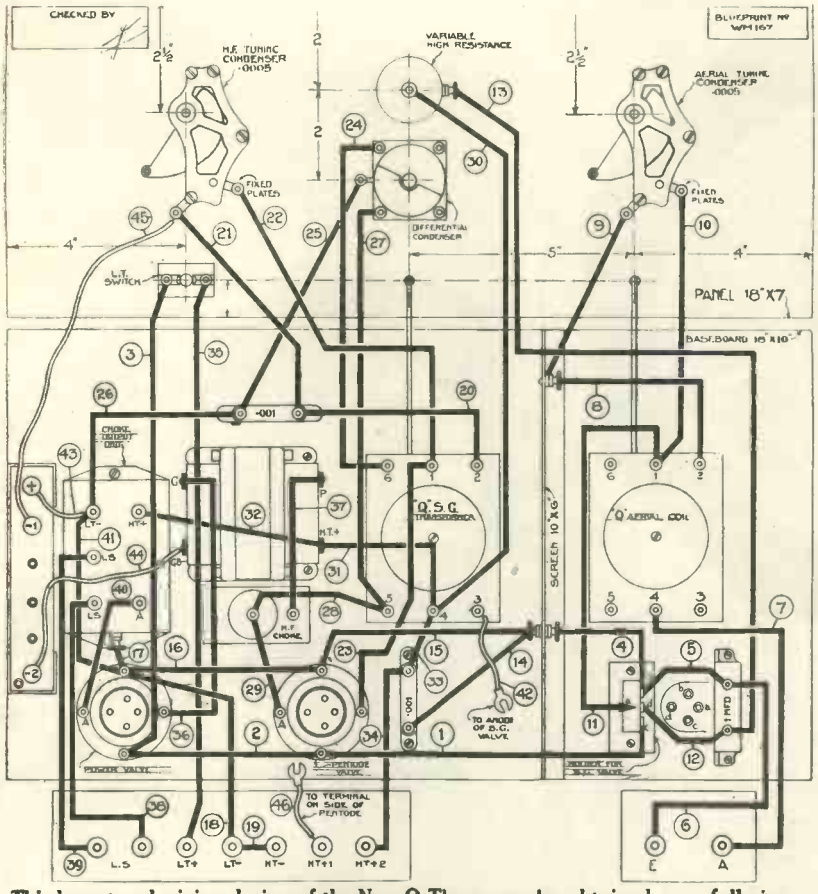
This is the circuit of the New Q Three, a novel set using a pentode as detector



The grid-bias battery is clipped on the base-board

The voltage on the priming grid of the pentode-detector need be only 20 or 30 volts

The New Q Three—*Continued*



This layout and wiring design of the New Q Three can be obtained as a full-size blueprint for half-price, that is 6d., post free, if the coupon on page iii of the cover is used by Dec. 31. Ask for WM 167. Wire up in numerical order

question of the increase in A.C. resistance of the valve, due to the bias on the grid, crops up again. Owing to the negative bias, the A.C. resistance of the valve under working conditions is about three times as great as under ordinary conditions, and this factor must be taken into account when designing the circuits to follow the detector valve. In the present instance, it was desired to follow the detector with a transformer, but this is clearly not practicable with the ordinary run of pentode valves.

Transformer Coupling

Fortunately, however, the new Cossor pentode (230PT) has an anode resistance of 20,000 ohms only under normal conditions, so that, under the correct biasing conditions for use as a detector, its A.C. resistance is still only approximately 60,000 ohms, and this is not too high to be followed by a transformer having a high primary inductance. This has been done in the present instance, a Ferranti 3½ to 1 (AF5) transformer being used.

This is an essential point in the working of the receiver. Other makes of transformer may be used if desired, provided that the primary impedance is well over 100 henries.

The remainder of the H.F. and detector circuits are more or less conventional. A transformer-coupled H.F. system is employed with reaction applied around the detector, a differential condenser being utilised in this latter connection. This condenser has two sets of fixed plates, the moving plates being arranged to slide in between one set of fixed plates as they slide out of the other set.

Constant H.F. By-pass

The circuit is so arranged that one set of plates controls the reaction, while the other is connected as a by-pass from the anode of the detector to earth. Thus the total path for the high-frequency current to earth, either through the reaction coil or direct, is always maintained the same, so that the detector is enabled to operate at its proper efficiency over the whole scale.

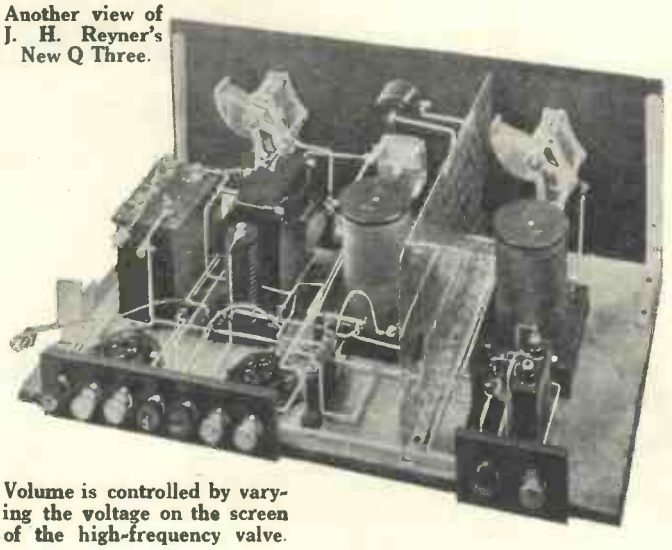
The H.F. choke employed should be a good one, and the use of the Lewcos or the new Wearite iron-cored choke is to be recommended here. If a poor H.F. choke is employed, there will be a nasty growl as the circuit goes into oscillation. This may be noted on both wavebands, or only on one, but should this be experienced, the remedy lies in the use of a better choke.

Controlling Volume

Volume control is obtained by means of a variable control of the screen voltage on the H.F. valve. This is a very convenient method of obtaining the required control, for it does not upset the quality in any way, and enables the volume to be reduced

(*Continued on page* 528)

Another view of J. H. Reyner's New Q Three.



Volume is controlled by varying the voltage on the screen of the high-frequency valve.

The New Q Three—*Continued*

COMPONENTS REQUIRED FOR THE NEW Q THREE

Choke, High-frequency
1—Lewcos, 7/9 (or Wearite).

Choke, Low-frequency
1—Wearite choke-ouput unit, type P, 21/-.

Coils
2—Ready Radio Q Coils, types QA and QSG, 30/- (or Wearite, Lewcos).

Condensers, Fixed
2—T.C.C. .001-microfarad, 4/8 (or Ormond, Edison Bell).
1—T.C.C. 1-microfarad, 2/10 (or Dubilier, Lissen).

Condensers, Variable
2—Burton .0005-microfarad, 10/6 (or Igranic, Marconiphone).
1—Lotus .0002-microfarad differential, 7/6 (or Pye).

Dials, Slow-motion
2—Brownie, 5/- (or Ormond).

Ebonite
1—Parfait, 7 in. by 18 in. (or Raymond, Ready Radio).
2—Terminal strips, 7 in. by 2 in. and 3 in. by 2 in.

Holders, Valve
2—W.B. anti-microphonic, 3/- (or Formo, Clix).
1—Parex screened-grid, single type, 2/- (or Keystone, Colvern).

Plugs
3—Belling-Lee wander plugs (marked: G.B.+, G.B.—1, G.B.—2), 9d. (or Clix).

Resistance, Variable
1—Volustat, medium resistance, 7/- (or Clarostat, Regentstat).

Screen
1—Ready Radio vertical, 10 in. by 6 in., 2/- (or Parex, Peto-Scott).

Sundries
Short length of Lewcos rubber-covered flex.
Glazite for connecting up.
1—Pair Bulgin panel brackets, 1/6 (or Raymond, Camco).
1—Pair Bulgin grid-bias battery Clips, 6d.

Switch
1—Bulgin on-off, 1/6 (or Benjamin, Pioneer).

Terminals
9—Burton (marked: Aerial, Earth, L.T.+, L.T.—, H.T.+2, H.T.+1, H.T.—, L.S.+, L.S.—), 2/3 (or Eelex, Belling-Lee).

Transformer, Low-frequency
1—Ferranti AF5, 30/-.

RECOMMENDED ACCESSORIES

Batteries
1—Siemens 120-volt, brown label, 20/- (or Lissen Marconiphone).
1—Siemens 9-volt, 2/- (or Lissen, Ever Ready).
1—Oldham 2-volt accumulator, type CL64, 13/9 (or Young, Exide).

Cabinet
1—Camco, with 10-in baseboard, 24/- (or Raymond, Caxton).

Loud-speakers
1—M.P.A. cone (or Climax, Celestion).

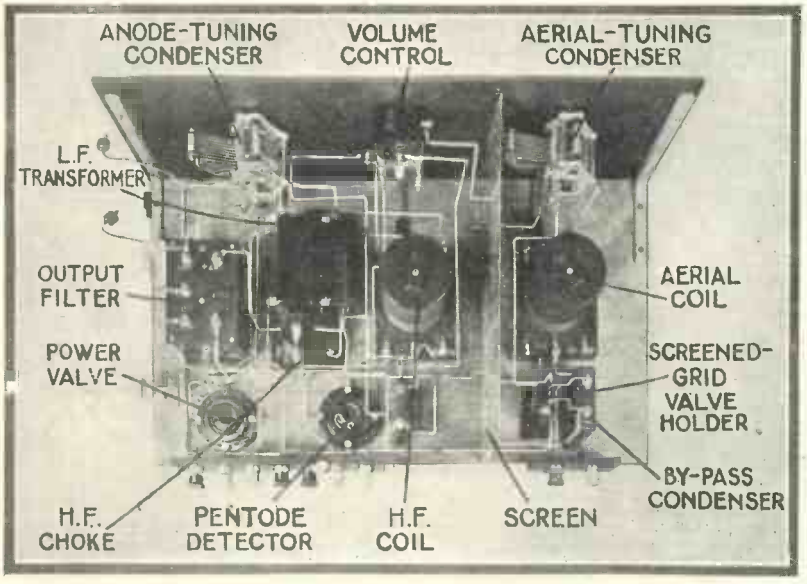
Valves
1—Mazda 215SG, 22/6 (or Osram S215, Marconi S215).
1—Cossor 230PT, 25/-.
1—Lissen P215, 12/6 (or Osram P215, Marconi P215).

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

before the detector stage, thereby avoiding any overloading of the latter, due to the presence of too strong a signal.

It is possible to tune the receiver fully in to Brookman's Park and yet to reduce the volume by means of this control to a pleasant strength of quite good quality. A medium-resistance Volustat should be used for the purpose and this, with most screened-grid valves, will be found to be satisfactory.

In some cases, however, it may not be found possible to reduce the volume quite to the required amount, and if this proves to be the case, a resistance of 20,000 ohms should be connected across the screening-grid by-pass condenser, that is to say, between the screening-grid and L.T.—. This resistance need not be wire wound, provided it is reasonably silent in operation, and its inclusion will be found to put the volume control in a thoroughly satisfactory condition. It has been omitted in the present instance because it is not always necessary.



This plan view clearly shows how all the parts are arranged in the New Q Three

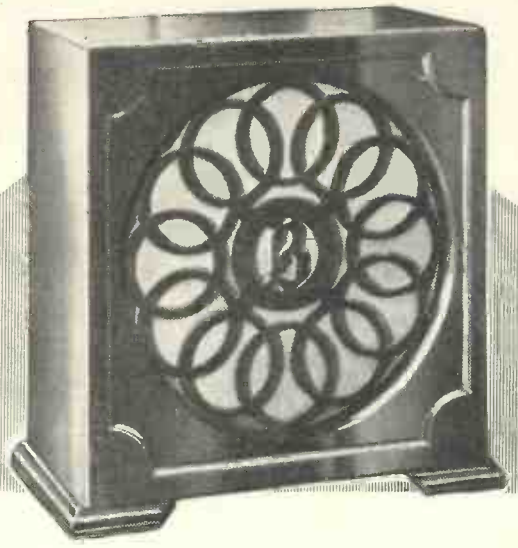
Avoiding Battery Feed-back

The only other point of interest concerning the circuit is the output stage, in which a choke-output filter has been employed. This avoids any battery feed-back which would set up whistling, when the battery ran down, or might cause the set to "motor-boat" if it were utilised with a mains unit. Otherwise, the receiver is of straightforward construction, and requires no comment.

To operate the receiver, insert a screened-grid valve in the H.F. stage, and connect the flexible lead from terminal No. 3 of the QSG coil to the anode. Insert a low-resistance pen-

(*Continued on page* 530)

BRITISH THROUGHOUT



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on the TRUTH *of these* STATEMENTS

THE new Brown "Vee" Reed principle combined with the new Brown Duplex diaphragm gives results far in advance of any other kind of loud speaker.

Only in the new Brown Duplex Loud Speaker are these revolutionary principles to be found. They are the patent of Mr. S. G. Brown who is known throughout the world as the maker of the first wireless loud speaker.

For this reason, no matter how much you have paid for a loud speaker, you have not heard results that can even be compared to the reproduction of these new Brown instruments.

But a hundred descriptive words are not worth as much to you as one minute's listening. Before you buy a loud speaker, get your Dealer to demonstrate the new Brown Duplex models. You will be more than impressed and will place your order at once.

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906 CA

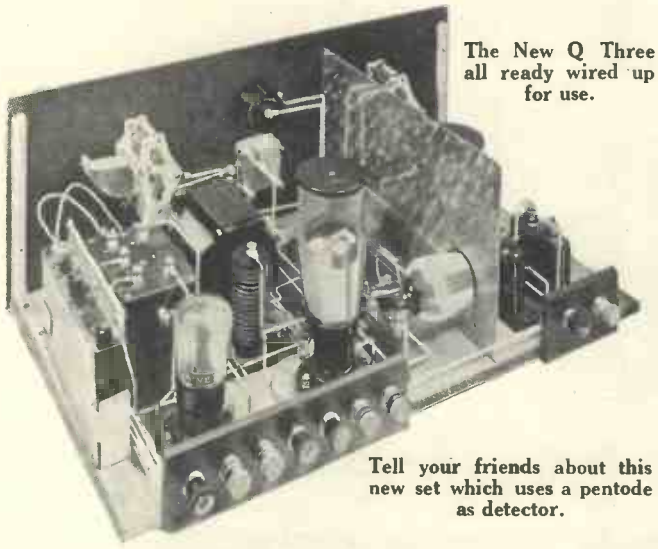
When you send your order don't forget to say you "saw it in the 'W.M.'"

The New Q Three—*Continued*

tode having an A.C. resistance of 20,000 ohms or less in the detector stage and connect a flex lead from H.T.+1 to the terminal on the side of the cap.

A suitable power valve should be incorporated in the last stage. If particular volume is required, a pentode valve may be included, although this will naturally increase the current consumption somewhat. If a pentode valve is used, however, the choke-output unit should be obtained specially for the purpose.

A normal choke-output unit is known as type P and this is employed for power valves of the ordinary type, while for pentode valves the type PP should be used as this is provided with a step-down in order to match the loud-speaker better to the valve resistance.



The New Q Three all ready wired up for use.

Tell your friends about this new set which uses a pentode as detector.

H.T.+1 should be connected to about 20 volts ; G.B.—1, the grid bias on the detector should be —3 volts, while the grid bias on the last (power) valve should be chosen in accordance with the maker's instructions. H.T.+2 may be 100 or 120 volts, or more if desired.

At first it is best to screw the Volustat towards its maximum (fully in) position, as the best operating point will be somewhere round this region. Both the Q-coil switches should either be in (long waves), or out (short waves). Do not have one in and the other out, as they will not operate satisfactorily. The receiver will then tune in the ordinary manner.

Current Consumption

One final remark may be made regarding current consumption. Despite the fact that a pentode is used for the detector, this set does not consume any more than one using a normal type of detector. The pentode is biased so that the anode current is nearly zero, in consequence of which it does not take any appreciable current from the battery.

Provided the power valve in the circuit does not take too much, therefore, readers need have no hesitation in using this receiver with a medium-size battery.

"Schools" of Radio Production

SPECIAL TENDENCIES THAT LISTENERS MAY DISCOVER

ALTHOUGH British broadcasting is several years old, the programme-builders are still working in the experimental stages, and, as I gathered from one of the Savoy Hill staff some time ago, they are not at all eager to lay down laws as to what constitutes the right way and what the wrong of broadcasting any particular item.

Encouraging News

This is encouraging news since, whatever its faults, the B.B.C. is definitely governed by an artistic rather than commercial impulse, and this, whether it be "high-brow" or "low-brow," demands time and freedom to develop.

At Savoy Hill there are men working, as it were, shoulder to shoulder, some producing jolly "radio slap stick" and others works of a "literary" value. But whatever badinage passes between the groups, there are artists on both sides putting inspiration into the work.

Although there are no hard and fast rules, certain "schools" of thought and treatment are developing, and the listener who cares to do so may detect them in the various plays which are broadcast from time to time.

One of the most outstanding of these is what I might call the "Sievking School." Mr. Sievking, who was responsible for those milestones of broadcasting, *Kaleidoscope No.* 1 and *No.* 2, is a great believer in sound effects, and has done some valuable work on their development.

Those who heard his picture of a drowsy summer day in *Kaleidoscope No.* 2—the bees, the mowing machine, and so on—will realise the possibilities of this school.

The other school of dramatic production usually takes music as its basis for "atmospherics." It would rather give a musical background of something slumberous than reproduce the sound of a mowing machine. It would rather stop its music suddenly, leaving a striking silence than bang a door.

Discovering "How It Works"

Both schools (and there are others) have their possibilities.

It seems to me the musical school requires a finer ear and more susceptibilities to follow, but for the listener who desires to get the best out of his radio, there is as much fun to be had in trying to discover the "how it works" side of an item. A. D

GET MELODY OUT OF THE MEDLEY

AND UNDISTORTED REPRODUCTION

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A QUESTION EVERY LISTENER ASKS:

Which Is the Best Volume Control?

In this article W. JAMES answers a question that every set owner asks at some time or other, and explains how volume can be controlled without introducing distortion.

A VOLUME control is admittedly a necessary part of a modern wireless receiver, if only because of the local station.

Practically everyone finds that the signals collected by the aerial when tuned to the local station are so strong that, unless the magnification provided by the set is cut down, the volume is excessive.

Probably the quality is poor as well. Anyhow, if the volume when fully tuned to the local station is not too great, the set is not a powerful one and will not reliably receive other stations.

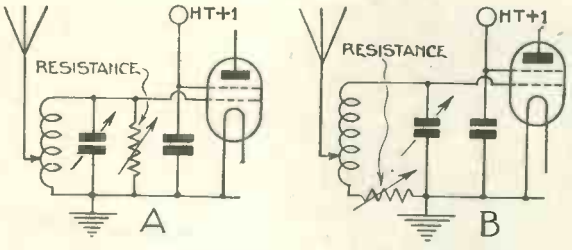

Fig. 1.—Resistance in parallel (a) and in series (b) with aerial-tuning coil

Clearly, then, the prime function of a volume control is to enable a user to regulate the volume. But this is not the only reason for including such a control.

Selectivity and quality of reproduction must be considered as well. Thus, for example, the most used volume control, reaction from the detector to one of the high-frequency circuits, undoubtedly affects selectivity and the quality.

Reaction may be considered an indirect form of volume control, however, and as it is often included in a set fitted with one of the more direct controls, will not be discussed here.

Regulating Detector Input

A volume control is normally included in one of the high-frequency circuits, in order that the input to the detector may be regulated. As is well-known, a detector may be overloaded by the application of too strong signals and will then distort.

Further, when the signals applied to the detector exceed a certain value the low-frequency amplifier will overload. Consequently, there is every reason for including a control in one of the high-frequency circuits.

But sometimes it is equally essential to employ one in the low-frequency circuit of the receiver. Thus, when the detector is of the anode-bend type, its input should preferably be kept within limits and then the actual volume be controlled by adjusting the amount of the low-frequency magnification.

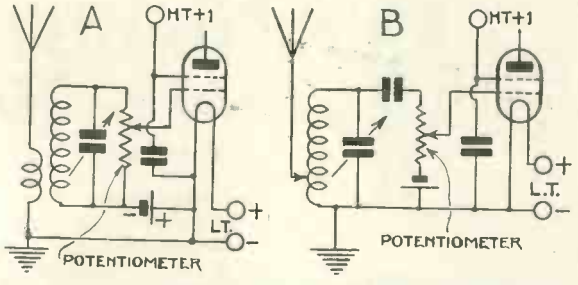

Fig. 2.—Two potentiometer arrangements for screened-grid valve sets

In sets without high-frequency amplification, too, a low-frequency control may be used.

One of the simplest controls, suitable for a "local station" type of set, comprises an adjustable resistance, connected either across the aerial-tuning coil or in series with the coil and condenser, as illustrated in Figs. 1A and 1B respectively. The adjustable shunt resistance of Fig. 1A may be of 250,000 ohms, whilst a suitable resistance for the circuit of Fig. 1B would be of 50 or 100 ohms.

These resistances will not greatly alter the tuning when they are of suitable pattern. They must be non-inductive and have the miminum of capacity in order that they shall not change the inductance or capacity of the circuit. They reduce the input to the valve by increasing the damping of the circuit. Therefore, the selectivity is varied as they are adjusted.

Broader Tuning

As the resistance of Fig. 1A is reduced, for instance, the signal strength is cut down, and the tuning of the circuit is made more broad. The resistance of Fig. 1B must, of course, be increased to reduce signal strength.

Controls of this type are not often used in sets intended for the reception of distant stations, but they are quite useful when it is suspected that the tuning is normally so sharp that the quality is poor.

A different type of control is shown in Fig. 2. Here a potentiometer is used between the aerial circuit and the grid of the first high-frequency amplifying valve. Two methods are indicated. The first, Fig. 2A, shows a potentiometer with grid bias fitted to a high-frequency transformer; and the second, Fig. 2B,

(*Continued on page* 534)

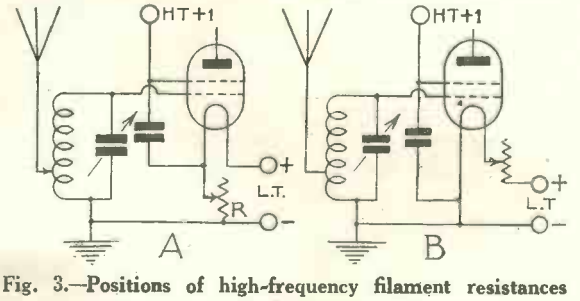

Fig. 3.—Positions of high-frequency filament resistances

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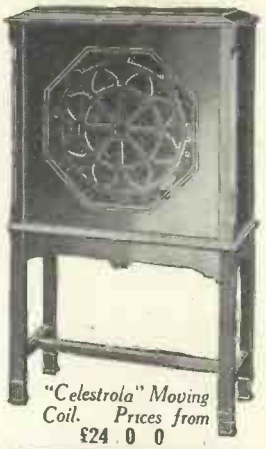

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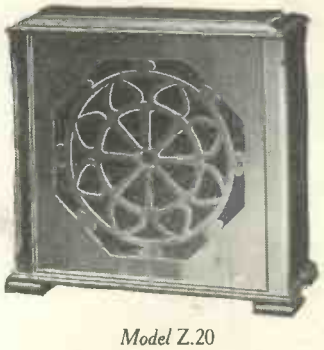

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101

Which is the Best Volume Control ?—*Continued*

showing how the method may be applied to a plain aerial circuit.

The potentiometer method looks ideal, but it is not. In the first place, the control tends to reduce the selectivity; and secondly, owing to the capacity of the valve, there is a choking effect which renders the control non-uniform.

High Grid Resistance

Thus, let us suppose the potentiometer to have a resistance of 250,000 ohms, and that the slider is set about its mid-point. Then there is, in effect, a resistance of about 120,000 ohms in series with the grid of the valve.

The effect of this will be understood when it is remembered that we often include a resistance of this value in the grid circuit of a low-frequency amplifying valve in order to prevent H.F. currents passing through.

Thus, although the potentiometer is set half way (when one might think half the voltage of the circuit was being applied to the valve), in actual fact the grid voltage of the valve is much less than half the full amount.

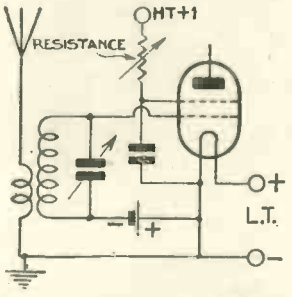


Fig. 5.—Circuit with variable screen resistance

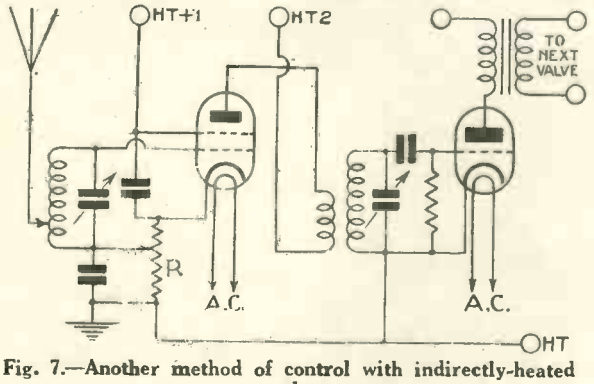


Fig. 7.—Another method of control with indirectly-heated valves

In spite of this serious drawback, however, the method is sometimes used.

Obviously, the choking effect will be minimised by employing a low-resistance potentiometer, and a value that might be used is 100,000 ohms. When the tuned-grid circuit is heavily damped, that is, when its losses are high, a resistance of this value will not materially reduce the strength.

As so often happens, a comparatively cheap and simple method may be used with better results in many instances. The arrangements of Fig. 3 will be recognised from the number of times I have included them in sets, the resistances being of the ordinary filament types. In Fig. 3A the resistance is included in the negative side of the filament circuit; in Fig. 3B in the positive side.

The arrangement of Fig. 3A is the one more often used, because a negative bias is provided for the valve. Being in the negative side of the filament circuit, the grid is biased by the amount of the voltage dropped.

Thus the effect of increasing the amount of the resistance in circuit is twofold. First, the filament current is reduced. This increases the impedance of the valve, and therefore lowers the actual amplification obtained. Secondly, the grid bias is increased and this also raises the impedance.

In the circuit of Fig. 3B the grid bias does not change with adjustment of the resistance, and more resistance is therefore needed to produce a given effect in comparison with the arrangement of Fig. 3A.

Volume control by alteration of the anode impedance of the H.F. valve is reliable and safe. It introduces no tuning complications, and has the further advantage that a loose-coupling effect may be obtained. Thus, as the resistance is increased, the tuning becomes more sharp.

A smooth-acting component is, of course, essential as noises are produced when the contact is not good.

A control not much used at present is shown in Fig. 4. It comprises a potentiometer and grid-bias battery, and also a grid leak R and condenser C. This arrangement may be preferred by some to those of Fig. 3.

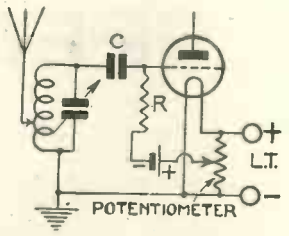


Fig. 4.—Use of potentiometer

Volume is, of course, controlled by altering the H.F. magnification. Actually, the grid bias is increased or reduced by adjustment of the potentiometer, and this varies the impedance of the valve. The grid bias is conveniently applied through the grid leak, whilst the condenser C prevents the grid battery from discharging through the leak.

The values of C and R are not critical; C can be of .001 microfarad, and R of 1 megohm or thereabouts.

Control of high-frequency magnification may also be effected when a shielded valve is used by adjusting the voltage of the shield. This may conveniently be carried out by including an adjustable resistance in the shield circuit, as in Fig. 5.

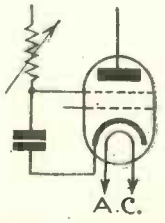


Fig. 6.—Use of resistance with indirectly-heated valve

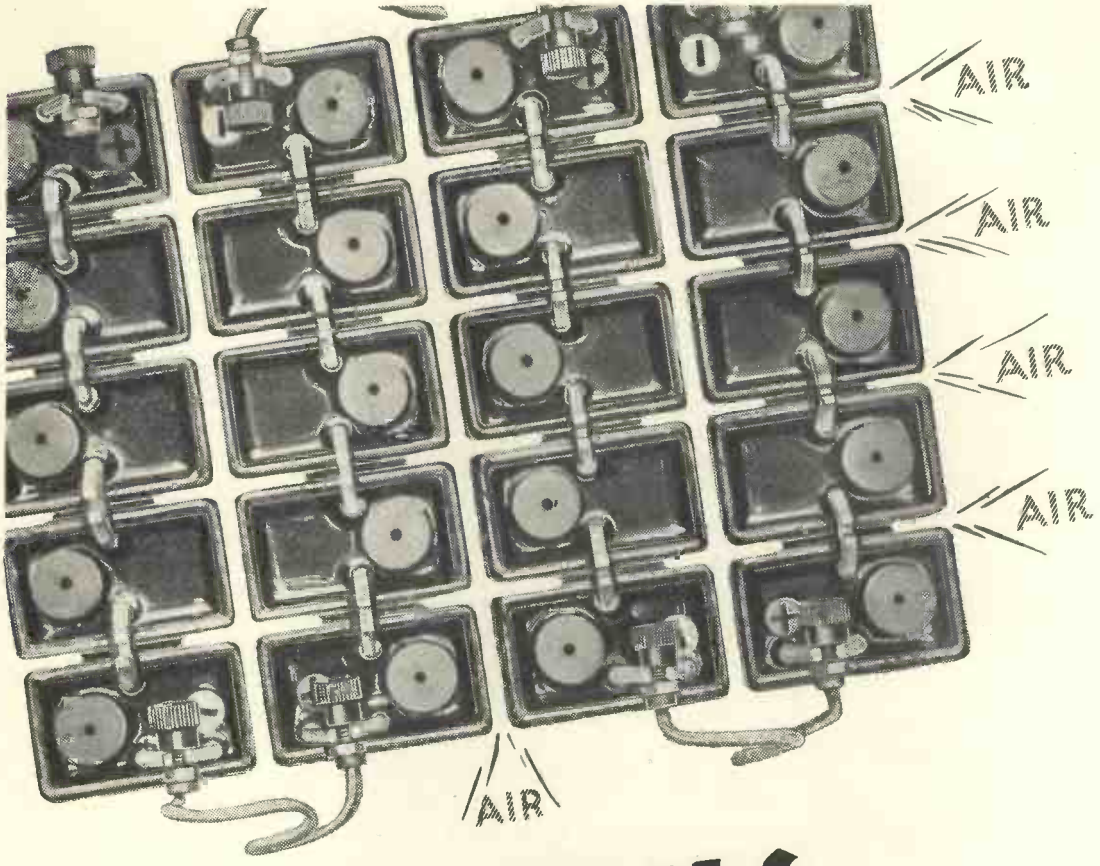
The resistance must be of the high-resistance type, as the shield current is normally a fraction of a milliampere and it should be of a pattern which does not vary during use.

Danger of Excessive Current

A compression type is generally satisfactory when it has a resistance ranging from a few hundreds to say 500,000 ohms. A certain amount of care must be exercised in adjusting the resistance, because if it is reduced to too small a value, an excessive current may pass through the valve.

The anode impedance of the valve alters with the shield voltage, with the result that the selectivity of the H.F. coupling may be controlled within certain limits.

(*Continued on page* 536)



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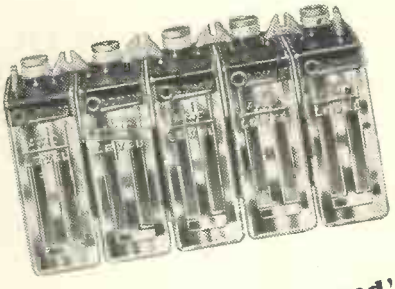

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Which is the Best Volume Control?—*Continued*

The same principle is used in the circuit of Fig. 6, which shows an H.F. valve of the indirectly-heated type. It is not possible to control a valve of this type by connecting a filament resistance in the filament circuit, as there is a considerable temperature lag.

Fall in Voltage

It is possible to employ the grid-bias method, however, and a neat way of including it is shown in Fig. 7. Here a potentiometer R is included in the cathode circuit. The anode current therefore passes through resistance R and there is a fall in voltage across it. By adjusting the sliding contact, therefore, the grid bias is varied.

This is an excellent control when the valve is of the indirectly-heated type. The resistance of R may be 1,000 ohms approximately. With this value, and an anode current of 2 milliamperes, the voltage drop is 2 volts, which is adequate. Many valves pass a greater current, however, with the result a little lower resistance may be used in some cases.

Methods of adjusting the low-frequency magnification are well-known. In one well-tried method, an adjustable resistance is used across the primary winding of the first transformer in the set, as in Fig. 8A.

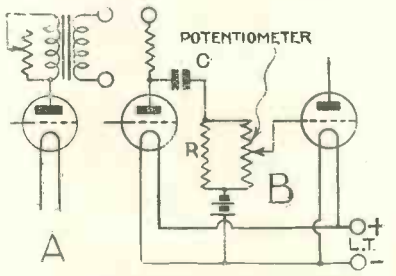

Fig. 8.—Use of resistance and potentiometer

This resistance should be adjustable from a few hundreds to, say, 100,000 ohms.

In the second method illustrated, a potentiometer is used in the grid circuit of a resistance-capacity stage. The grid condenser is marked C, and the grid leak R. This leak is not needed when the potentiometer is of the continuously variable pattern, but is useful when a stud-type is used. A usual value is from 100,000 ohms to 500,000, according to the capacity of condenser C.

When an anode-bend detector is employed with H.F. and L.F. magnification, two controls may be fitted. One of them may be used to adjust the H.F. signal strength applied to detector and the second to control the actual low-frequency magnification.

Anode-bend Distortion

An anode-bend detector distorts if it is supplied with too strong or too weak signals, and arrangements are, therefore, often provided in the best sets for the input to be regulated. A separate L.F. volume control is also fitted, as one does not always need the full output from the set.

One of the H.F. controls described may be fitted to the set, and also a control as in Fig. 8A or 8B. They are both non-distorting and do not complicate a set.

How They Anticipated Wireless!

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Shakespeare: *Hamlet.*

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"Speak the speech, I pray you, as I pronounced it to you, trippingly on the tongue; but if you mouth it, as many of your players do, I had as lief the town-crier had spoken my lines."—Shakespeare: *Hamlet.*

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"'Tis the defect of age to rail at the pleasures of youth." Mrs. Centlivre: *Basset Table.*

Tuning-in

"Few men can afford to be angry."—A. Birrell: *Obiter Dicta.*

The Listener

"The sincere controversialist is above all things a good listener."—G. K. Chesterton: *What's Wrong with the World.*

Broadcast Debates

"Our disputants put me in mind of a scuttle-fish, that when he is unable to extricate himself, blackens the water about him till he becomes invisible."—Addison: *Spectator.*

Oscillation

"You have not converted a man because you have silenced him."—Lord Morley: *On Compromise.*

Television

"I don't know where this here science is to stop, mind you; that's what bothers me.—Dickens: *Sketches by Boz.*

The Average Listener

"The English take their pleasures sadly, according to the custom of their country."—Sully: *Memoirs.*

The Burnt-out Valve

"An event has happened, upon which it is difficult to speak, and impossible to be silent."—Burke: *Impeachment of Warren Hastings.*

The New Gadget

"Man's nature is greedy of novelty."—Pliny the Elder.

The Broadcast Critics

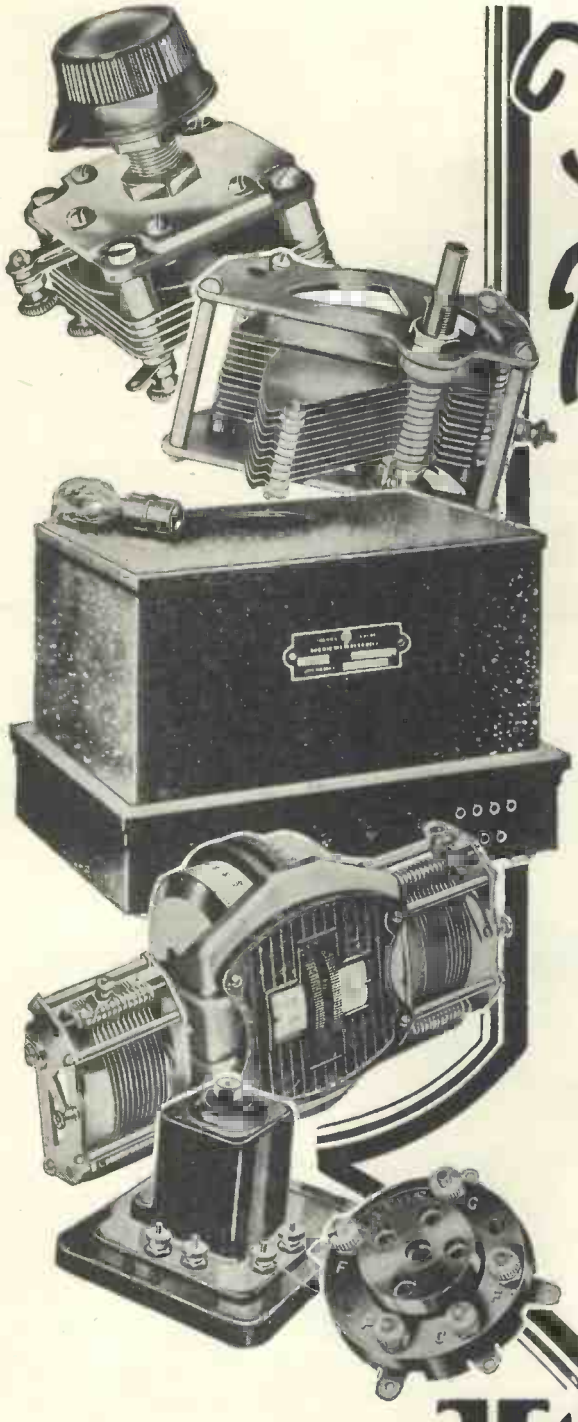
"No one minds what Jeffrey says—it is not more than a week ago that I heard him speak disrespectfully of the equator." — Sydney Smith: *Sayings.*

The New Valve

"A good man is merciful, and lendeth."—Prayer Book.

Weather Report

"When two Englishmen meet, their first talk is of the weather."—Johnson: *Idler.*



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BROADCAST MUSIC OF THE MONTH

REVIEWED BY STUDIUS

THE month of November is practically the first of the winter months, and variety is the one essential for good programmes. The orchestra has been tolerably well represented by the start of the B.B.C. Symphony Concerts, the choice of Arthur Catterall, the famous English violinist, being eminently a wise one.

A concert of foreign interest was that announced from Belfast on November 13, when the vocalist was Cornelius Bronsgeest, the German baritone who broadcast recently from 2LO also. He is well known on the Continent, and is operatic director to the Berlin broadcasting station.

For the greater part of the month, best results have been obtained through the work of the special quartets, outside bands, and instrumentalists. The Miami Dance Band is one of the most popular of dance bands, and heard chiefly through 5XX; the bands, too, of Moschetto and Alphonse du Clos, on a higher musical plane, are invariably welcome. Among newcomers have been Fred Kitchen at the Astoria, Brixton.

On the classical side, the concerted music by Gershom Parkington and his quartet of players, the John Fry Quartet, and a new combination, heard through 5GB, known as the D'Alton Quartet, consisting of four members of a Northampton family, who have previously appeared with Mario de Pietro and his mandoline and guitar orchestra, were good.

Including the world-famous artists who are appearing in the Symphony series at Queen's Hall, we have had a good measure of instrumentalists. In the concert of November 9, conducted by Sir Landon Ronald, the two Hungarian sister violinists, Adila Fachiris and Jelly D'Aranyi, were the stars.

Others have been Eduard Steurmann, the brilliant pianist, Adolphe Hallis, and Paul Belinfante, the violinist. A clever young 'cellist also figured prominently in Ursula Katrovitch, a Russian musician.

Welcome re-appearances have also been made by the Aeolian Players, a combination between Joseph Slater, Gordon Bryam and Rebecca

(*Continued on page* 538)

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Sandy Rowan, humorist

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Broadcast Music of the Month—*Cont.*

Gwynneth Edwards

Clarke, one and all soloists of merit.

In the provinces, some artists of interest have been Alec Sim, the Scottish violinist heard from Aberdeen very frequently, and known also for his fine Beltona records. From Belfast was heard the new Radio Quartet, and from Eastbourne, Tom Jones and his Grand Hotel Orchestra. Mr. Jones fills the place of Albert Sandler most admirably.

There is naturally a preponderance of singers in every programme, but under the new regional system, it is worth noting that there is far more room for improvement in diction than before. The voice is heard, but the words are apt to be lost. Whether this is a defect that can be overcome or not, it is hard to say. The best known operatic and concert artists have been heard, but even with these, the change has proved the existence of this difficulty.

Tom Jones

Elsie Cochrane

Amongst the finest voices, one must mention Olga Haley, known for her many classical recitals, as well as concert-hall appearances. From 5XX were heard Dennis Noble and Eda Bennie, late of the B.N.O.C. In the provinces, also, mention should be made of Eliot Dobie, the Scottish baritone, noted as well for his Beltona records, and A. Robson, also a well-known Scottish artist.

Artists who have made noteworthy appearances before the microphone include Gwynneth Edwards, Elsie Cochrane, and Marjorie Dixon.

Julian Rose, although by no means a perfect impersonator of Hebrew characters, still led off the month by his rather free translation of *The Merchant of Venice* into *Ikey Gets His*. Clapham and Dwyer with their new 1929 Concert Party, "5GB Calling," made a brave attempt to recall holiday memories. Of capital account, also, was the programme with Tommy Handley, Yvette Darnac, and Clarice Mayne.

Ronald Frankau could do with stronger material, but his artists, known as the Cabaret Kittens, in the sketch, *Up to the Scratch*, reached its third edition on November 13.

Stephen Wearing

Marjorie Dixon

Elliot Dobie, bass baritone

Television would have helped the representation of a real Russian cabaret from 2LO on November 7, but the effects were as strong as could be expected. Built on, more or less, familiar lines, the vaudeville programme of November 8 from 5GB, included Tommy Handley again, with fresh songs at last; Helen Alston, always a popular singer; and Jack Rickards, Winifred Dunk and the two old favourites, Pitt and Marks.

With plays, we have been a little more fortunate this month. Truly, we had inflicted the boresome Shaw play, *Captain Brassbound's Conversion*, which is not so clever as its author believes, but it was redeemed by the adaptation of Joseph Conrad's *Typhoon*, and Compton Mackenzie's *Carnival*, the last adapted for the microphone by Holt Marvel.

Ursula Kantrowitch, 'cellist

Stanley Kaye, pianist

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To say that the Brookman's Three is the best set I have ever built is no mere extravagance of words. The results, on an indoor aerial, are briefly as follows :

Long waves : all the stations shown on the tuning chart given on page 344 come in at good loud-speaker strength. 5XX, strange to say, is the weakest of these and Hilversum the strongest.

On the medium waves, the number of stations on the loud-speaker is too numerous to detail. Incidentally, Brookman's Park comes in at such volume that use of the volume control is absolutely necessary.

I hope you will pass on my quota of cheers to the designer.

P.S.—Selectivity excellent.

ANOTHER reader at Dover finds the Brookman's Three especially selective on the long waves :

Having last week made up the Brookman's Three, I thought you would like to know my opinion of it.

I may say I have made up many sets, from super-hets, etc., and I find this set to be one of the best I have heard and, what is most important here, that it is very selective on the *long-wave band*, where I find most sets fail.

I can with the Brookman's Three separate *completely* Daventry 5XX, Zeesen, and Eiffel Tower, which is a very good test in this part of the world.

Of course, on the short waves it is also very selective and I have up to date, in under a week, received nineteen medium-wave stations and eight long-wavers.

I have used the components you specify, except for Remler condensers and a Ferranti AF5 transformer.

I may say I use as a loud-speaker the linen-diaphragm double cone as described in *Amateur Wireless* some time ago, which I think is one of the best I have heard.

◆ ◆ ◆

LODESTONE MOVING-COIL LOUD-SPEAKER

SPECIALLY designed for the WIRELESS MAGAZINE, *W. James' Lodestone Moving-coil Loud-speaker calls forth praise wherever it is heard. Here is a comment from a Wembley reader :*

I am writing to you to express my appreciation of the wonderful reproduction obtained from Mr. James' Lodestone Moving-coil Loud-speaker.

I also wish to thank and congratulate the makers, Whiteley, Boneham & Co., Ltd., for such perfect production.

I am using the speaker after the Dubilier S.G. Four (Toreador).

The letters from readers reproduced here are something more than just praise for the WIRELESS MAGAZINE—they are a definite help to the listener who intends to build a new set, showing as they do the merits of various types of receivers in different localities.

Remember that full-size blueprints of and back copies describing most of these sets are available as indicated on page 469 of this issue.

Readers are invited to send us photographs of WIRELESS MAGAZINE receivers they have built; for each one printed we shall pay half a guinea. The prints must be sharp and clear for reproduction.

DRUM MAJOR

A READER at Hornsey has obtained excellent results with the Drum Major (WIRELESS MAGAZINE, *April*, 1929). *Read what he has to say about it :*

I am sending you my impressions of the Drum Major, which I have made. I must say that I do not think you would recognize it if you saw it, as it is mostly built with parts from an ancient four-valve set I bought about three years ago, that is, before I built your Nomad Six, which still retains pride of place as a family entertainer.

From experience gained with the bigger set, a milliammeter was incorporated in the Drum Major, as it was primarily built for quality programmes from London and 5GB. These two stations are really worth listening to on the Drum Major as the last valve is a super-power type taking 15 milliamperes at 150 volts.

The Drum Major also has quite a useful log of foreign stations, the chief being Nurnberg, Cologne, Turin, Toulouse and Brussels, although of course for foreign programmes the Nomad comes into its own, as the great range and terrific volume of this set make the results comparable to a programme from the local station.

The two sets are sharing an aerial and earth between them, either set being brought into use by means of switches on the wall which cut one set right off when the other is in use. Both sets are running from the mains, and the 2-microfarad earth condensers are mounted in the sets so that the mains units are treated as ordinary H.T. batteries and the earth lead from the sets is not broken.

This, I think, is much the best way as the earth lead can be as short and direct as if using batteries and, furthermore, the earth terminal on the set is not live, so no shock can be felt if anyone touches it.

The mains unit for the Nomad is an Ekco 3V supplying four voltages, the last at 30 milliamperes and the unit for the Drum Major was described in the issue for March, 1928, to supply both H.T. and L.T., so that the Drum Major has practically been turned into an all-mains set, but with the advantage that the best possible valves for each stage can be used.

The valves are four-volt Mullards, as used in the Nomad. Thank your staff for two really good sets.

◆ ◆ ◆

CHUMMY FOUR

A MOST useful report on W. James' Chummy Four (WIRELESS MAGAZINE, *June*, 1929) *has been received from a Birmingham reader, who recently made an extended tour in the North :*

You will perhaps be interested in my results with the Chummy Four.

At first I had some trouble, but your correspondence people did all they could to help me, and in the end the fault was traced down to a defective coil. When this was rectified the set became alive, and we took it on a tour with us this holiday and derived a great amount of pleasure and satisfaction, besides some very interesting data which I think you might be interested in.

In the Midlands 5XX comes in with enormous volume and 5GB comes in with great volume. My home does not appear to be a particularly good spot, as I have noticed with other sets, but after dark several stations—Toulouse, Hamburg and Manchester—sometimes come in with great strength.

The first place we tried the Chummy Four on tour was at Doncaster. Here 5XX was very powerful. The next place was Hornsey, near Bridlington; 5XX powerful and 5GB very good. This was at 9 o'clock in the evening. Our next call was at Barnard Castle in the Pennines. 5XX came in here at very nice loud-speaker strength; 5GB we could not get, but Manchester came in at nice strength.

Stopping for a picnic near Gretna Green, 5XX came in at a nice loud-speaker strength, but we had to use full reaction here owing to slight fading. Strangely, at Dumfries, some 30 or 40 miles further on, 5XX came in about the same strength, but no fading. The same applies to Castle Douglas.

The next day we rode round the Mull of Galloway and at the lighthouse there 5XX came in very loud indeed, but Manchester one could only just hear; strangely, I could not pick up Belfast.

At Stranraer, 5XX was very good. We next tried the set at Kilmarnock, but here 5XX was very, very weak. Glasgow came in very good indeed.

(*Continued on page* 544)

Some Famous "W.M." Sets—*Continued*

At Sanquher, which is on the Mountain Road about half way between Glasgow and the Border, we could not get a trace of 5XX, but Glasgow was very good. We also tried the set in the Mountain Pass, Dalvein, but we could only get 5XX about phone strength, and we could not pick up Glasgow.

Next we stayed at Keswick a few days, and here we were right under the shadow of Skiddaw and 5XX came in very, very weak, but we put an outside temporary aerial from a tree to the farm, and here the set became immediately wonderful, and we could get 5XX, Manchester, Glasgow and one foreigner very nicely indeed; this appears to be a real dead spot, because I have heard of them not getting very good results with four valves up there, usually having to use five.

We also tried the set on the Cotswolds, near Broadway, and 5XX and 5GB came in like a true orchestra.

I think you will agree with me that this is rather a useful test, and proves to me that the set is far above the average, and we are, therefore, delighted with it.

ANOTHER reader, writing from Munich, tells a tale of woe—about getting his Chummy into Switzerland. He got good results once there, however :

As you like hearing what your readers think of WIRELESS MAGAZINE sets, I should like to tell you of my experiences with the Chummy Four on the Continent.

When, some months ago, I read in the WIRELESS MAGAZINE that Switzerland made difficulties about taking portable sets into the country, I was inclined to disagree. I now heartily endorse that statement.

Last year with another set I had no trouble at all. I wrote in advance to the post-office of the town I was going to, and obtained a licence. At the customs examination at Bale I produced the licence, the set was weighed, I received a yellow form, and paid 8 francs. On leaving the country I produced my yellow form and received my money back. This year I determined to take my Chummy Four with me. I accordingly wrote and got my licence as before. It was a slip of green paper stamped by the post-office and having written on the back "Concession Radio, 8 Août au 8 Septembre."

On producing this at Bale, they told me it was not a licence.

"But," I protested, "it has on it 'Concession Radio.'" "You might have written that yourself," was the reply.

There was a great deal of trouble and at the end of 40 minutes the gentleman produced a book of forms—white, red, and yellow. After weighing the set and writing for about three minutes, he said : "What make?"

I replied that I had made it myself. He repeated his question and I gave the same reply. He then called another official, who asked the same question. I replied that I was not ignorant of French, as the other man seemed to think I was, and that I had made it myself.

They then stamped the set with the customs seal and demanded 15 francs for the weight of the set and 20 francs for not having a licence. I pointed out that the weight of the set was less this year and yet the fee was nearly double, but they merely shrugged their shoulders.

I managed to get back the 20 francs, by much arguing, from the post-office. My advice is: "Don't take a set to Switzerland."

Once there, the Chummy Four worked splendidly, and was the envy of everyone. Rome, Milan, Turin, Toulouse, Lausanne, and two German stations being available any night at full loud-speaker strength. I was also able to get various other stations, unidentified, but conditions varied. Atmospherics were very prevalent.

I got the set into Germany without any bother whatever. No paying at the frontier for the weight, and no licence to buy, although I shall be here for some months.

Here I get the local and numerous German stations—Toulouse, Turin, and one unidentified station, probably Polish. 5GB comes in at weak phone strength, and I cannot get Vienna at all, although I can often get it in London. Atmospherics are very bad at the moment.

I can certainly say that the Chummy Four is the greatest boon; I am always sure of getting several programmes.

◆ ◆ ◆

TOUCHSTONE FOUR

A STATION at nearly every degree of the dial is a Ponders End reader's record with the W. James' Touchstone (WIRELESS MAGAZINE, *November*, 1928), *on which he has received thirty-one stations at loud-speaker strength (without reaction) :*

I am writing to you to express my appreciation of the Touchstone four-valve set. I built up the receiver exactly as specified, except that I am using a Ferranti AF5 transformer. I have also built up separate from the receiver a choke-filter output. (R.I. filter choke and 2-microfarad Dubilier condenser.)

The set behaves very well; as for selectivity, it is of the highest order. I have often been sceptical when I have read of sets that get a station nearly every degree of the dial but, believe me, I have logged thirty-one stations on the loud-speaker (Celestion C12), all identified.

I am using 4-volt valves in the following order : Ediswan HF410, Cossor 410HF, Cossor 410HF, and Mullard PM254. Also Exide 120-volt type WH accumulator.

My aerial has an effective height of 34 ft.; for an earth I am using the water main. The total anode-current consumption as shown by a Bulgin meter is 15 milliamperes.

With best thanks to the WIRELESS MAGAZINE for such a fine set.

"RESULTS are beyond expectation," is the comment of an East London reader, who had previously used another four-valve set designed by W. James some years ago :

Re my correspondence with you, and a personal interview, in reference to my difficulties with the Touchstone.

On your final advice, I tested the receiver stage by stage, and found that although the filament of the super power valve was not broken, it failed to amplify.

This has now been replaced, and the results are beyond expectation. I obtained splendid results with a four-valver designed by W. James some years ago, but I consider the Touchstone much in advance.

◆ ◆ ◆

BINOWAVE FOUR

THIS fine four-valver (WIRELESS MAGAZINE, *January*, 1929) *made use of the first dual-range coils to be designed by W. James. The following letter from an Eccleshall (Stafford) reader gives a good idea of its capabilities :*

I constructed the set a week ago, to replace the Inceptor 3, because I wanted a set to cover both wavelength ranges without coil changing. I have made two slight changes in the design and circuit, (1) an upright panel, and (2) I have included a jack switch in the plate circuit of the third valve to allow for the use of three valves only.

I constructed both the coils myself, in accordance with the directions given in a previous issue of your paper.

The results obtained are nothing short of marvellous. I don't think I can do better than give a list of stations to show what the set is capable of :

LONG WAVES

*Huizen	*Eiffel Tower
Lathi	Motala
*Radio Paris	*Kalundborg
*Zeesen	Hilversum
*Daventry	Croydon, etc.

SHORT WAVES

Hanover	Glasgow	*Stoke
*Budapest	*Frankfurt	Berlin relay
Munich	Wilno	*Bratislava
Vienna	*Toulouse	Königsberg
*Brussels	*Manchester	*Turin
*Milan	*Hamburg	Barcelona
Olso	*Stuttgart	Moravska
Prague	*London	Ostrava
*Daventry	Graz	Newcastle
*Langenberg	Barcelona	Leipzig
Lyon	Brno	*Horby
Zurich	Cadiz	Toulouse
Paris (PTT)	*Gleiwitz	*Breslau
Rome	Goteberg	Belfast
Madrid	Cardiff	*Nurnberg
*Berlin	Aberdeen	Munster
Katowice	Hilversum	*Cologne

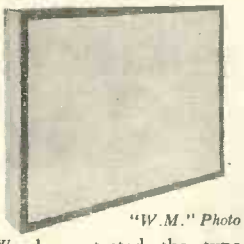
A total of about 60.

Those marked with a * are received at good loud-speaker strength on three valves, the remainder on four. I use Cossor valves throughout.

[Readers who wish to build this set will be glad to know that old-type Binowave coils are still obtainable from Oliver Pell Control, Ltd., the Makers of Varley Components.—ED.]

LOUD-SPEAKER GUIDE—Continued from page 476

ULTRA ✷



"W.M." Photo

We have tested the type F Ultra Air-Chrome loud-speaker and found it to possess all the inherently good characteristics of the double-diaphragm principle. Brilliant tone and great sensitivity are noteworthy. Four chassis are available, the prices ranging from 42s. to 105s. The smallest of these prices is admirable for portable sets.

CELESTION ✷

For constructors of portable sets and radio gramophones, the Celestion loud-speaker shells are recommended. The type C range have a back adjustment. Prices £3 5s. to £5 17s. 6d. The ZB range have a front adjustment; prices as before. The medium overall sizes in each range are 13½ by 13½ by 5 and 14¼ by 14¼ by 4 in.

CELESTION

Giving sufficient volume to fill a hall, if necessary, the Celestion model C24 loud-speaker is housed in an extremely ornate and handsome cabinet. A large diaphragm 24 in. in diameter is incorporated. The price in walnut is £25; mahogany, £21; and oak, £20.

CELESTION

Although the smallest and lowest price of the many Celestion models, type C10 retains all the characteristic Celestion features. Extreme sensitivity is claimed. A 10-in. reinforced diaphragm is used. In mahogany, the price is £3 17s. 6d.; and in oak, £3 15s.

ORMOND ✷

A very inexpensive cabinet cone loud-speaker is the Ormond type R452. It is fitted with the new Ormond four-pole adjustable unit. An even response, faithfulness of reproduction, and a capacity for handling great volume are claims we found justified. The price in oak is 29s. 6d. We consider this loud-speaker to be really excellent value for money.

"W.M." Photo

CELESTION ✷

Model C12 is the standard Celestion loud-speaker that has been so universally popular since its inception. The diaphragm is 12 in. in diameter, and the resistance is 2,000 ohms. In walnut it is 6 guineas; in mahogany, £5 17s. 6d.; and in oak, £5 12s. 6d.

BLUE SPOT ✷

In our test of the Blue Spot model 49Z loud-speaker, price 2 guineas, we were agreeably impressed with both the sensitivity, and the quality of reproduction. This is on the high-pitched side, but quite pleasing. It is of special value with small-power sets, such as a simple two-valver.

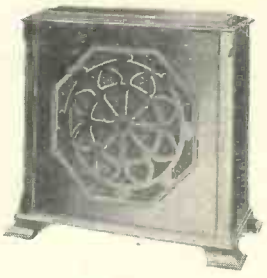
"W.M." Photo

"W.M." Photo

CELESTION ✷

In the Celestion model Z20, the designers anticipate that this loud-speaker will become the new standard Celestion. It incorporates a sensitive electro-magnetic reed movement, working in conjunction with the Celestion reinforced diaphragm. The price in mahogany is £8 5s.; and in oak, £7 15s. Made to special order, the walnut model is £9.

CELESTION



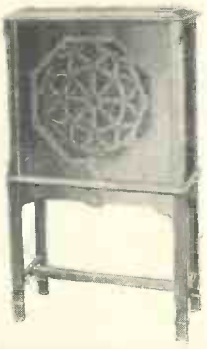
With its specially attached diaphragm, the new Celestion model Z25 is claimed to be of very advanced design. Its appeal is to both the music-lover and the cabinet connoisseur. The price in mahogany is 15 guineas, and in oak, £15.

BROWN ✷

"W.M." Photo

The new Brown V10 Duplex loud-speaker pleased us immensely during a recent test. There is plenty of bass of a natural quality, and the high notes are particularly well evident. It is sensitive to weak signals. The price is £5 10s.

CELESTION



Celestion's first moving-coil loud-speaker is the Celestrola. A 6-volt D.C. model with speech transformer and filter is available for £25. Other models for A.C. and D.C. mains are also listed.

A star (✷) indicates that the loud-speaker has actually been tested in the "W.M." Laboratories.

Continued on page 548

LOUD-SPEAKER GUIDE—Continued from page 546

EPOCH

The Epoch model 66P.M. moving-coil loud-speaker requires no external excitation. The permanency of the magnet is guaranteed for two years. The price of the complete unit is £6 15s.

GRASSMAN ✱

The new Grassman loud-speaker unit, in spite of a wide gap in the armature movement, is extremely sensitive. It has the advantage of being difficult to overload, so that a large output of sound is possible without any trace of rattle. The response is good for all frequencies. Its price is 19s. 6d.

SYMPHONY ✱

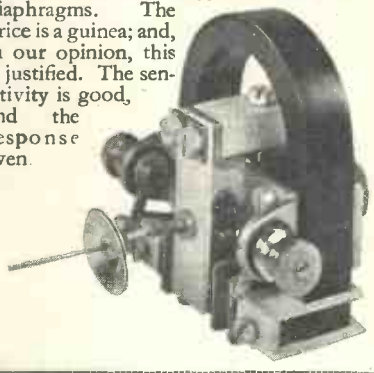
The Symphony loud-speaker unit is marketed complete with packing washers, cone washers and strip of felt for cone for the home-construction of an efficient cone loud-speaker. The price is 15s.; and our tests of the unit show that it is capable of good results when properly assembled. It has average sensitivity. There is no appreciable emphasis of any particular frequency.

MAGNAVOX ✱

In our test of the Magnavox X core moving-coil loud-speaker, we concluded that this model is one of the best we have ever heard. The bass is exceptionally good. There is no papery effect on the high notes. Prices vary between £8 5s. and £11 for D.C. and A.C. models. These loud-speakers are provided with two different sizes of cone, namely 10½ and 7¾ in., and for all kinds of supply.

G.E.C. ✱

Extensive test of the Gecophone Stork loud-speaker unit prove it to be a highly efficient drive for all types of cones and diaphragms. The price is a guinea; and, in our opinion, this is justified. The sensitivity is good, and the response even.



A star (✱) indicates that the loud-speaker has actually been tested in the "W.M." laboratories.

WITH OUR CARTOONIST in the STUDIOS

Caricatures by LISSENDEN

Above you see Professor W. G. de Burgh, who has been giving a series of talks on "The Meaning of Ethics" for six weeks

Colonel J. T. C. Moore-Brabazon (seen on the left) has been giving a similar series of talks on motoring

Every listener has heard Albert Sammons (seen below). He is a violinist of unusual merit, and is a frequent broadcaster. He was solo violinist at the popular Queen's Hall Promenade Concerts

Molly's Radio Education!

A Story with A Moral: By JAY COOTE

"HOW you do it beats me!" Molly, a very attractive cousin of mine, evinces considerable interest in radio, and "taking pity," as she terms it, on an old bachelor, periodically invites herself to my flat, towards the tea-time hour. The real reason of the visit, is, I believe, the fascination experienced in turning the knobs of my wireless receiver.

On these occasions, I have been usually dragged from a comfortable armchair and an interesting book to act as guide and mentor for a tour around Europe, and the innumerable questions fired at me as to "What's on now?" have usually left me in a state of utter prostration.

Improving the Mind

Molly, who will be twenty next birthday, if I remember rightly, is intent on improving her mind; her education, she considers, in the matter of languages, has been sadly neglected, and because in view of a smattering of foreign tongues I have been able to identify the nature of the various transmissions captured, I am called upon to act as interpreter whenever she strikes a foreign station.

I had switched off the set following an announcement to the effect that a Dutch lady would now recite some poem of which I had not clearly heard the title.

"Quite simple," I remarked, "when you know."

"Exactly!" retorted Molly, "and it's just what I want to know. So many of these stations give courses in Italian, French, German and other languages. I want to learn them all."

"When you were at school . . ." I began.

"When I was at school," said Molly, "I conjugated *ad nauseam* the verb to love in German, French, and Latin, in every conceivable tense, and you must admit that this knowledge would not be of much assistance to me in asking for a meal at any foreign hotel."

"Why not practise on me?" I said, "it might all come back to you."

Molly did not deign to reply, but she gave an audible sniff; it sounded contemptuous.

"And you propose?" I queried.

"To buy a wireless receiver and follow the courses regularly from both the home and foreign stations."

This ambition, I considered, was one worthy of encouragement, and we discussed ways and means, finally deciding on a visit to a West-End store, which in due course installed the necessary apparatus in her home. Both her father and mother were pleased with the arrangement which, personally, I felt was a good one inasmuch as I fully anticipated, at short intervals, a series of SOS calls demanding immediate assistance.

I was doomed, however, to disappointment, and not having heard from her for nearly ten days, I made an excuse to telephone about some trivial matter.

"Getting on?" I asked. "What language have you mastered?"

"None yet, but I am making good headway. I'm taking five courses," she added, "and you'll soon see what I can do."

"Stick to it," I enjoined, "and when you have time, drop me a line in, say, French or German or Italian. I should like to see what progress you are making," and I rang off.

As a matter of fact, I thought that she had undertaken too big a task and that the simultaneous assimilation of some five lessons per day was likely to cause mental indigestion. That she had undertaken the study of several languages was demonstrated in a short note received from her some days later. It read as follows:

A Good Start

"Mon caro Vetter Dick." As a start this was decidedly good; it proved *ipso facto* that French, Italian, and German were part of the curriculum, and the combination was the nearest approach to an international tongue that I had ever met. But more was to follow:

"Si Ich scrivere these queleques linien, es est solamente pour you zeigen combien io progrès gemacht habe," and so on. It was quite a long letter, rather rambling at times, but it comprised, I felt certain, the major portion of her vocabulary in at least four languages, and obviously was the result of a great effort.

In the text, so far as I could gather, reference was made to me in the guise of a French *cousin*, a German *Vetter* and, apparently influenced by a wave of affection, as a *carissimo cugino*, which sounded quite refreshing.

If anything, the work showed signs of originality, for notwithstanding the conventional phrases invariably adopted by the teachers, she made no reference to pens, ink, and paper, the gardener's irrepressible child, or to a visit to the railway station.

Moreover, she scrupulously avoided such involved sentences as: "I have one son and no daughter; two sons and one daughter; no son but three daughters," or, "Yes, I have a brother and two sisters; I have only one brother; I have no brothers and no sisters," so typical of the indefinite and vague answers given by the authors of conversational books.

Two Heads Better than One

That afternoon, proud of her work, Molly came to tea; we were, she said, to take these courses together, as two heads were better than one. It would also, she thought, make her work much easier, as she had often desired my assistance.

So you see, when the local station broadcast an Italian lesson, we both sat facing the loud-speaker, she with a notebook on her knees, and a pencil ready to take down the dictation and I—well——

We made considerable progress, I admit, and such words as *Io t'amo, carissima, un bacio* and other endearing terms usually associated with romantic operas came readily to my lips. Her vocabulary—with illustrations—was rapidly extended.

How the lessons progressed does not interest you in the least, but we are spending our honeymoon in France, Germany, Switzerland, and Italy. It would be such a pity if her language courses were wasted, and I am entirely with you in maintaining that education by radio is a blessing in disguise.

ALL POSITION C.A.V NON-SPILLABLE

Weight for weight and size for size the C.A.V. Jelly Acid Battery has a better capacity and higher efficiency than other non-spillable types. The special construction of the container, and the use of Jelly Acid allows it to be placed and used in any position, without the risk of spilt acid. It is both the safest and best for your portable. Recommended in the constructional articles of the Wireless Press, and standardised in many popular portable sets, the C.A.V. Jelly Acid Battery, provides the most reliable and the safest non-spillable battery obtainable.

The New C.A.V: H.T. Accumulator

Have you had details of our new range of high tension accumulators? Supplied in 10 volt units or 30 volt groups of 2,500 5,000 and 10,000 milliamp hour capacity, this entirely new and original H.T. is suitable for every class of receiver.

The new C.A.V. Radio accumulator catalogue and battery maintenance handbook will be supplied free upon application.

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The New C.A.V. H.T. Accumulator

To those seeking a perfect source of H.T. current we recommend the new C.A.V. H.T. Accumulator. Absolutely silent in operation, handsome and compact, inexpensive in first cost and cheaply maintained.

The Original Jelly Acid Battery.

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VACUUM RESISTANCES

EDISWAN GLASS-ENCLOSED VACUUM RESISTANCES.

(Grid Leak or Anode) Ediswan are the only British made resistances of this type on the market. All resistances are thoroughly tested before leaving the works, and are absolutely accurate and noiseless in operation. Obtainable in values from 5,000 ohms to 5 megohms. Overall length, 45 mm.

CARTRIDGE CONDENSERS.

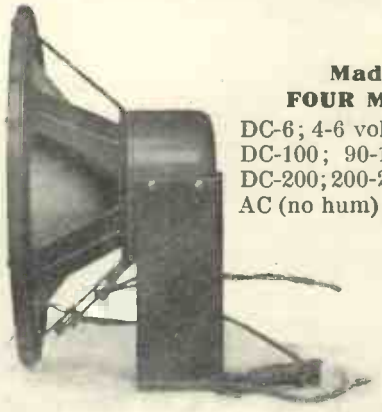
These condensers are ideal for the man who likes to experiment. In a second, you can pull one out of the clips and put in another of a different value. They are made in values from .0001 mfd. to .001 mfd. Overall length, 45 mm.

For the best results.

W 9

Made only by The Edison Swan Electric Co., Ltd., Head Office Ediswan Radio Division and West-End Showrooms 1a Newman Street, Oxford Street, W.1. 'Phone: Museum 9801

THE INCOMPARABLE "GRASSMANN" DYNAMIC SPEAKER



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DC-100; 90-100 v.
DC-200; 200-230 v.
} Each £4-17-6

AC (no hum) £8-5-0

FREE *Interesting 16pp. Booklet, with circuits, regarding this DYNAMIC SPEAKER in particular and others in general.*

AMATEUR WIRELESS said (10. 6. 29):—

"Above the average, for its sensitivity and uniformity of response throughout the audible register were notable features. Some moving-coil speakers have a reputation for unduly accentuating the bass, even when the coil impedance is correctly matched to the preceding valve or valves; in this speaker, however, the treble and bass appeared well matched."

CLAUDE LYONS LTD.
76 OLDHALL STREET, LIVERPOOL

If You Have Electric Light in the House, Says ALAN S. HUNTER,

USE A MAINS-OPERATED SET

THANKS to a big and concerted push by radio manufacturers, mains-operated sets have captured the set-buying public's imagination.

By abolishing batteries, the nuisance of run-down accumulators and battery renewals, the mains-operated set made a tremendous appeal to visitors to Olympia, where, during the Radio Exhibition, the huge increase in the number and variety of mains-operated sets was the outstanding feature of the show.

What Are They?

What are these all-mains sets, and wherein lies their alleged superiority over the battery-operated set that has served, and is serving, most of us so well?

These and other pertinent questions are being asked by WIRELESS MAGAZINE readers, who want to know whether the all-from-the-mains cry is merely a stunt sales policy or a definite change in radio fashions; radio *has* fashions, as was surely proved last year, when portables were considered the last word in reception. But at this year's exhibition, portables, although still in great demand, have to yield in interest to the onslaught of the all-from-the-mains campaign.

As a matter of fact, the power supply of the set is the most important thing to be considered by the set buyer. Because this is so, every prospective purchaser of a set, and there are many WIRELESS MAGAZINE readers who come within this category, will welcome an explanation as to the superiority of the all-mains set. That is the object of this article.

Mains Limitations

Mains-operated sets naturally require an electric-light supply to operate them, and since the number of set buyers with mains in their homes must be considerably smaller than the number without, this new type of set cannot possibly oust the battery operated set from general use, at least, not for several years to come.

We must retain a sense of proportion when discussing mains sets; some manufacturers appear to have run away with the idea that the whole country has miraculously been wired with electric-light supplies; in this, they give the Central Electricity Board rather more credit than their slowly developing "grid" system of distributing electricity merits!

Up to a reasonable point the development of mains sets in this

The Marconiphone model 39 is available as a mains-operated set. It uses a screened-grid valve, and the price is £21

country is quite logical; for it must be true that those best in a position to spend money on a set are usually those who have a sufficient income to insist upon the luxury of electric light; it is still a luxury in all but the newest houses.

It is the set buyer with electric-light in his house who, as the most intimately interested purchaser of a mains set, needs to be given a lead in the matter. I say quite unconditionally that such set buyers would be ill-advised to consider buying a battery-operated set; they should back up the efforts of the manufacturers in popularising mains-operated sets as far as the distribution of electricity permits. The mains-operated set is not a snare, but is a decided and important factor in the improvement of broadcast reception.

A report on this Kolster-Brandes KB169 all-electric three-valver set will be published next month. Its price is £17 10s.

Quality and Maintenance

As a rule, two things worry the set buyer; one is whether the quality of reproduction is satisfactory; the other is how the set is maintained. With mains sets, quality is nearly always excellent and maintenence worries are practically non-existent. The reason for the superiority in the quality of mains sets goes down to the very heart of things; let me explain what I mean.

The average three-valve set with batteries differs from the average three-valve mains set only in the last valve. The battery set embodies a small power valve, because the batteries cannot economically deliver the extra current required by the big power valves used in mains sets. These big power valves, requiring a high voltage and passing considerable current, can develop a lot of power, so that good volume can be obtained without forcing the set.

Importance of Last Valve

I have said that up to the last valve the mains and battery sets bear a close resemblance; if we assume, as we reasonably may, that a given signal receives equal treatment by the first two stages of each type of set, we can see that the last valve is the one that most affects the quality.

A big power valve, as used in the mains-operated sets, will not *necessarily* give greater volume than the smaller power valve, but with its greater reserve of power, it will impart a higher degree of quality to the reproduction.

(*Continued on page* 554)

Use A Mains-operated Set—*Continued*

The absence of maintenance troubles greatly off-sets the high initial cost of a mains-operated set. It must be admitted that the prevailing prices for a good "family" set working from the mains are on the high side, and possibly out of reach of listeners with a modest purse.

The Amplion Standard mains-operated three-valver is priced at £50

But when giving consideration to cost, do not overlook the fact that a mains set involves no expense in battery renewals, which are often quite a heavy item, and a constantly-recurring one, in the battery set. The mains valves will eventually require renewal, but not so soon as ordinary valves, owing to their more robustly constructed filaments.

I know several listeners who, although quite satisfied with the quality of reproduction produced by their battery sets (I am not suggesting that battery sets *cannot* give good quality), most emphatically dislike the worry of battery maintenance.

No-trouble Maintenance

The charging of the accumulator and its annoying habit of running down just when the set is most wanted are disadvantages that are viewed with disgust; to these good people, I point out that, apart from all other considerations, a mains-operated set entirely eliminates the worry of maintenance—and that is indisputably one of the biggest selling points of the mains set.

So far as I can gather from various sources of information, there are as many homes wired for direct-current as for alternating-current electric-light supplies; this mixed state of affairs is a hindrance to the mass production of a mains-operated set, for the apparatus is quite different for each type of mains. In general, the D.C. mains sets is cheaper than the A.C. mains set, because in the former no rectifying apparatus is required.

As the D.C. supplies are being converted as rapidly as possible to A.C., manufacturers have concentrated more on A.C. sets. There are other reasons why D.C. sets are less general than A.C. sets, one reason being the extra difficulty in manufacture. But such D.C. mains sets as the Gambrell and Ekco types can be thoroughly relied upon and are, in my opinion, just as good a solution as the set having a D.C. mains unit for the high-tension supply, as advocated by manufacturers who only make A.C. sets.

The cost of running a D.C.-mains set is about twice as high as that of an A.C.-mains set, but since the A.C.-mains set can be run at almost negligible cost, the extra cost will not make much difference to the electric light bill.

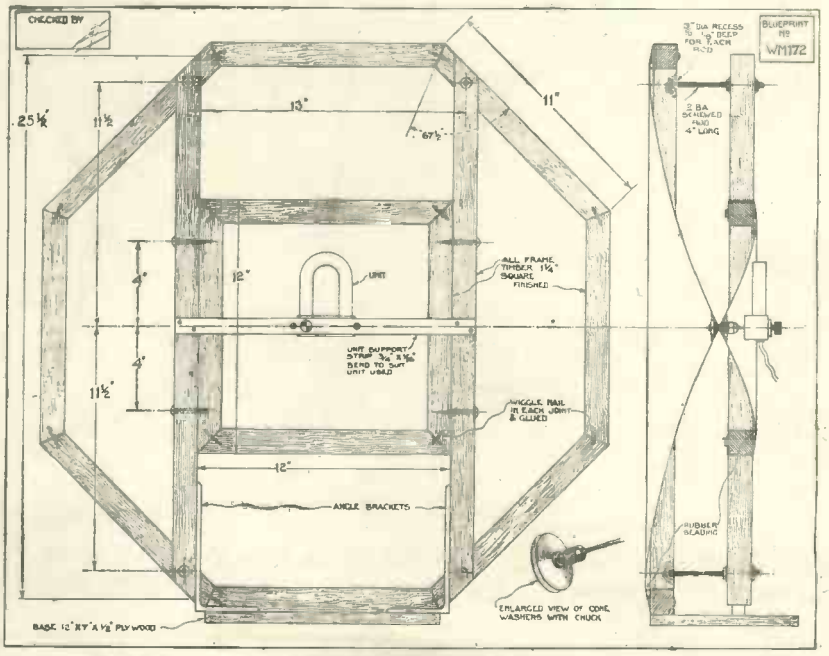
I am sometimes asked to recommend a set suitable for use with a mains unit; but where the supply is A.C. I strongly urge the set buyer to get a mains-operated set and not an ordinary set with a separate mains unit. The all-mains set has the advantage that it embodies mains valves, with working characteristics superior to those of valves deriving their filament current from an accumulator, which would have to be used with the mains unit.

Safety of Mains Sets

Finally, let me dispel any doubt that may still conceivably exist in the minds of readers as to the safety of the all-mains set. Conforming as they do, almost without exception, to the recommendations recently issued by the Institute of Electrical Engineers, mains sets of to-day are every bit as safe in use as the domestic vacuum cleaner or electric fire.

An Improved Linen Loud-speaker

(See Page 520 for Constructional Details)



Half-scale blueprints of this linen loud-speaker can be obtained for half-price (that is, 6d., post free), if the coupon on page iii of the cover is used by December 31. Ask for No. WM172

THE NEW Q COILS

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

IN view of the progress which takes place in radio from year to year, many readers will have wondered whether any improvements have been made in Q coils.

While the coil undoubtedly supplied a big need at the time when it was introduced, it was obvious that there were several minor points in which it could be modified with advantage. Against such modification, however, must be placed the inconvenience occasioned to those who already possess Q coils.

It was, indeed, with considerable regard to this aspect of the question that the original Q coils were designed.

Marked Advantage

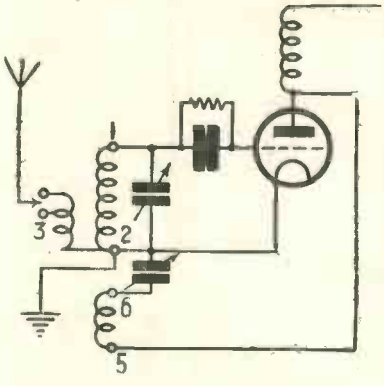
After a time, however, the advantages of some new experimental coils became so marked that it was decided to make a change. This was done with as little alteration to the general arrangement of the coil as possible, such matters as the terminal connections being left exactly as before. The principal alterations are in the windings of the coil itself and in the switching associated with it.

The original Q coil utilised a series-parallel scheme which, while effective, necessitates a multi-contact switch and, despite all precautions, trouble was experienced in many instances from this source.

A switch contact may make a quite good joint as far as a D.C. test is concerned and yet have a considerable resistance to high-frequency currents, and this gives rise to many curious effects. The method of placing the coils in parallel was, therefore, modified so that a simple push-pull switch could be used, and instead of placing the two sections of the coil in series on the long waves, only one section was employed.

This method has the advantage that the performance of the coil on the short waves is improved considerably, the average high-frequency resistance being 7 ohms, as against rather more than twice that figure with the older form of winding.

The efficiency on the long waves remains of a high order, as before, the actual figure depending upon the particular method of construction of the long-wave coil, which varies with the different makes.



Connections for QAT (aerial) coil

The base has been reduced in size and also the coil diameter itself, while the push-pull switch is mounted at right angles to its former position, as this had become, for various reasons, the most popular and convenient arrangement. Apart from this change, the QSG and QSP coils (for screen-grid and neutralised H.F.) remain the same as before, the terminal connections being identical.

The aerial coil has always been a somewhat unsatisfactory proposition. Right from the start it was found to be difficult to produce a coupled aerial coil capable of giving good results on both wavebands. For this reason the most common arrangement was the connection of the aerial through a .0001-microfarad condenser, either across the full coil or, later on, across a portion of the coil only, as with the QAA coil.

The QAR and QAM coils were attempts at Reinartz or coupled-aerial arrangements, but were not altogether satisfactory, being too selective on the short waves for ordinary operation.

Where the Difficulty Lies

The difficulty lies in the fact that the aerial coupling winding tunes the aerial circuit, and where one has to cover such a large band of wavelengths as 250 to 2,000 metres, it is a matter of great difficulty to avoid the tune of the aerial circuit lying at an awkward place within the actual tuning band of the secondary.

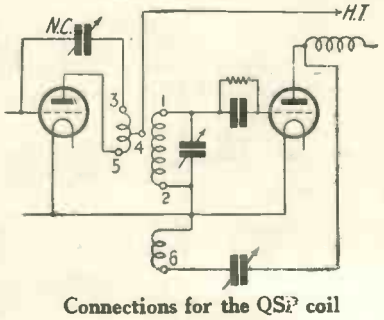
For a long time the problem seemed insoluble unless two distinct aerial coupling windings were employed.

The discovery of the solution was, to some extent, accidental. The new Q aerial coil is at once particularly selective and yet lively, that is, the signal strength has not suffered.

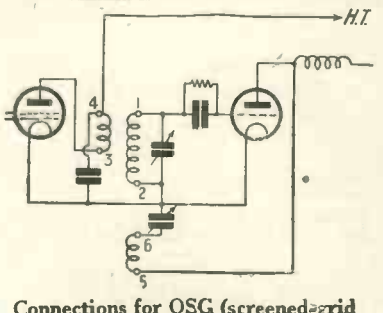
This particular coil, therefore, will be different from the previous aerial coil and, indeed, it entirely replaces all the other three types, there being only one aerial coil now marketed.

On this 1 and 2 are connected to the tuned winding. The aerial is connected to terminal No. 4, while an entirely separate reaction coil is connected between terminals Nos. 5 and 6.

The coils are now obtainable without difficulty, the firms licensed being London Electric Wire Co. & Smith's Ltd.; Wright & Weaire, Ltd.; and Ready Radio. All coils have been reduced to 15s., irrespective of type.



Connections for the QSP coil



Connections for QSG (screened-grid transformer) coil

The INSTRUMENTS of the ORCHESTRA

C. WHITAKER-WILSON Discusses the Strings

HAVING given some account of the wood-wind, the brass, and the percussion instruments, I propose this month to write about the stringed instruments of the orchestra.

I gave a few notes upon the string quartet in the May issue, as a matter of fact; but only from the point of view of the combination of two violins, a viola, and a 'cello as a recognised group of solo instruments.

Only a Loose Term

In any case, when considering the full orchestra the addition of the double-bass is necessary, apart from which it should be made perfectly clear that the string quintet is only a loose term, because *five only* would be quite inadequate; it does not strain the imagination of anyone to realise that five stringed instruments would never be heard against wood-wind, brass, and drums.

Indeed, many a conductor of a municipal orchestra, where expense has to be considered, has had to fight his council on the matter of obtaining enough strings. The larger bands will have as many as thirty first violins; such a number is by no means uncommon.

In broadcasting, however, the difficulty is solved another way: by placing the stringed instruments nearest the microphone and the brass farthest away a reasonable balance is easily obtained. But such a method can only apply where a microphone is used. In "real life," so to speak, unless enough strings be employed it is impossible to secure a proper orchestral balance.

The stringed instruments are naturally important—they are the most important of all, so far as that goes—and it may be of interest to listeners to treat them here from the point of view of broadcasting. Let us consider the violin first. It is an instrument which is entitled to great respect, if only upon account of its antiquity.

It is not known who first constructed a perfect violin; it is quite likely that several good ones were made by different men about the same time. But such names as Stradivarius, Amati, and Guarnerius come to the mind immediately one thinks of a violin.

Extraordinary History

There is something extraordinary about the history of the violin compared with that of the piano. Without going deeply into the evolution of either instrument, I might do worse than point out that the fact that no one wants a new violin if he can get an old one and no one has any use for an old piano if he can get a new one.

It is an odd thought that the violin has passed its height of per-

(*Continued on page* 560)

The Instruments of the Orchestra—*Continued*

fection two centuries ago and that the piano has yet to reach its perfect form. Every day of the month new patents are taken out for the protection of some improvement in piano action.

Perfect Tone and Touch

I played upon a new one by a leading maker a few months ago which had what seemed to me to be a perfect tone and touch. It ought to have had, for the price was over £600. Such a sum would not be out of the way for a violin by Stradivarius, by any means; but if one paid that amount for a piano two hundred years old it would only be because it was something of a curio. Neither would it be a real piano; it would probably be a harpsichord—one of the predecessors of the piano.

But a violin two hundred years old is younger than ever it was. To handle an instrument by Stradivarius or Amati is something of a thrill; one finds one's self wondering who has played upon it, loved it, and coaxed the tones from its very soul.

But a piano, or rather a harpsichord, of that age is merely a curio, a relic of the past; it has little or no meaning in these days. So that the violin is, as I have said, entitled to some respect. We can afford to honour it as a broadcasting medium, for it "comes through" as well as any instrument in the orchestra.

I have several friends who are violinists, and we are always arguing the matter of the comparative difficulty of playing a stringed instrument with that of a keyed instrument like the piano or the organ. It is useless for me as an organist, for example, to say that I have to use both hands and both feet to produce my notes; the violinist always throws it in my face that he has to *make* his notes, whereas mine are already there.

There is not space here for me to lay forth both sides of the argument, but it has often proved to be interesting. Have you ever examined a violin? If you have, you cannot have failed to be impressed by the apparent simplicity of its construction: a resonant body of wood, a finger-board, a neck terminating in a head or scroll, and four strings carried from a tail-piece over a slight-looking bridge to tuning pegs in the neck.

The strings are of varying thickness. The thickest is the G string, and is tuned to the G below middle C on the piano. The next is the D string, the third is tuned to A, and the fourth to E. So that the violin cannot sound *below* the G, but each string is capable of being raised considerably by means of what is called stopping, effected by the fingers of the left hand.

Shortening the String

Each note of the scale—up to a considerable height—may be produced by placing the fingers on the string—shortening it, in other words—while the sound is produced by the bow held in the right hand, or by means of plucking the string with

(*Continued on page 562*)

The Instruments of the Orchestra—*Continued*

the fingers of the right hand, an excellent device (known as *pizzicato*) occasionally employed.

To those who play the violin this explanation will not be particularly interesting; but I am supposed to be addressing those listeners who do not themselves play any orchestral instrument.

First and Second Violins

One other point about the violin as used in the orchestra; it is the question of first and second violins. The "firsts" play a part higher than the seconds. That is all; there is no difference in the actual instruments themselves.

Now let us consider the third of the so-called string quintet—the viola. Not many people an easily recognise a viola from a violin—at least, at a distance. It is really about one-seventh larger in size than the violin; it is consequently lower in pitch. That is a rule with orchestral instruments: the larger they are, the lower they are in tone.

The viola has a G string, just as has the violin, but it is not its lowest string. It possesses one tuned to what is called tenor C; that is to say, the C below middle C on the piano. The other three strings are the same as the three lowest on the violin, that is G, D, and A. Consequently the viola cannot soar as high as the violin, nor does it suit it to do so.

There is something very different about the viola—it is not so brilliant. All the same, it is a great mistake to suppose, as many do, that it is not a solo instrument. It is, on the contrary, exceedingly effective when played *solo*.

Corresponds to Tenor

In its place in the stringed portion of the band it corresponds to the tenor in a vocal quartet; in fact, it is often called the tenor. Some very fine compositions have been written for the viola; strangely enough, many of the great composers played upon it rather than upon the violin.

If you happen to see any work for viola in the broadcasting programmes, may I suggest that you listen carefully, comparing your impressions with those you gain when listening to a violin?

The fourth of the stringed instruments is, of course, the violoncello—usually called the 'cello (*chello*, not *sello*, as it is sometimes mispronounced).

This noble instrument is easily recognised owing to its considerable size. It is tuned one octave below the viola and its strings are much thicker. Also, the bow for it is wider and shorter altogether than that belonging either to the violin or the viola.

Favourite Instrument

The 'cello has always been a favourite instrument with English audiences, probably on account of its deep, sonorous tone. As a solo instrument it is largely a one-stringed instrument; by which I mean that

(*Continued on page 564*)

The Instruments of the Orchestra—*Continued*

the top string is in great demand owing to its melodic value. In the orchestra, however, the 'cello generally plays a much lower part.

It forms the bass of the string quartet and usually plays a bass part in the full orchestra, even though the double-bass is able to go down so much lower. As a matter of fact, the double-bass is generally playing the same part as the 'cello *an octave lower*.

Suiting the Microphone

The 'cello is always worth listening to on the wireless because, not soaring too high nor yet descending too low, it seems to suit the requirements of the microphone. Perhaps there is no instrument which is more effective on the wireless.

There is something very noble about the tone of sixteen or twenty of them when playing together in a large orchestra, and more than ever when fifty of them play together, as they do in concerts given by some of the 'cello schools of music.

We now come to the last and the largest of the stringed instruments—the double-bass or *contra-basso*. This unwieldy instrument is the making of the orchestra, for its depth of tone makes it as valuable to the orchestra as the pedals are to an organ. I am not sorry I do not play the double-bass; I always feel sorry for those who do, because of the difficulty of taking it about. It generally means a taxi everywhere!

A Good Joke

Perhaps you may have seen the excellent picture which appeared some years ago in one of the humorous papers of a double-bass player who was extremely annoyed because a small urchin followed him along the road. (He was carrying his instrument on his back.) In response to his inquiry, the boy said he was waiting to see him "chin" that thing!

The double-bass may have either three or four strings; four is the general number in this country. Its lowest note is E—the lowest E on the piano—but the music is written for it an octave higher, merely as a matter of convenience in both writing and reading.

It is not a solo instrument in any sense of the term; neither can it be said to be wholly satisfactory on the wireless, because its lowest notes are so low that the microphone is inclined to miss them. The same thing applies to gramophone recording: it is difficult to be sure of the deepest notes getting through.

But there has been a great development recently, and the day may come quite soon when we shall feel the grip of the double-basses in orchestras which are broadcast and recorded.

A Great Contrast

Looking at the strings as a whole, there is no doubt that they afford a great contrast with all wind instruments, whether wood-wind or brass, and there is no mistaking their tone on the wireless.

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

NEW APPARATUS TESTED

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

NEW PROCESS COSSOR VALVES

WE have recently tested the new range of Cossor 2-volt valves introduced for the coming wireless season. The characteristics of these, as will be seen from the figures given, are a distinct improvement on last year's types, such results being obtained with the aid of a filament capable of providing a still greater emission.

It is interesting to note that the position of the electrodes has now been altered, and the filament, grid and plate are mounted horizontally in the bulb. A V-shaped filament is employed, supported at three points.

The first valve tested, a 210RC, proved to have an A.C. resistance of approximately 60,000 and an amplification factor of 32; for such a valve the mutual conductance is commendably high. This valve is intended for use with resistance coupling or normal H.F. coupling, and should preferably be employed with a high impedance in the anode circuit.

The next in the series, the 210HF, with an A.C. resistance of 20,000 and an amplification factor of 17, makes an excellent general-purpose valve, suitable either for H.F., detector or even first-stage low-frequency work.

The third in the series, known as the 210LF, is designed primarily as a first-stage low-frequency amplifier, and has an A.C. resistance of 13,000 with an amplification factor of 11.

The 220P, which, as its designation implies, consumes .2 ampere, is intended as a normal power valve and has an impedance of approximately 4,500 ohms with an amplification factor of 8. The 230XP is a special power valve, capable of handling grid swings of 15 volts at 150 volts $H.T._{\frac{1}{2}}$ and makes an excellent final stage amplifier.

A pentode, known as the 230PT, is also included in the range and has greatly improved characteristics. The A.C. resistance is only 20,000, but the amplification factor reaches 40.

The final valve in this series is known as the 220SG and with an A.C. resistance of 200,000 ohms and an amplification factor of 170 is exceptionally suitable for screened-grid work. These values are all well in accordance with the maker's figures and the valves can be recommended.

◆ ◆ ◆

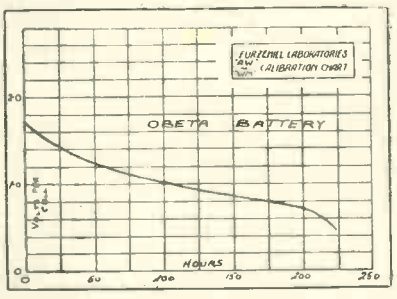
OBETA BATTERIES

THE amateur of to-day is not restricted in his choice of H.T. batteries. He is able to choose from a variety of makes at varying prices and he must sometimes be bewildered as to which particular type to buy.

In deciding upon the relative merits of two makes the principal test is, of course, that of the service rendered and this is largely a matter of the conditions under which the battery is used. In some circumstances the battery is not used a great deal, in which case shelf life (the capability of the battery to maintain its voltage when not in action) is important.

Where the battery is given heavy use, on the other hand, its capacity to supply current without serious drop in voltage is important and its capability for recuperating during the idle periods is also a factor to be taken into consideration.

A simple test of the performance under normal conditions is obtained by discharging the battery continuously through a constant resistance until the voltage falls to half of the initial value. In the case of the Obeta battery which we have recently received for test, the initial voltage is higher than normal and during the first few hours of use the voltage drops more rapidly than over the rest of the discharge.



Life curve of Obeta battery on test.

In the circumstances, we deemed it advisable to continue the test slightly beyond the usual point and the battery was actually discharged to 0.7 volts per cell.

Under these conditions, the battery lasted for 202 hours, corresponding to a mean discharge of 1,060 milliampere hours. This is up to the standard for a continuous discharge for a battery of the present size.

Under practical conditions where the battery is used intermittently something like twice this capacity would be obtained. It is supplied by F. L. Lesingham, of 13 Victoria Street, S.W.1.

◆ ◆ ◆

CLIX PLUG AND SOCKET

ELECTRO-LINX, LTD., of 254 Vauxhall Bridge Road, S.W.1, who are well-known manufacturers of Clix plugs and sockets, have submitted for test a new type of these useful gadgets having very material advantages over ordinary types when used for high-voltage work.

The sample tested consisted of a plug and socket completely shrouded in black polished insulated material; not only is the socket protected in this manner, but the point of the plug is also totally enclosed in a shroud which, when in position, fits over the metal pin of the socket. In reality the plug is made in the form of a socket and vice-versa.

Efficient electrical contact is ensured

(*Continued on page 572*)

WATES

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LOUD-SPEAKER UNIT

WATES DOUBLE CONE CHASSIS, with brackets.

12/-

You realise immediately that the Wates Star Duplex is definitely an advance on any other speaker, irrespective of price. The liquid beauty of the softer cadences blend with the verve and volume of the louder chords that is a joy to hear. Experts and the everyday listener acclaim it. Deliberately built above the standard of "built down to a price speakers"—whilst dearer in price—it becomes an investment in hours of happy entertainment and superlative reproduction.

Obtainable as a separate unit, or with special Double Cone Chassis, or as illustrated in complete Cabinet form in mahogany or oak.

Complete unit, with Double Cone Chassis, in Oak Cabinet,

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Mahogany,

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as illustrated, ready for use.

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WATES STAR DUPLEX. Unit only, 36/-

M.B.

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CLIX ALL-IN PLUG and SOCKET TERMINAL

Entirely supersedes the old type of panel terminal. Shorts and burnt out valves are impossible when it is used.

Every plug is engraved for its particular use; also H.T.+ and G.B.— plug-in sections vary in size and safeguard your valves.

Wherever a terminal of any sort is required, the Clix Plug and Socket can be utilised. With it you will obtain safer, speedier and better contact.

Write for descriptive leaflets of Clix 21 Varieties for perfect contact.

Price **8d.** *Complete*

Panel Portion 4d. *Flex Portion* 4d.

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Craftsmanship of high repute, honoured in use by Famous People, Leading Experts, Radio Press & over 3000 clients.

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models, just as you wish to afford. A Guaranteed product. Hand French-polished (Piano Finish), sturdy construction.

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The Soundness of our product brings orders for all we can make—without wholesalers or expensive showrooms. An exceptional value that needs to be seen to be realised. **You may return at our expense if you wish to part with it.**

XMAS Makes a splendid Xmas present—we supply ready for existing (or New sets) and send to any address packed FREE.

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PICKETT'S Wireless Furniture Makers,
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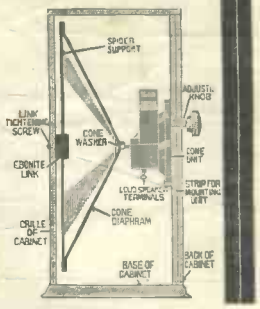
SOVEREIGN

Cone Kit—a perfect cone suspension at last . . . cute cheap



All popular makes of speaker units may be used with the Sovereign Cone Kit including the Ormond, Brown 'Vee,' Watmel or Blue Spot. Remember no costly cone cradle required.

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This new and wonderful development immensely improves home assembled speakers

SURPASSES every other speaker kit on the market for simplicity, rapidity and success of assembly. Faithful reproduction and extreme sensitivity assured. All popular makes of speaker units, driving a Sovereign Cone with the patent Prov. Pat. 9098/29 spider suspension, builds a marvellously efficient speaker. It gives pleasing quality and volume—you can wish for nothing better.

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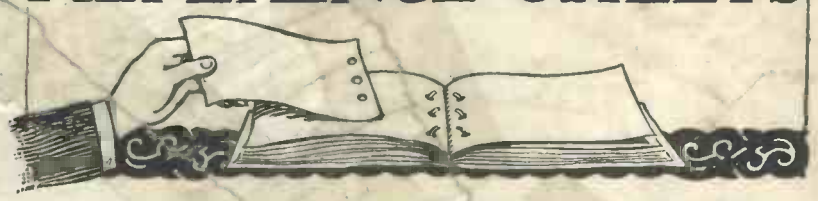


Compiled by J. H. REYNER, B.Sc., A.M.I.E.E.

Month by month these sheets can be cut out and filed—either in a loose-leaf folder or on cards—for reference. The sequence of filing is a matter for personal choice. In a short time the reader will be able to compile for himself a valuable reference book.

WIRELESS MAGAZINE Reference Sheet — *No. 156*

Power Output, Undistorted

THE power output obtained from a valve depends upon the relation between the external impedance in the anode circuit and the internal resistance of the valve itself. Of the total power developed in the circuit a proportion is wasted in the valve itself, the remainder being developed usefully external to the valve.

In accordance with the well-known law of electrical engineering, the maximum power output is obtained when the external and internal impedances are equal. We then obtain one-half of the total power output in each portion of the circuit, giving us a 50 per cent. efficiency.

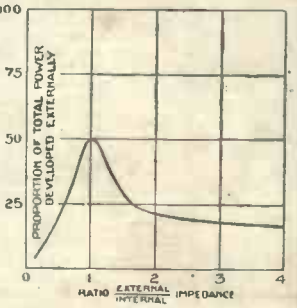
It is not practicable to do this, however, in the case of a power amplifier, for it is necessary always to ensure that the anode current variation is a reasonably faithful copy of the voltage input and this condition will not hold concurrently with the condition for maximum power output.

The maximum undistorted power output was obtained when the external anode impedance is greater than that of the valve. The extent to which it should be greater depends upon the characteristics of the valve and the extent of the curvature at the negative end of the characteristic. The value generally lies between two and three times.

The difference in actual power output, according to whether the external impedance is two or three times that of the valve, is not large, but in both cases the output is distinctly less than the maximum power.

The power output is

$$P = \frac{m \cdot E_2}{n} \times \frac{n}{(n+1)^2}$$



How power output varies with impedance ratio

where m = amplification factor of valve.
r = internal resistance of valve.
E = RMS grid swing.
n = ratio of external to internal impedance.

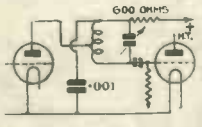
WIRELESS MAGAZINE Reference Sheet — *No. 157*

H.F. Leakage, Prevention of

ONE of the biggest troubles in compact receivers, and more particularly portable receivers, is that high-frequency currents circulate in the low-frequency stages. The effect of this is to cause thin quality, sometimes to give rise to L.F. instability and generally to cause the set to function in an inferior manner. Particular care must be taken, therefore, to avoid this difficulty and to confine the high-frequency currents to their legitimate circuit.

Apart from direct transfer of high-frequency energy through capacity coupling, which is a very prevalent form of trouble wherever a compact layout is adopted, there are two other ways by which the high-frequency energy can enter the L.F. stage.

The first of these is from the rectifier itself. The anode circuit of the rectifier valve carries high-frequency and low-frequency currents. It is essential to separate these, which can only be done by providing separate paths for the two currents, each of which must have a low impedance to its own current and a high impedance to the unwanted currents.



Typical H.F. Stopper

The filtering here is usually accomplished by the use of a high-frequency choke between the anode and low-frequency coupling device, on the anode side of which must be a condenser connected either directly to earth or ultimately to earth through some reaction device. Preferably both these arrangements should be adopted.

In many cases even these precautions are not sufficient to cure the trouble completely, and this is particularly found to be the case where the battery begins to run down. A set will often work satisfactorily until the battery has been in use for two or three weeks, when troubles will begin to develop. These may be completely obviated by preventing any high-frequency current passing through the battery.

When the battery develops any internal resistance, the high-frequency current flowing through it sets up voltages which are immediately produced into the low-frequency stages and cannot be filtered out by the usual methods.

The circuit accompanying this reference sheet gives a resistance-capacity filter which may be employed very successfully in this connection. A resistance of 600 ohms is included in the lead to the anode of each high-frequency valve, and at the end of this resistance a large condenser is taken to earth.

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WIRELESS MAGAZINE Reference Sheet — *No. 158*

Battery Discharge Curves

THE life obtained from a dry battery, such as is used for high-tension supply, depends very largely upon the conditions under which it is used. The peculiarity of the type of primary cell usually employed for this class of work is that if it is allowed to stand idle after having been used, it will tend to recover to some extent.

This recuperation is due to the fact that the polarisation of the battery in use is not completely checked by the chemicals, which continue to do their work after the battery is taken out of service.

A complete test under actual conditions, therefore, should use the battery for a certain number of hours and leave it off for the rest of the day. Such a test, however, takes a long time, and experiments have shown that an equally good practical test may be obtained by a continuous discharge

For this purpose, the battery is connected across a resistance which is adjusted to give initially the normal current which the battery is supposed to handle. As the battery runs down, its voltage drops and, in consequence, the current through the resistance also falls.

After a considerable period, the battery voltage drops to one-half of its initial value, and at this point the test is considered completed. The length of the run in hours is noted and the milliampere-hour capacity of the battery is deduced in the following manner:—

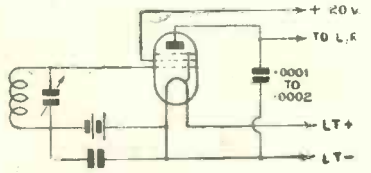
The current taken from the battery is not constant during the test, falling from the normal value to half this value at the end of the test. Therefore, assuming a steady falling away, which is usually the case, the average current is three-quarters of the mean value. This figure is multiplied by the number of hours which the battery was on discharge before the voltage fell to one-half of the original value, and this gives the milliampere hour capacity of the battery.

For example, a battery discharged at an initial rate of 7 m.A. might fall to half voltage after 197 hours. The capacity would then be $\frac{3}{4} \times 7 \times 197 = 1{,}035$ milliampere hours. This figure serves as a basis for comparison. In actual intermittent use the battery would last about twice as long.

For the standard size of battery, the continuous rating capacity should be of the order of 1,000. For double- and treble-capacity batteries the figure should be 2,000 and 3,000 respectively. In all cases, it is necessary to discharge the battery at its normal working rate in order to obtain a fair test.

WIRELESS MAGAZINE Reference Sheet — *No. 159*

Pentode Rectifier



Pentode as rectifier

THE high amplification factor of the pentode makes it appear on paper a desirable rectifier. Actually, with certain precautions, this is so, it being possible to obtain the sensitivity of a grid rectifier with the selectivity or absence of detector damping customarily obtained with an anode rectifier.

Sowerby (*Wireless World*, Nos. 525 and 527) has reviewed the subject in detail and shows that if about 20 volts positive is applied to the priming grid and about 3 volts grid bias to the control grid, the arrangement acts as a very good rectifier and is capable of giving considerable amplification.

He further goes on to show that the damping imposed by a pentode rectifier on a circuit is negligible provided that one connects a condenser from the anode of the valve to L.T.−. This is now almost universal practice, so that if the valve is used in a normal manner, it will behave satisfactorily.

A suitable circuit is shown herewith. It should be pointed out that the use of a pentode in this manner does not necessitate a heavy drain on the battery, because it is biased to take a very small current just as an anode-bend rectifier. It therefore requires no appreciable current to operate it, its sole disadvantage being the extra cost.

As far as possible, the pentode should be one having a low resistance, so that when the bias is applied, its ultimate resistance (somewhere about three times its normal value) will not be too high. (See Sheet No. 88.)

WIRELESS MAGAZINE Reference Sheet — *No. 160*

Push-pull v. Parallel

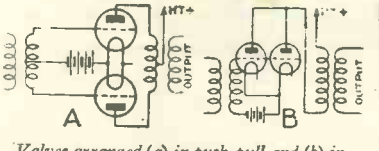
CONSIDERABLE controversy rages round the point of push-pull versus parallel arrangements of valves. There are, indeed, a number of fallacies regarding the paralleling of valves, one being that two valves in parallel are capable of handling a greater input than one valve alone. This is quite incorrect.

Consider the two circuits shown here. The first consists of a push-pull arrangement and the second of two valves in parallel. If all four valves are of identical characteristics, then, apart from any other considerations, each valve will be capable of handling exactly the same maximum grid swing, say 100 volts.

If we place two valves in parallel, as in figure (*b*), and do not alter this fundamental fact, each valve will then be handling its full grid-swing of 100 volts. Owing to the fact that the anode resistance of the two valves in parallel is half that of one valve alone, the maximum undistorted power output obtainable from the arrangement is doubled.

With the push-pull arrangement, however, each valve will handle its full 100 volts grid swing, and consequently 200 volts can be supplied to the complete push-pull stage. On the other hand, the anode impedance has been doubled, which offsets the increased power obtainable from the larger grid swing (Sheet No. 156); allowing for this, the increase in power is actually 2 : 1, exactly the same as for the two valves in parallel.

Thus, with correctly-designed output transformers, the power output from push-pull or parallel arrangements is exactly the same, but the push-pull will handle twice the grid swing. Owing to the particular arrangement of the valves, push-pull is somewhat less liable to overload, but this is due to entirely different considerations from the simple grid swing question.



Valves arranged (a) in push-pull and (b) in parallel

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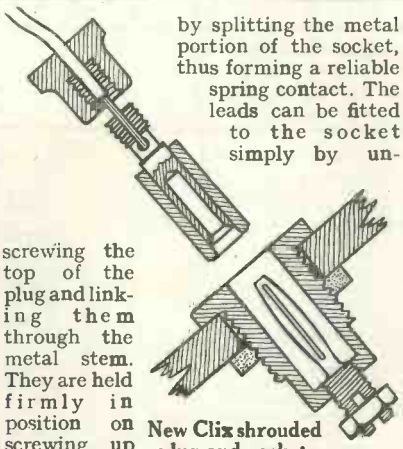

New Clix shrouded plug and socket.

by splitting the metal portion of the socket, thus forming a reliable spring contact. The leads can be fitted to the socket simply by unscrewing the top of the plug and linking them through the metal stem. They are held firmly in position on screwing up the top. The metal portion at the end of the socket is slit and fitted with a nut for clamping a connecting wire.

These components are attractively finished and engraved in white lettering; they should add to the appearance of any set in addition to serving a useful purpose.

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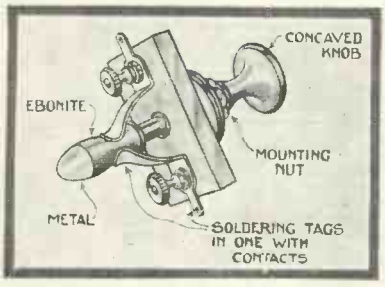
PIONEER SWITCHES



Pioneer push-pull on-off switch.

THE number of push-pull switches on the market is not by any means small and it seems as if there could be little novel in this direction. Our first impression of the Pioneer battery switch was that it was "another" push-pull switch, but closer inspection showed that this was not a fair statement, various points being revealed which made the component of undoubted merit.

The springs are of nickel silver and are shaped at the top to conform with the plunger. The other end of the spring is finished off in the form of a soldering tag giving a one-piece contact. At the same time, terminals are provided for convenience.

When this switch is in the "off" position, the springs rest in a grooved portion of the plunger, the diameter being less than the diameter of the contact portion. Thus, the springs are not perpetually strained, but are at rest when the switch is not in use and under tension when the switch is making contact.

This is a useful property and should do much to avoid the noises which occur in push-pull battery switches after they have been in use for some time.

The action is definite without being harsh and the whole switch is of a workmanlike construction. The particular sample we tested was a three-point switch of the type often used in modern circuits, but a similar battery switch is made having two contacts only. The prices are 1/6 and 1/3 respectively, very reasonable figures in view of the quality of the article.

The makers are the Pioneer Manufacturing Co., of Cromwell House, Fulwood Place, W.C.1.

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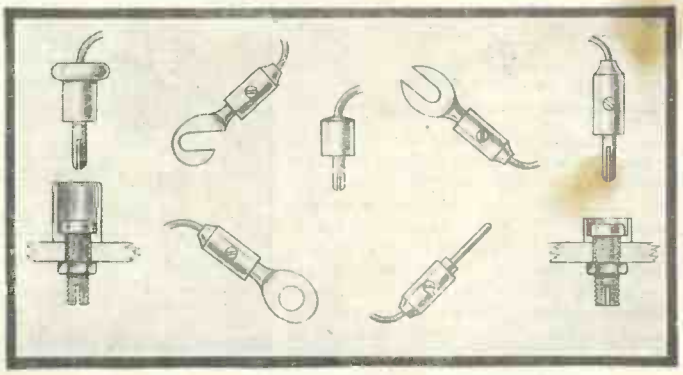
EELEX PLUGS AND SOCKETS

J. J. EASTICK & SONS, of 118 Bunhill Road, E.C.1, are probably well known to readers as makers of the Eelex plugs, sockets and connectors. The experience gained by the firm during the time which they have been manufacturing small articles of this nature has led them to make various modifications to comply with the requirements of the up-to-date apparatus.

The latest type of connectors are not only fully up-to-date, but ingeniously constructed, rendering them handy and reliable in use. One of the most important requirements in any plug and socket system is that it should make a good electrical joint. The Eelex plugs are split into four sections and so shaped at the ends that they glide with ease into the socket, but at the same time make good electrical contact with the socket.

One of the chief improvements in these small accessories is the extra shrouding fitted to the sockets which overlaps the insulated shrouding on the plugs and thus completely obscures any metal work. The importance of this cannot be overestimated in these days of high mains voltages when very often a chance contact with metal work may result in the reception of a nasty shock.

The method of fixing a wire to the plugs and connectors has also been improved.



Various types of improved Eelex plug and socket.

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* *

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OPENING bars of the overture—pure, flawless . . . Deep notes of double bass and oboe—low roll of drums . . . Strings and voices take up the melody . . . gay, triumphant . . . soaring higher and higher . . .

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