GUIDE TO ALL THE NEW SETS

Wireless Magazine

NO 60. JANUARY. 1930. 1/-

The Celerity Three!

QUICK TO BUILD
ONE DIAL TO TUNE

THE B.B.C. TO HELP YOU TEST YOUR SET?

A SELECTION OF THE NEW SEASON'S BEST SETS REVIEWED

J. H. REYNER *on* HOW STRONG IS A GOOD SIGNAL?

TABLOID RECORD CRITICISMS

NEW BROOKMAN'S FOUR SET
by W. JAMES

Also

A.C. Two and Regional Crystal Set

Editor:
BERNARD E. JONES

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

Wireless Magazine

The Best Shillingsworth in Radio

Vol. X :: JANUARY, 1930 :: No. 60

Research Consultant:
W. JAMES

Assistant Editor:
D. SISSON RELPH

Giving Readers the Right Stuff!

"DO We Listen?" is a question answered by Whitaker-Wilson in an article on another page, plentifully sprinkled with italics. He is a musician. Most of us are just listeners; but if we answer the question from the standpoint of the everyday man we can only say: "Yes, when it's worth while."

My experience as an editor tells me that people read when they are given the right stuff, and I expect they listen when they are treated similarly.

Take, for example, those new features in which we guide you in the choice of manufactured sets. This month, by the way, we classify 250 sets according to price and give independent test reports of six new models.

How We Help Readers

Do readers read these pages? Without doubt. More and more they write to us with reference to these reports and tabulated particulars. More and more they act upon them, and frequently ask for further information and advice. And we are always willing, as you know, to afford further help.

Following the tradition of the highly successful Brookman's Three—about which, by the way, W. James has something more to say in this issue—we give this month the Brookman's Four, another screened-grid valve set of great power and volume.

And, to please a large number of people who put simplicity of construction and operation in the very first place, we are this month presenting the Celerity Three, an extremely popular type of screened-grid valve set with one-dial tuning.

A mains two-valver would be a good proposition within a fifty-mile range of a regional station—nearly as good as a three-valve battery-operated set—and readers who have the convenience will therefore welcome the A.C. Two, of which we give full constructional details on another page.

High-power Stations and Crystal Reception

The coming of a high-power station has considerably extended the range over which crystal reception is worth while. In the Regional Crystal Set described this month younger readers will find interest both in the making and the using.

In our Gramo-Radio Section, including a list of the latest records and reviews of a large majority of them, will be found many articles worth your while.

Wireless is doing fine service in bringing sound to the deaf, and I am especially glad this month to be able to publish J. H. Reyner's article in which he refers to a new radio device for the deaf developed by C. R. M. Balbi.

"Radio Week" is Sunday, January 12, to Saturday, January 18—a fine opportunity to introduce friends to broadcasting. Amateur Wireless published on Thursday, January 9, will tell you all about the event.

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

Bernard E. Jones

CONTENTS

Published by BERNARD JONES PUBLICATIONS, LTD., publishers of "Wireless Magazine" and "Amateur Wireless." Editorial and Advertisement Offices: 58-61 Fetter Lane, London, E.C.4. Telephone: City 3733, 3734. Telegrams: "Beejapee, Fleet, London." Published about the 23rd day of the month and bears the date of the month following. Subscription: Great Britain and Abroad, 15s. 6d. a year, post free (Canada only, 13s. 6d.) Contributions are invited and will be promptly considered.

Look Out for Something Special in the Way of Three-valvers Next Month!

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

L.F. TRANSFORMER CURVES ARE EASY TO UNDERSTAND

The curve is an authoritative indication of a Transformer's performance and you will be repaid many times for the little care you take in understanding and comparing curves.

For instance, spend three minutes in considering the curve here shown—it is that which records the performance of the Ferranti AF5 Transformer under definite working conditions.

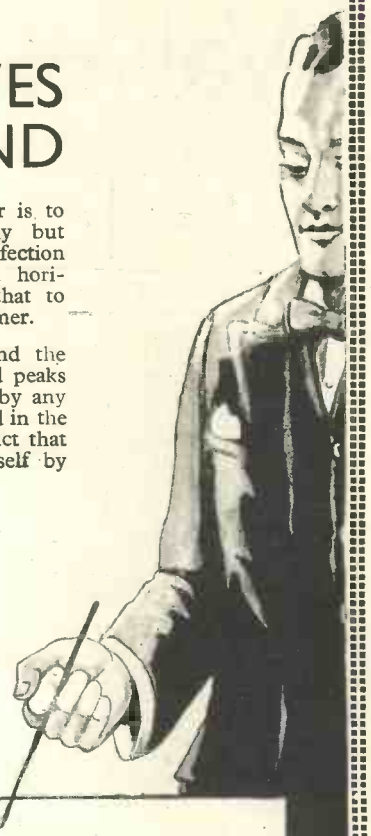
To begin with you will notice that the chart is drawn to a musical scale, and that the easily recognised notes are then transferred into terms of "frequency in cycles per second." Nothing intricate or misleading about that!

The markings down the left-hand side of the chart indicate the amplification ratio—that is, the amount that the signal is amplified by the Transformer and one valve. A uniform amplification ratio of 50 is a high standard at which to aim.

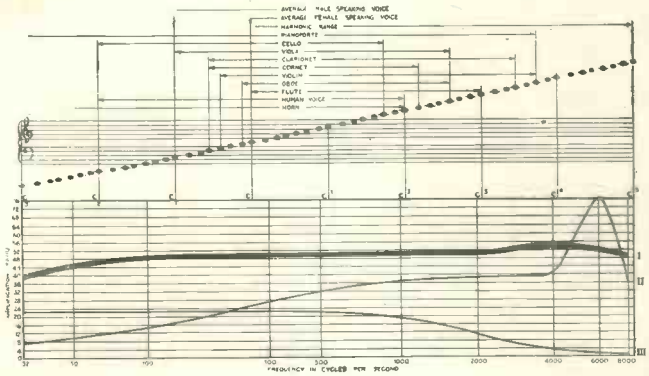
As the duty of the Transformer is to amplify signals not only strongly but evenly it will be realised that perfection lies in the direction of a straight horizontal line on the chart, and that to some extent "curve" is a misnomer.

The high amplification ratio and the entire absence of sharply defined peaks in the AF5 curve is not equalled by any other transformer when connected in the normal manner—a statement of fact that you can easily prove for yourself by comparison.

Choose your Audio Frequency Transformer, firstly by its guaranteed curve; secondly, by its mechanical design and finish; and finally by the name which is a guarantee of quality.



TYPE AF5
30/-



Curve 1. The FERRANTI AF5 Transformer following a 10,000 ohm valve having an amplification factor of 14. H.T. 100 volts. Milliamps 3.5. Grid Bias 1.5 volts. Filament 4 volts.

Curve 2. A modern Cheap Transformer used under similar conditions.

Curve 3. Resistance Capacity using high amplification Couplings.

FERRANTI

FERRANTI LTD. HOLLINWOOD LANCASHIRE

Valves to Use in Your Set

TWO-VOLT VALVES

Three-electrode

Make	Type	Impedance	Amp. Factor	Fil. Cur.	Mutual Conduct.
Dario	Resist.	60,000	30	.1	.5
Mazda	H210	59,000	47	.1	.8
Lissen	H210	58,000	35	.1	.6
Six-Sixty	210RC	55,500	39	.1	.7
Mullard	PM1A	51,000	36	.1	.7
Cossor	210RC	50,000	36	.1	.72
Marconi	H210		35	.1	.7
Osram	H210		35	.1	.7
Six-Sixty	210HF	25,000	19	.1	.75
Marconi	HL210	23,000	20	.1	.87
Osram	HL210		20	.1	.87
Mullard	PM1HF	22,500	18	.1	.8
Dario	Super HF	21,000	25	.15	1.2
Lissen	HL210		18	.1	.85
Mazda	HL210		26	.1	1.25
Cossor	210HF	20,000	20	.1	1.0
Six-Sixty	210LF	12,500	10.6	.1	.85
Cossor	210LF	12,000	10	.1	.83
Marconi	L210		11	.1	.9
Mullard	PM1LF		11	.1	.9
Osram	L210		11	.1	.92
Six-Sixty	225D	11,000	13.5	.25	1.2
Mullard	PM2DX	10,700	13.5	.25	1.25
Dario	Univ.	10,000	9	.1	.9
Lissen	L210		10	.1	1.6
Mazda	L210		15.5	.1	1.55
Marconi	P215	5,000	7	.15	1.4
Osram	P215		7	.15	1.4
Six-Sixty	220P	4,800	7.2	.2	1.5
Lissen	P220	4,700	7	.2	1.5
Dario	SP	4,500	9	.15	2.0
Mullard	PM2	4,400	7.5	.2	1.7
Cossor	220P	4,000	8	.2	2.0
Mazda	P220	3,700	12.5	.2	3.4
Six-Sixty	230SP	2,750	5.5	.3	2.0
Dario	Hyper	2,700	5	.3	1.8
Mullard	PM252	2,600	5.4	.3	2.1
Marconi	P240	2,500	4	.4	1.6
Osram	P240		4	.4	1.6
Cossor	230XP	2,000	4	.3	2.0
Lissen	PX240	2,000	4	.4	2.0
Mazda	P240	1,900	7	.4	3.7

Screened-grid—Four-electrode

Make	Type	Impedance	Amp. Factor	Fil. Cur.	Mutual Conduct.
Mazda	215SG	400,000	450	.15	1.1
Dario	SG	250,000	250	.15	1.0
Mullard	PM12	230,000	200	.15	.87
Six-Sixty	215SG	220,000	190	.15	.87
Cossor	220SG	200,000	200	.2	1.0
Lissen	SG215		180	.15	.9
Marconi	S215		170	.15	.85
Osram	S215		170	.15	.85

Pentodes—Five-electrode

Make	Type	Impedance	Amp. Factor	Fil. Cur.	Mutual Conduct.
Lissen	PT225	64,000	90	.25	1.4
Six-Sixty	230PP		80	.3	1.25
Mullard	PM22	62,500	82	.3	1.3
Dario	Pent.	55,000	100	.3	1.8
Marconi	PT240		90	.4	1.65
Osram	PT240		90	.4	1.65
Lissen	PT240	22,500	50	.4	2.0
Cossor	230PT	20,000	40	.3	2.0
Mazda	230Pen	—	—	.3	1.5

FOUR-VOLT VALVES

Three-electrode

Make	Type	Impedance	Amp. Factor	Fil. Cur.	Mutual Conduct.
Cossor	410RC	60,000	40	.1	.66
Dario	Resist.		30	.075	.5
Marconi	H410		40	.1	.67
Osram	H410		40	.1	.67
Six-Sixty	4075RC	58,000	37	.075	.64
Mullard	PM3A	55,000	38	.075	.66
Dario	Super HF	21,000	25	.075	1.2
Cossor	410HF	20,000	20	.1	1.0
Mullard	PM3	13,000	14	.075	1.05
Six-Sixty	4075HF	12,500	13.5	.075	1.1
Dario	Univ.	10,000	10	.075	1.0
Cossor	410LF	8,500	15	.1	1.76
Marconi	L410		15	.1	1.76
Osram	L410		15	.1	1.77
Mullard	PM4DX	7,500	15	.1	2.0
Six-Sixty	410D	7,250	14.5	.1	2.0
Marconi	P410	5,000	7.5	.1	1.5
Osram	P410		7.5	.1	1.5
Dario	SP	4,500	9	.1	2.0
Mullard	PM4	4,450	8	.1	1.8
Six-Sixty	410P	4,200	7.7	.1	1.85
Cossor	410P	4,000	8	.1	2.0
Dario	Hyper P	2,700	5	.15	1.8
Marconi	P425	2,300	4.5	.25	1.95
Osram	P425		4.5	.25	1.95
Cossor	415XP	2,000	4	.15	2.0
Mullard	PM254		4.2	.18	2.1
Six-Sixty	420SP		4	.2	2.0
Mazda	P425	1,950	3.5	.25	1.8
Marconi	PX4	1,450	3.8	.6	2.6

Screened-grid—Four-electrode

Make	Type	Impedance	Amp. Factor	Fil. Cur.	Mutual Conduct.
Dario	SG	250,000	250	.075	1.0
Mullard	PM14	230,000	200	.075	.87
Six-Sixty	4075HF	220,000	190	.075	.87
Cossor	410SG	200,000	200	.1	2.0
Marconi	S410		180	.1	.9
Osram	S410		180	.1	.9

Pentodes—Five-electrode

Make	Type	Impedance	Amp. Factor	Fil. Cur.	Mutual Conduct.
Dario	Pent.	55,000	100	.15	1.8
Mullard	PM24A	53,000	83	.275	1.55
Six-Sixty	SS4		83	.275	1.55
Marconi	PT425	50,000	100	.25	2.0
Osram	PT425		100	.25	2.0
Mullard	PM24	28,000	62	.15	2.3
Six-Sixty	415PP	27,000	60	.15	2.2
Cossor	415PT	20,000	40	.15	2.0
Mazda	425Pen	—	—	.25	2.0

SIX-VOLT VALVES

Three-electrode

Make	Type	Impedance	Amp. Factor	Fil. Cur.	Mutual Conduct.
Mazda	H607	90,000	40	.07	.45
Cossor	610RC	60,000	50	.1	.8
Marconi	H610		40	.1	.67
Osram	H610		40	.1	.67
Six-Sixty	6075RC	58,000	42	.075	.7
Mullard	PM5B	53,000	40	.075	.75

(Continued on page 578)

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

Valves to Use in Your Set—*Continued*

from page 576

SIX VOLT VALVES—Three-electrode (Continued)

Make	Type	Impedance	Amp. Factor	Fil. Cur.	Mutual Conduct.
Marconi ...	HL610	30,000	30	.1	1.0
Marconi ...	DE5B		20	.25	.67
Osram ...	HL610		30	.1	1.0
Marconi ...	LS5B	25,000	20	.8	.8
Cossor ...	610HF	20,000	20	.1	1.0
Cossor ...	680HF		27	.8	1.35
Mazda ...	HL607		20	.07	1.0
Six-Sixty	6075HF	15,200	17	.075	1.1
Mullard ...	PM5X	14,700	17.5	.075	1.2
Six-Sixty	D610	9,250	18.5	.1	2.0
Mullard ...	PM6D	9,000	18	.1	2.0
Cossor ...	610LF	7,500	15	.1	2.0
Marconi ...	L610		15	.1	2.0
Osram ...	L610		15	.1	2.0
Marconi.	DE5	7,000	7	.25	1.0
Cossor ...	680P	6,000	5.5	.8	.92
Marconi ...	LS5		5	.8	.87
Osram ...	LS5		5	.8	.83
Six-Sixty	610P		7.2	.1	1.22
Cossor ...	62XP	4,000	10	2.0	2.5
Marconi ...	DE5A		3.5	.25	.87
Mullard ...	PM6	3,550	8	.1	2.25
Cossor ...	610P	3,500	8	.1	2.28
Marconi ...	P610		8	.1	2.28
Osram ...	P610		8	.1	2.3
Cossor ...	680XP	2,750	3	.8	1.1
Marconi ...	LS5A		2.5	.8	.91
Osram ...	LS5A		2.5	2.5	.91
Cossor ...	625P	2,500	7	.25	2.8
Mazda ...	P625B		7	.25	2.8
Marconi ...	P625	2,400	6	.25	2.5
Osram ...	P625		6	.25	2.5
Cossor ...	610XP	2,000	5	.1	2.5
Mullard ...	PM256	1,850	6	.25	3.25
Six-Sixty	625SP	1,780	5.8	.25	3.25
Marconi ...	P625A	1,600	3.7	.25	2.3
Mazda ...	P625A		4	.25	2.5
Osram ...	P625A		3.7	.26	2.3
Cossor ...	620T	1,400	3.2	1.6	2.3
Mazda ...	P650	1,300	3.5	.5	2.7
Marconi ...	LS6A		3	1.6	2.3
Osram ...	LS6A		3	1.6	2.3
Cossor ...	660T	800	2,25	4.0	2.25

Screened-grid—Four-electrode

Six-Sixty	SS6075SG	210,000	190	.075	.9
Cossor	610SG	200,000	200	.1	1.0
Mullard ..	PM16		200	.075	1.0
Marconi ...	S610		210	.1	1.05
Osram ...	S610		210	.1	1.05
Marconi ...	S625	175,000	110	.25	.63

SIX VOLT VALVES—Pentodes

Make	Type	Impedance	Amp. Factor	Fil. Cur.	Mutual Conduct.
Marconi ...	PT625	43,000	80	.25	1.85
Osram ...	PT625		80	.25	1.85
Six-Sixty	SS617PP	28,500	54	.17	1.9

Pentodes—Five-electrode

Mullard ...	PM26	25,000	50	.17	2.0

MAINS VALVES

.8 Volt 1-1.5 Amperes

Dario ...	Super HF	20,000	25	1	1.25
Dario ...	GP	10,000	10	1	1.0
Dario ...	SP	5,000	9	1.5	1.8
Dario ...	HP	2,500	5	1.5	2.0

.8 Volt .8 Ampere

Marconi ...	S.8	200,000	160	.8	.8
Osram ...	S.8		160	.8	.8
Marconi ...	H.8	55,000	40	.8	.73
Osram ...	H.8		40	.8	.73
Marconi ...	D.8	21,000	14	1.6	.67
Osram ...	D.8		14	1.6	.67
Marconi ...	HL.8	17,000	17	.8	1.0
Osram ...	HL.8		17	.8	1.0
Marconi ...	P.8	6,000	6	.8	1.0
Osram ...	P.8		6	.8	1.0

4 Volt 1 Ampere

Mullard ...	S4V	1,330,000	1,000	1	.75
Six-Sixty	SS456		1,000	1	.75
Mazda ...	AC/SG	800,000	1,200	1	1.5
Marconi ...	MS4	500,000	550	1	1.1
Osram ...	MS4		550	1	1.1
Cossor ...	MSG41	200,000	400	1	2.0
Marconi ...	MH4	23,000	35	1	1.5
Osram ...	MH4		35	1	1.5
Cossor ...	M41RC	20,000	35	1	1.75
Six-Sixty	SS4GP	14,500	35	1	2.4
Cossor ...	M41HF	14,000	25	1	1.8
Mullard ...	354V		25	1	2.5
Mazda ...	AC/HL	13,500	35	1	2.6
Marconi ...	MHL4	8,000	16	1	2.0
Osram ...	MHL4		16	1	2.0
Cossor ...	M41LF	7,900	15	1	1.9
Six-Sixty	SS4Det		16	1	2.3
Mullard ...	164V	6,650	16	1	2.4
Cossor ...	M41P	5,000	10	1	2.0
Marconi ...	ML4	3,000	6	1	2.0
Osram ...	ML4		6	1	2.0
Six-Sixty	SS4P		10	1	3.3
Mullard ...	104V	2,850	10	1	3.5
Mazda ...	AC/P	2,650	10	1	3.75
Cossor ...	M41XP	2,000	4	1	2.0
Mazda ...	AC/P1		5	1	2.5

WISE WIRELESS USERS PREFER BATTERIES

BECAUSE—

pure H.T. current comes only from a dry battery, for it contains steady, direct current and does not depend upon humming generators for its source of supply.

Batteries are handy, portable and safe, too; and cheaper in the long run—no expensive valves or windings to burn out.

Buy a battery and get the best in EVER READY, the battery that has stood the test for 25 years.

Use an EVER READY refill battery for your Electric Hand Lamp.

The Popular Batteries for Portable Sets

PORTABLE 1.
63 volts, 6×5×3". 8/6

PORTABLE 2.
99 volts, 9×5×3". 13/6

PORTABLE 3.
108 volts, 10×5×3". 15/-

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	
	Barcelona (EAJ13)	Spain	
270	Kaiserslautern	Germany	
	Trollhatten	Sweden	
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)	" "	
286	Petit Parisien	France	
291	Turin	Italy	
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	
325	Breslau	Germany	
329	Grenoble (PTT)	France	
330	Naples	Italy	
332	Falun	Sweden	
335	Posen	Poland	
342	Brunn	Czecho-Slovakia	
349	Barcelona (EAJ1)	Spain	
352	Graz	Austria	

Wave-length	Name of Town	Country	Dial Reading
356	Brookman's Park	Great Britain	
360	Stuttgart	Germany	
363	Radio LL (Paris)	France	
368	Seville (EAJ5)	Spain	
372	Hamburg	Germany	
377	Manchester (2ZY)	Great Britain	
381	Radio Toulouse	France	
385	Genoa (1GE)	Italy	
	Wilno	Poland	
390	Frankfurt	Germany	
394	Bucharest	Roumania	
399	Glasgow (5SC)	Great Britain	
403	Berne	Switzerland	
408	Kattowitz	Poland	
413	Dublin (2RN)	Irish Free State	
416	San Sebastian (EAJ8)	Spain	
418	Berlin	Germany	
426	Madrid (EAJ7)	Spain	
436	Stockolm	Sweden	
441	Rome	Italy	
447	Paris (Ecole Sup. PTT)	France	
453	Bolzano (1BZ)	Italy	
	Salamanca (EAJ22)	Spain	
456	Aachen	Germany	
459	Zurich	Switzerland	
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	
566	Freiburg	Germany	
680	Lausanne	Switzerland	
760	Geneva	Switzerland	
770	Ostersund	Sweden	
825	Moscow (PTT)	Russia	
1,000	Leningrad	Russia	
1,010	Basle	Switzerland	
1,071	Scheveningen-Haven	Holland	
	Hilversum	Holland	
1,153	Kalundborg	Denmark	
1,200	Reykjavik	Iceland	
	Boden	Sweden	
1,304	Kharkov	Russia	
1,348	Motala	Sweden	
1,411	Warsaw	Poland	
1,444	Eiffel Tower, Paris	France	
1,554	Daventry (5XX)	Great Britain	
1,635	Zeesen	Germany	
1,725	Radio Paris	France	
1,796	Lahti	Finland	
1,875	Hulzen	Holland	
1,935	Kovno	Lithuania	
2,100	Norddeich	Germany	
2,290	Norddeich	Germany	

IN TUNE WITH THE TRADE

FETTER LANE'S Review of Catalogues and Pamphlets

Those Bears!

A FAMILIAR little friend, now in an appropriate winter setting, is the Polar bear. He figures on a Polar catalogue which I have just received, dealing with Wingrove & Rogers' Polar parts for the new season.

Polar specialise in condensers—good, sound, and solid brass-vane jobs with a slow-motion control that really does work, and a pig-tail flexible connection that does not make scratchy noises, even when one works on the very short waves.

I am particularly keen on the new drum-control condensers, which seem easy to mount, and which give a panel a very distinguished and "Polarised" appearance. The catalogue deals with all the other Polar parts, too: midget condensers, H.F. chokes, coils, potentiometers, and so on. A book worth having. **78**

◆ ◆ ◆

Lewcos' Latest

THE Lewcos people aren't content with their present laurels (which, goodness knows, ought to be heavy enough by now), and they have brought out a number of new bits and pieces to add to the existing range. Anyone would think their present coils weren't good enough! But Lewcos were ever progressive.

And now my good friends have sent along particulars of three new Lewcos fancies, namely, a new triple-tapped X coil, new model Q coils for base-board or six-pin mounting, and, finally, an entirely new line, a low-frequency transformer.

Lewcos have just issued their latest catalogue, and as these folk really are experts in the wire business I strongly recommend you to get the book, which is full of handy circuits and coil arrangements to suit almost any kind of set. **79**

◆ ◆ ◆

Those "Juice" Problems

AS a good motorist, I have an Oldham battery in my car at present. Therefore you must consider me biased when I'm talking about the Oldham solution to the battery problems of a radio set. So I won't do the talking, but will let a recently received Oldham catalogue speak for itself.

This is a little book which should be in the possession of every set user—even set users with mains supplies available, because Oldham make some neat trickle chargers, which are just the thing for—but I said I wouldn't do the talking!

The booklet's full title is "Radio Power Problems," and you can get a copy from Oldhams, of Denton, near Manchester.

There is just one thing I will add, and that is that in the all-power units, incorporating an accumulator and a trickle charger, the switching is carried out with an essentially simple type of three-pin plug, which entirely obviates, to my mind, the risk of "blowing-up" from the mains or of connecting the supply the wrong way round: which is all very reassuring. **80**

Lissen's Giant Range

THERE's one man at Lissen's whom I don't envy, and that is the gentleman connected with the compilation of Lissen's catalogues. The Lissen range is increasing so rapidly that it's no enviable job keeping pace with the *totum* development. By the latest post comes another collection of catalogues relating to the new lines.

The popular model eliminators are newcomers, of course, and the prices are so reasonable that they bring "juice from the mains" within the reach of all. Then there is the needle-armature pick-up—a development which marks a great change, and a very convenient one, in the method of needle and armature support.

I am particularly keen on the combined pick-up and tone arm: with this new type of pick-up one has only to drop the needle into a holder, and there is no fiddling adjustment.

There are other things, too, such as moving-coil speakers and portable sets, and even portable gramophones. There's bound to be something in the whole wide range which you will need; so get in touch with Lissen, Ltd., at Friars Lane, Richmond, Surrey. **81**

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 Jan. 31*

A McMichael Batch

THIS rather undignified title I apply to a number of leaflets, catalogues, and so forth sent me by old friends in the trade, namely, L. McMichael, Ltd. McMichael's enjoy (or perhaps I should say "have earned") a most enviable reputation in the trade, because they have never been guilty of putting out "duds."

Their modern portables to-day are just as intrinsically good as the more cumbersome receivers of yesteryear, when radio progress was not so far advanced.

The new avalanche of literature covers a wide field, from the Junior H.F. choke to a super-range transportable four-valver. In between these extremes come useful coils, mains-driven three-valve sets, switches, portable sets of other types, and so on—one might almost say *ad infinitum*.

When you're writing to McMichael's, ask for whichever section interests you most. **82**

◆ ◆ ◆

Clix for Contact

"A MATTER of Connection," says Clix on the front of a snappy folder which has just arrived. And, on the back, "Don't take change! Take Clix!"

The familiar little Clix connectors come in awfully handy when wiring up a set, and I always use them for the extremities of battery leads and so forth.

But Clix make other good things as well, such as anti-corrosion accumulator knobs, bushes, wood-screw fixings, and other similar handy whatnots.

Anyway, my business is not to act as Lectro-Linx's publicity agents, but is simply to advise you to get the folder and see the range for yourselves! Which I do, most heartily. **83**

◆ ◆ ◆

Bulgin Titbits

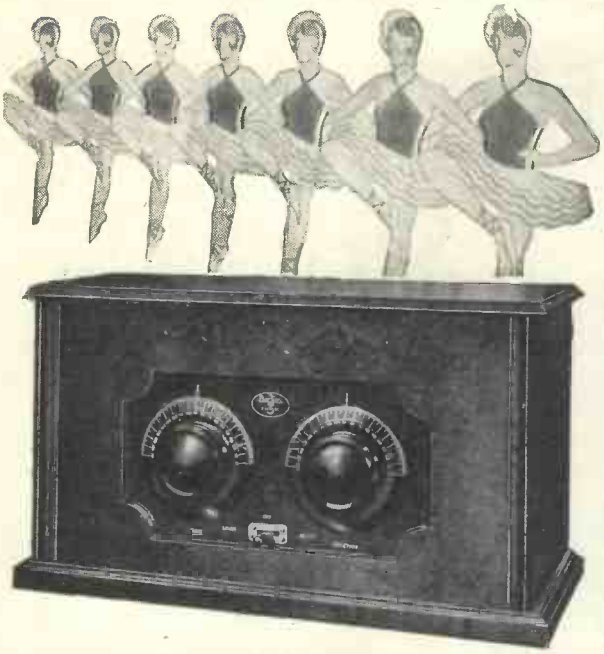
PREVIOUSLY I have made mention of the interesting range of accessories and small components put on the market by A. F. Bulgin & Co., of 9-11 Cursitor Street, Chancery Lane, E.C.4. Surely this firm enjoys a unique position in the industry.

Whenever I am making up a set and I want some little gadget, fixing or what not, I search round for the Bulgin list.

This, however, is really more than a list, because, after a number of pages studded with little drawings of helpful fittings of every kind, there are about twenty pages devoted to technical information of a useful kind. The whole book comprises fifty-six pages or so and, as a free gift, and a useful one, too, it is well worth having. **84**

It helps us if you mention "Wireless Magazine"

TEAM WORK



—ON EACH DEPENDS THE WHOLE!

On each dancer depends the act—on each part depends the set! Every dancer in the chorus trained by one man—every part in the "Empire 3" built by one firm—BurTons! Team work brings a tumult of praise for the chorus—team work brings a chorus of praise for the "Empire 3."

£5. 10

Valves, Batteries and Royalties extra.

ALL MAINS MODEL

(self-contained)

Price of Set - - - - **£11 : 5 : 0**

Price of Valves (Mullard A.C.) **£3 : 10 : 0**

(Royalties extra)

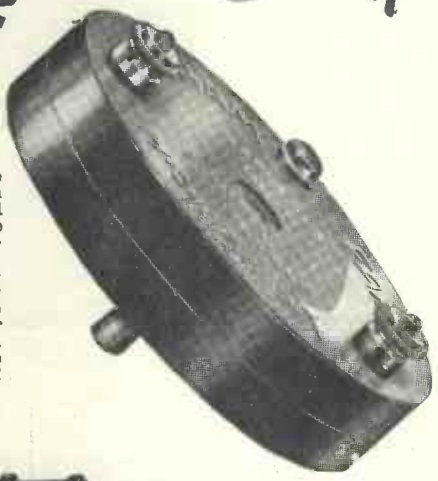
Identical in appearance to the Battery Model.

THE BURTON EMPIRE 3

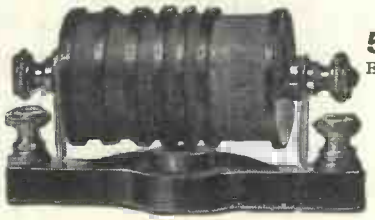
EVERY PART A BURTON PART.

C. F. & H. BURTON, Progress Works, Walsall, Eng.

4/6! FOR A BRASS-VANED LOG CONDENSER



Just a typical example of Graham-Farish value. A brass-vaned log-mid-line variable condenser using Bakelite as a dielectric. Robust in construction, and ideal for portable sets. Can be mounted for either drum or ordinary dial control, with one hole fixing with special claw panel grip. ·0005, **4/6**; ·0003, **4/3**; ·00015, **4/3**.



5/- EACH

The "MULTIWAVE" H.F. CHOKE designed for modern valves. By employing solenoid winding followed by sectional windings, high impedance is obtained with low D.C. resistance. Also very effective for use in H.F. stopper or filter circuits. With Base **5/-** each.

2/3 EACH

The famous "OHMITE"—a new-process Moulded Resistance with a value that remains constant. Infinitely better than wire-wound. Hermetically sealed in Bakelite. Noiseless and efficient. Negligible self capacity, so that the high notes are retained. Also fitted with terminal ends. All values 1,000 to 500,000 Ohms. **2/3** each. Holders for above 6d.

GRAHAM FARISH

BROMLEY — RADIO GF — KENT

146/6

NEW
PUBLIC ADDRESS
and Broadcasting
MICROPHONES

The Ideal Instruments for addressing an Audience through Loudspeaker (via Valve Amplifier or L.F. Stages of Wireless Set), and for relaying Speech and Musical Entertainment to any distance.

Powerful Loudspeaker reproduction with perfect purity.

Hand Type,

highly distance-sensitive, yet guaranteed entirely free from distortion or microphonic noises, absolutely silent background; far superior to ordinary Microphone Transmitters; for use with Valve Amplifier or Valve Set (through leads of Gramophone Pick-up if desired) at Open-air Meetings, in Cinema, Theatre, or Concert Hall. Operates from 2-volt tapping of L.T. Accumulator, through Microphone Transformer. Current consumption one-tenth Ampere. Provided with detachable Sound Collector, handle, hook for suspension, and a 9 ft. silk connecting cord, as illustration. **16/6**

Pedestal Type,

HIGHLY SENSITIVE MICROPHONE as above described, provided with detachable sound collector and a 9 ft. silk connecting cord, but fixed by rubber-cord suspension in nickel-plated frame, on pedestal, 11 in. high; for mounting on Speaker's Platform, in Pulpit, on top of Camera Stand, or for suspension from ceiling, as illustration. **25/-**

The above microphones are rendered Directional by attaching the Sound Collector.

Microphone Transformer,

special design to obtain best possible results from sensitive Microphones when connected, to high-resistance phones, Loud-speakers, Valve Set, or Valve Amplifier; best Transformer made for clear Speech with volume, modulation speech and music transmission, Public Address Microphones, etc.; Prim. and Sec. terminals fitted; full directions for use of Microphone and diagrams of connections free. Goods by return post. **6/-**

FREDK. ADOLPH, Sensitive Microphones,
27, Fitzroy Street, London, W.1.
Phone: Museum 8329

---

for XMAS - RADIO CONNECTIONS

Overhaul your set for Xmas to make sure of good results. See that every connection is perfect. Replace old connections with the acknowledged best—Belling-Lee engraved Terminals, Wander Plugs, Spade Terminals, Plugs and Sockets, Anode Connectors, Twin Connectors, Fuses, etc.—all are the last word in safety and efficiency, and improve the appearance and convenience of any set.

Thousands give Belling-Lee "radio connections" as Xmas presents. Few such low-priced gifts are so acceptable. How about pleasing your friends this Christmas with these useful little products?

Ask your Dealer, or send to us, for Belling-Lee Handbook "Radio Connections."

BELLING-LEE
FOR EVERY RADIO CONNECTION

Advt. of Belling & Lee, Ltd., Queensway Works, Ponders End, Middlesex.

Free
to callers

1929-30 CATALOGUE

by post 6d., money returned on first order

Shows all the latest Receivers, Components, Loud-speakers, etc.

WILL DAY LTD

(THE BEST IN THE WEST)

19 LISLE STREET, LEICESTER SQUARE, LONDON, W.C.2

Telephone (3 lines) Regent 0921—0923. *Telegrams: Tilles, Westrand, London*

Complete with 16½" baseboard and removable baffle board.

Use the **CAMCO** CABINETWORK **CHIMCO** REG. TRADE MARK

"MAJOR" Cabinet
FOR YOUR
RADIO-GRAM

Especially suitable for
Mullard Orgola, Osram Music Magnet

and for panels up to 18" x 8". Loud-speaker compartment is 18" x 18" x 16½"

OAK . . . . £7 . 10 . 0
MAHOGANY . . £7 . 15 . 0

See full range of "Camco" cabinets at

CARRINGTON MANUFACTURING Co Ltd
New Showrooms, 24 HATTON GARDEN, LONDON, E.C.1
CA 2931

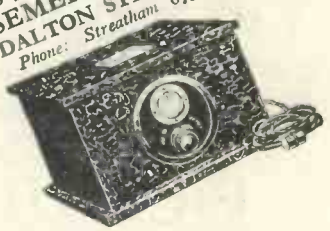
TANNOY

YOUR SET FROM THE MAINS FOR **£2:7:6**

Such is what TANNOY offers you. Instead of buying your next dry battery try a mains unit at our expense. Think what it means . . . no more battery trouble; simply "switch on," Constant H.T. means more perfect reception and better selectivity.

Ask your retailer for particulars or write, phone or call. . . .

TULSEMERE MFG. CO.
1—7 DALTON STREET, S.E.27
Phone: Streatham 6731



Mains Units

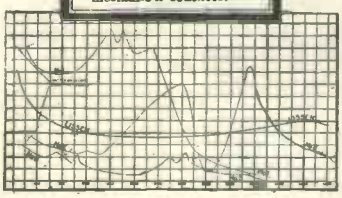
There is news in the "Wireless Magazine" advertisements

Revolutionary New Lissen Pick-up

NEW NEEDLE ARMATURE FULLY FLOATING AND SO LIGHT THAT RESPONSE is PERFECT at ALL FREQUENCIES!

HOW THE NEEDLE IS SUSPENDED

Held in position by magnetic attraction without restriction by mechanical contacts.



"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 ost.

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-point actually *feels 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 artiste—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/-

LISSEN LTD., Worple Rd., Isleworth, Middlesex (*Managing Director*: T. N. COLE.)

H.T. ELIMINATORS YOU CAN USE LIKE A BATTERY

D.C. 27/6 Model A

A.C. 60/- Model A

MOULDED CASES MADE of INSULATING MATERIAL—HEAVY "CAB TYRE" FLEX LEADS

D.C. MODEL "A"
Employs 3 H.T.+ tappings. H.T.+1 giving 80 volts for S.G. valves; H.T.+2 giving 60 volts at approx. 2 m/A for detector valves; H.T.+3 giving 120/150 volts at 12 m/A.
PRICE **27/6**

D.C. MODEL "B"
Employs 3 H.T.+ tappings. H.T.+1 and H.T.+2, are continuously variable (by means of two control knobs) and capable of giving any desired voltage up to 120/150 volts at approx. 2 m/A.; H.T.+3 giving 120/150 volts at 12 m/A. for power valves .. ..
PRICE **39/6**

The current you get from Lissen Batteries is the purest form of current you *can* get for radio. But if you want to use an eliminator, use a Lissen Eliminator. You'll then get H.T. current from your mains smoother, steadier, better than before.
There are 4 types of Lissen Eliminators; one of them will almost certainly be just right for your set. Tell your dealer what voltage your mains supply is and whether it is A.C. or D.C.; tell him what output you require, or what valves you are using, and he will demonstrate for you the Lissen Eliminator to suit your needs.

A.C. MODEL "A"
Tappings as in D.C. Model A.

LN 576	for A.C. Mains voltage ..	200-210
,, 577	,, ,, ,, ..	220-230
,, 578	,, ,, ,, ..	240-250
,, 639	,, ,, ,, ..	100-110

PRICE **£3:0:0**

A.C. MODEL "B"
Tappings as in D.C. Model B.

LN 579	for A.C. Mains voltage ..	200-210
,, 580	,, ,, ,, ..	220-230
,, 581	,, ,, ,, ..	240-250
,, 640	,, ,, ,, ..	100-110

PRICE **£3:15:0**

LISSEN

ELIMINATORS

LISSEN LTD., Worple Rd., Isleworth, Middlesex (*Managing Director*: T. N. COLE)

The B.B.C's First Christmas

In this article FRANK ROGERS recalls the thrilling story of the B.B.C.'s first Christmas broadcast, which took place seven years ago.

Much of what he discloses will be news to those who have only recently become listeners and will recall to older hands the thrills that were experienced in the early days of broadcasting.

PERHAPS this seems so long ago to most of us that we have some difficulty in recalling it at all. Not that it is so far away really—only in 1922, in fact—but time flies at an amazing rate and wireless has progressed at such a remarkable speed that it is made to appear almost pre-war in its origin.

And if for a moment we do consider that amateur-looking collection of coils which used to pass for a set, we shall surely agree with the manufacturer who said recently that nearly a century's progress had been made in less than ten years.

When I asked the officials at the B.B.C. how Christmas Day passed off in 1922 they found it far from easy to remember. However, they were all agreed on one point —that it was rather a hectic occasion.

In the Cinema Room at Marconi House

No. 2 Savoy Hill had not then been taken over, and their sole accommodation was the cinema room at Marconi House, in the Strand. This was not by any means a large one for their purposes, being only three or four times the size of a normal parlour

Moreover, it was right at the top of the building, and the lift attendant went off duty about six o'clock each evening and at one on Saturdays. So that nine times out of ten they had to walk all the way up.

Every scrap of business had to be conducted within its four walls. Programmes were drawn up and fitted together, songs played over and discussed, auditions given, letters read and answered, telephone calls made and replied to, and, as often as not, meals taken as well.

To say that pandemonium reigned is to put it mildly. Yet, out of it all arose the B.B.C. of the future.

To illustrate the chaotic conditions I can recount a little story of an audition. The official in charge —either Stanton Jeffries or A. M. Burrows, for there were but two of them in those days—was listening to an accordionist and drafting a programme as well.

Sizing Up the Situation!

Another member of the staff reminded him of another job which had to be attended to at once, and he dashed away without realising he had so far said nothing to the poor applicant. The latter, however, sized up the situation and waited for Mr. Jeffries to return.

It was on the Saturday before the first B.B.C. Christmas that the orchestra made its bow as such. It was fifteen strong, and Mr. Jeffries rehearsed and conducted it by standing on the table, which served him at other times for a desk. The transformation was effected simply by stuffing all the various letters, notes, and music scores into the already over-crowded drawer and spreading a piece of green baize over the top.

Listeners will be interested to know that the first item given by this orchestra was *The Children's Overture*, by Quilter. On the Sunday—that is, December 24

The B.B.C.'s First Christmas—*Continued*

THREE YEARS AGO—

A B.B.C. studio at Savoy Hill as it appeared in 1926

—Mr. Jeffries was bold enough to give Schubert's famous *Unfinished Symphony*.

At this very early stage of broadcasting, copyright questions had not been settled, and the B.B.C. gave an undertaking to keep a copy of every programme. Later on the performing-right fees were paid up to date and certain bans imposed. Everyone will remember that the ever-popular Gilbert and Sullivan operas came under this ban for a long time, but it may come as a surprise to some to learn that selections from them had been previously played.

New Type of Microphone

It was around Christmas that the change-over was made from the old type of carbon-granule microphone to the modern one. Formerly no single instrument would record all sound frequencies—a drawback which entailed employing seven or eight. For a choral or orchestral number they were hung round the walls, looking somewhat like Yuletide decorations, sometimes tied up with odd lengths of string, and their terminals tightened with wedges of sixpences.

A soloist or talker would hold the instrument in his hand while broadcasting. Before any broadcast they were tested out with fear and trembling, for they were almost feminine in the uncertainty of their mood. The new single microphone was usually stood upon a box, affectionately designated the "soap-box."

On the Sunday Mr. Jeffries almost collapsed in making frantic but utterly unavailable attempts to persuade one of his soloists to stop shouting into it. She afterwards explained that she had some friends in Aberdeen whom she particularly wanted to hear her!

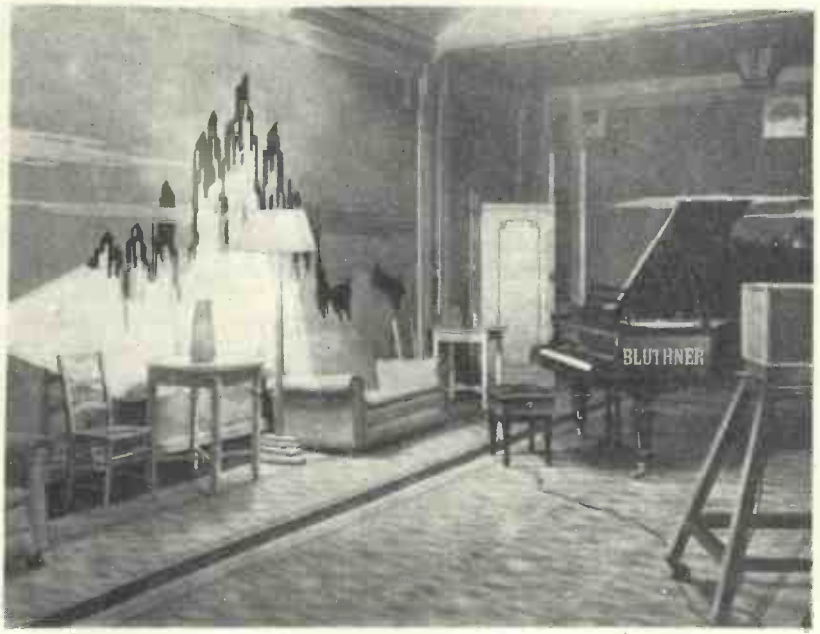
A further interesting point regarding this Sunday is that it was the occasion of the first religious address, the speaker being the Rev. J. A. Mayo, B.A., of Whitechapel

Nature's Celebration

Christmas Day itself started none too promisingly, for the weather decided that a fog was necessary to celebrate the occasion, and produced a really fine specimen lest it should be accused of any lack of enthusiasm. As every Londoner knows—and, alas, most provincials also!—such a state of affairs on Christmas Day, of all days in the year, was disastrous for anyone who had to travel.

Mr. Jeffries himself, being personally responsible for the programme, started from his home very early, and managed somehow to arrive at Marconi House just

—AND TO-DAY!



As the studio shown above appears to-day. There is no doubt that the B.B.C.'s taste in furnishing is distinctly modern

An Article That Recalls Thrilling Memories!

before five o'clock with Miss Vivienne Chatterton.

But when he had climbed all the stairs which led to the cinema room —far more than a hundred—he found that he was the first on the scene. The programme was timed for five, and he quickly realised that he would have to be his own engineer unless someone else turned up in a very few seconds.

Theory of Vague Ideas

His knowledge of electricity was neither extensive nor deep, comprising only what he had "picked up" through the chaotic state of affairs in which he worked. His theory consisted of one or two vague ideas that this switch was usually down, that the next one seemed more familiar when it was up, and so on.

He was just going to put his theory to the test, and risk sending Miss Chatterton and himself soaring heavenwards through the roof when —fortunately, I feel—an engineer arrived.

For the tuning note that day he gave a blast on a small hand organ-pipe. That done, the soap-box had to be dragged out of its corner ready for Miss Chatterton to help him with the Children's Hour, which lasted until a quarter to six. At this juncture there was an interval of forty-five minutes, during which time the members of the orchestra began to arrive, all of them very red in the face and out of breath from climbing the stairs.

There were no clever ventilation arrangements in those days. So long as the microphone was "live" the room had to be well-nigh hermetically sealed to keep out extraneous noises, and the state of the atmosphere may be guessed. For three minutes out of every ten the station was "closed down" so that the window and door might be opened to change the air. When fog reigned supreme this theory broke down, since there was little difference between one roomful of fog and another.

Marconi House, it must be remembered, stands very close to the river, where the fog is of a particularly choice brand, especially when warmed and mixed with stale breath!

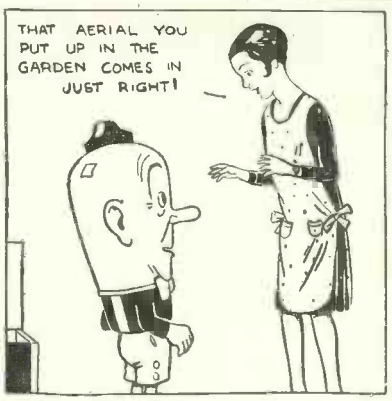
The orchestra had scarcely recovered their wind when they had to start their half-hour's playing. And when seven o'clock came they were all very tired men, losing but little time in making for the corridor, where they hoped to find a cool spot not yet discovered by the fog in its wanderings.

Mr. Jeffries, having given his baton its concluding flourish, climbed wearily down from his perch on the table and sank into a chair, while his colleague, A. M. Burrows, read the news bulletin for the next thirty minutes.

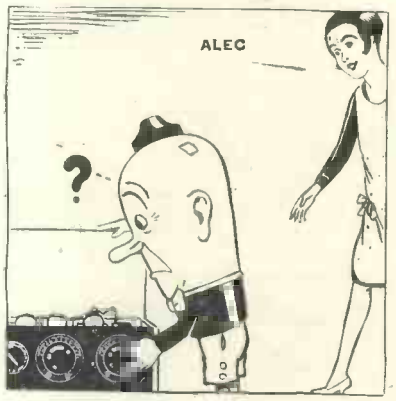
— TRODE

— ALEC —

— OF —



THE ADVENTURES—



At seven-thirty the orchestra, reinforced with Kenneth Ellis, Cecil Mannering, and Olive Sturgess, embarked upon an hour and a half's concert, a feat of endurance as much as anything else. Before very long the room became so hot and oppressive that everyone was obliged at some time or another to tip-toe stealthily to the door and creep softly into the corridor for a "breather."

The room was so crowded with tables and cupboards that there were not enough chairs for everyone, so that resting places were found on any piece of furniture that had a flat top.

At nine o'clock the orchestra carried on for twenty-five minutes as a dance band.

This was the last item calling for the orchestra, and was followed by a piano solo, *The Kitten on the Keys*, and the second news bulletin—twenty minutes long.

Big Ben's Chimes

Big Ben's chimes had not yet been linked up with the microphone, but the idea had occurred to those in charge of the programmes and an imitation was given on the tubular bells. The day concluded with an address by Dr. Fleming, a Scottish divine, and a few selections by a bagpiper.

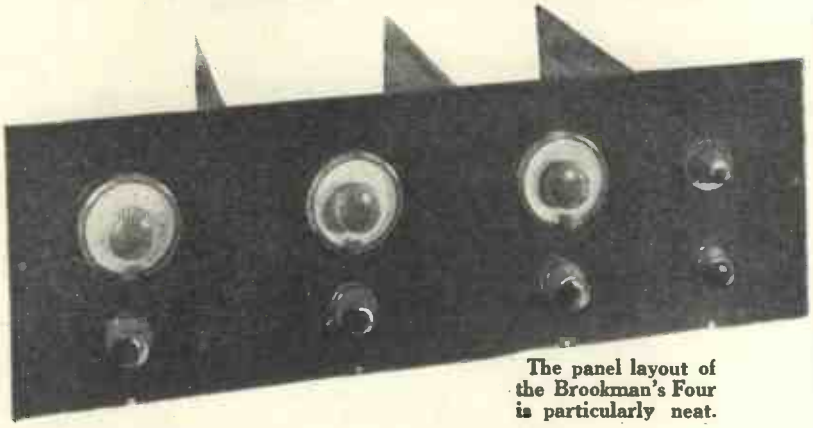
It only remained for Mr. Jeffries to say "Good night, everybody!" —a sentiment which I feel sure must have come straight from his heart.

The Brookman's Four

ANOTHER FINE ADDITION TO THE FAMOUS AND POPULAR RANGE OF "BROOKMAN'S" SETS By W. JAMES

For many years now W. James has enjoyed a high reputation for the product of home-constructor sets. In this article, he gives details of one that is likely to be the best and most successful that he has ever designed.

The range of the Brookman's Four is enormous and reception of the most distant stations becomes a matter of ease. The quality of reproduction has not been overlooked, either.



The panel layout of the Brookman's Four is particularly neat.

Those who desire to take advantage of the high efficency of W. James' 1930 Binowave Coils in a smaller set should read about the Brookman's Three (October), Brookman's Two (November) and Brookman's Push-pull Three (December).

Letters from readers in appreciation of the Brookman's Three appear on page 658 of this issue and there is a further article by W. James on page 618.

IT is a long time since I described a four-valve set having two stages of high-frequency magnification, yet this is my favourite type of receiver.

Easy Distant Reception!

How much more easily the distant stations are received than with a three-valve set and how much better the selectivity! There is, of course, a further knob to turn. But this knob does not complicate matters, as it tunes within a part of a degree or so of one of the other knobs.

In fact, the three knobs tune practically alike under certain conditions, although the aerial and the particular aerial connections adopted affect the tuning point of the aerial-circuit condenser.

Compared with the Brookman's Three, for example, which has already earned for itself a reputation as a first-class set, I should describe the chief difference as being one of selectivity and more certain reception of the more difficult distant stations.

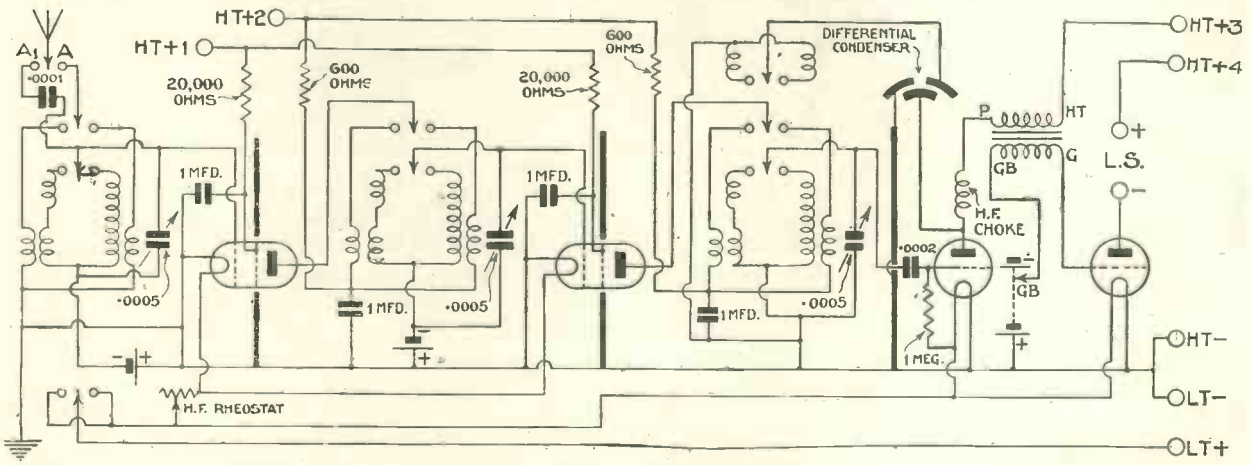
There is more volume from some of them. It is not correct to say the volume is greater from all stations, as this is clearly dependent upon the power valve. If the same type of power valve is used in the Brookman's Three and Four sets with equal values of high tension and grid bias, then clearly the amount of the volume which the last stage can handle is identical in the two instances.

The advantage of the four-valve set is that it raises the strength of more stations to the full power handling capacity of the last stage than does the Three, and it does this easily.

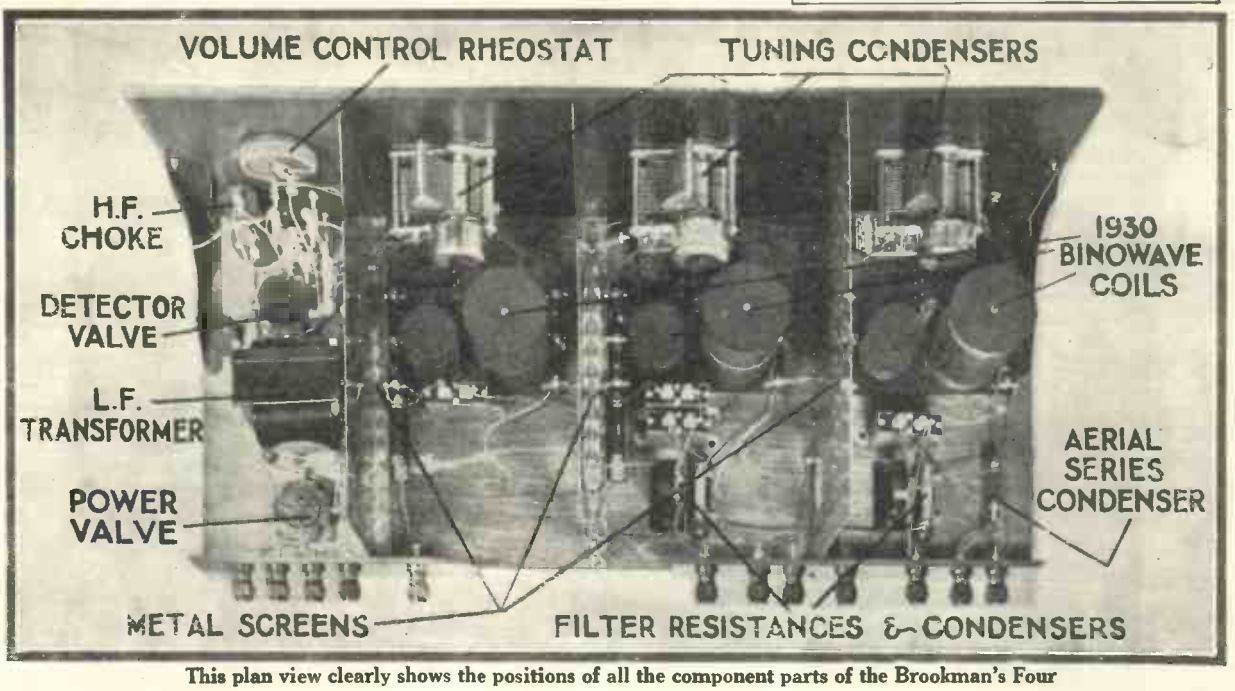
The second high-frequency stage is no passenger. It is not put there to work in a half-hearted fashion. No "lossers" are included in the set to stabilise it or to limit the magnification.

Great Magnification

The extra stage is of exactly the same type as that used in the Brookman's Three. Therefore, the two



Circuit of the Brookman's Four, which includes two screened-grid valves, detector and transformer-coupled power valve—and, of course, the famous 1930 Binowave coils

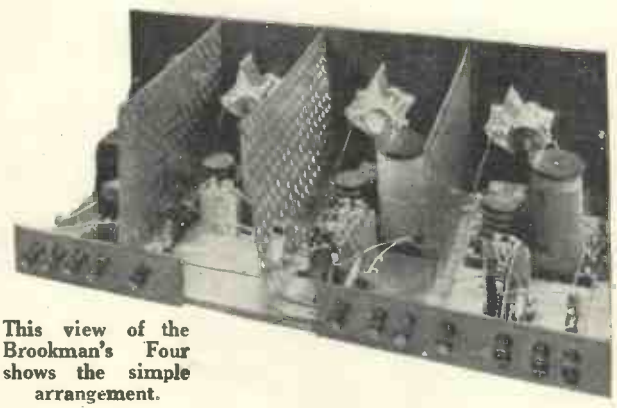


This plan view clearly shows the positions of all the component parts of the Brookman's Four

high-frequency stages between them—both working at full power, as they are not damped down in any way—provide very great high-frequency magnification.

That the set is perfectly stable is due to circuit design and layout. The magnification is provided by the good coils and shielded valves. Separately tuned circuits mean simplicity. I could have ganged the circuits; the coils are made accurately enough. But shielded condensers accurately balanced sound mechanically, and with provision for compensating for different circuit capacities that will hold good over the whole tuning range, are costly

I have therefore used separate condensers, as I appreciate that numerous readers may be able to find one or two suitable types and will want to try the set without purchasing all new parts.



This view of the Brookman's Four shows the simple arrangement.

A glance at the circuit diagram will reveal the main features of the set. There are three dual-range coils of the 1930 Binowave type. One is an aerial high-frequency transformer and the other two are anode transformers They are the types used in the Brookman's Three

Plain Metal Screens

These three transformers are tuned with .0005-microfarad variable condensers. They are separated by plain metal shields having a few holes for connecting wires to pass through and two for the shielded valves.

The screens do not provide magnetic shielding. They are for the purpose of minimising capacitative couplings between the tuning coils and variable condensers.

Shielded valves are so constructed that the capacity of the grid to anode is minute. Were the capacity appreciable and good coils used, then stable amplification would be practically impossible unless the magnification were reduced to a ridiculously low figure.

The lower the grid to anode capacity of the valve, the greater is the amount of the high-frequency magnification to be obtained with stability. It is not hard to understand when this is realised : that the stray circuit capacities must be reduced to the minimum.

There is, for instance, a coil connected in the grid circuit and another in the anode circuit. Any capacity coupling here would be added to that of the valve. Our circuit arrangement must therefore be such that stray capacities of this nature be cut down to the very minimum

Horizontal Mounting

The shielded valves are mounted horizontally through the screens for shielding, and incidentally the detector and low-frequency valves are also separated by a shield from the second high-frequency valve.

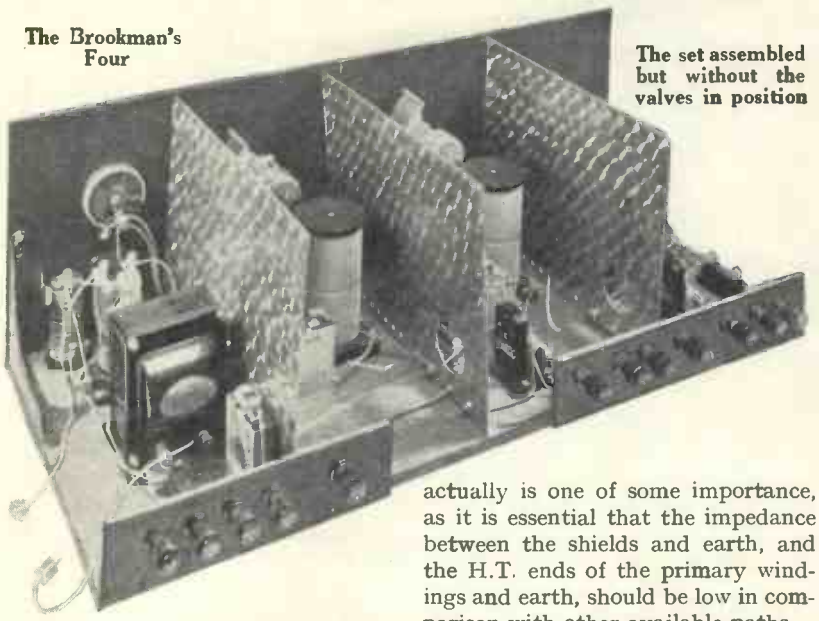
You will observe that a grid-bias cell is included in the two high-frequency circuits. We want no grid current to flow here; therefore we bias the grids of the two high-frequency valves by 1.5 volt negative. Also, a 20,000-ohm grid leak and a 1-microfarad fixed condenser are included in the two shielded circuits.

They effectually stop high-frequency currents from passing from the shield circuits to the high-tension supply. Thus they help stabilise the set.

There is, naturally, a fall in voltage across the resistances. This must be allowed for by applying to the shield circuit a little greater voltage than usual. When shielded valves that normally have a shield voltage of,

The Brookman's Four—*Continued*

The Brookman's Four



The set assembled but without the valves in position

say, 60 are used, the actual high-tension applied should be from 70 to 80 volts.

The value is not critical, of course, and it is the better plan to try different values, as they alter the impedance and magnification factor of the valve. An increase in shield voltage will lower the impedance.

Anode Stoppers

As a further precaution, a 600 ohm resistance was included in each of the two high-frequency anode circuits, being shunted by 1-microfarad condensers, of course.

These filter circuits—for this is what the resistance and condenser combinations form—tend to stop high-frequency currents passing from the anode circuits to the high-tension supply, and therefore from passing out of one circuit and into another.

Resistance Limitations

Resistances of 600 ohms or so are adequate here; indeed, much greater values could not very well be used, as they carry the anode current of the high-frequency valves. This may be, say, 3 milliamperes per valve, which is equivalent to a voltage wastage of 3 per 1,000 ohms.

The 1-microfarad filter condensers recommended are of an improved pattern, having a lower value of high-frequency resistance than is usual with paper condensers. This may seem a trivial matter, but actually is one of some importance, as it is essential that the impedance between the shields and earth, and the H.T. ends of the primary windings and earth, should be low in comparison with other available paths.

Amplification is controlled in this set by a filament resistance connected to the two high-frequency valves. This resistance is in the positive side of the filament circuit and does not alter the grid bias of any of the valves. It controls the filament current, and therefore the anode impedance of the high-frequency valves, thereby affecting the magnification *before* detection.

A leaky-grid detector is used. The values are .0002 microfarad and 1 megohm with the grid leak taken to the positive side of the filament circuit. The detector will handle more power than when a larger grid condenser and grid leak are used.

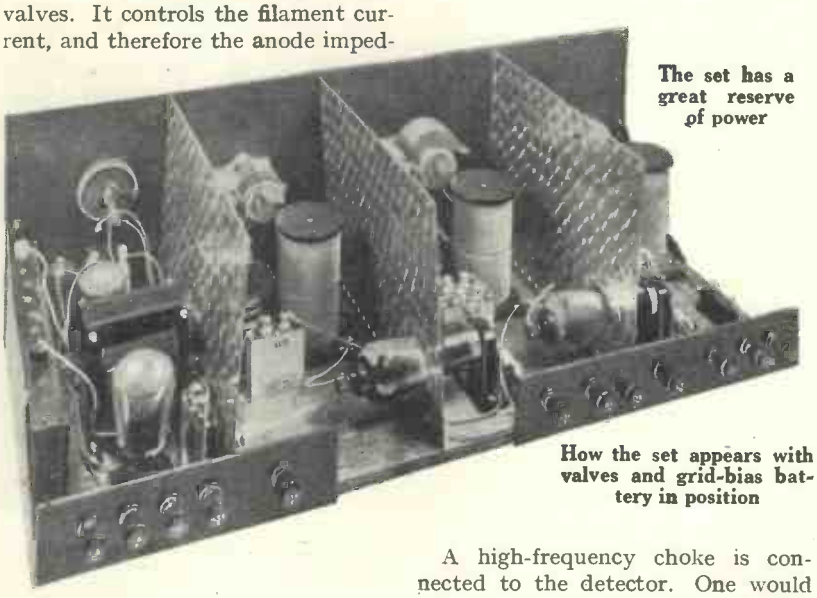
You may wonder why a leaky-grid detector is used and not an anode bend. There are several reasons, the chief being simplicity, quality, sensitivity, and the make-up of the low-frequency circuit.

Unsuitable Detectors

Not all present-day valves make good anode-bend detectors, and the advantage of selectivity claimed for this type is not needed in this set. Most amateurs use a small power valve because of the relatively small anode-current consumption, and this can be fully loaded with a single resistance-capacity stage giving little magnification.

Excellent Quality

I have used a transformer, the actual one employed having a ratio of 7 to 1, and a detector valve of the medium-impedance or high-frequency type, and with the grid condenser and leak values recommended the quality is good, and it is easy fully to load the power valve from distant stations.



The set has a great reserve of power

How the set appears with valves and grid-bias battery in position

A high-frequency choke is connected to the detector. One would not be needed with most low-frequency transformers, that employed having a condenser permanently joined across its primary winding by the makers.

For controlling the reaction a differential condenser of .0003 microfarad is used. Thus there is always capacity between the anode of the detector and earth—a condition

Another Fine Receiver by W. James

COMPONENTS REQUIRED FOR THE BROOKMAN'S FOUR

CHOKE, HIGH-FREQUENCY
1—Wearite, type HF1, 6/6 (or Climax, Igranic).

COILS
3—Wearite 1930 Binowave coils, one type A and two type B, 51/-.

CONDENSERS, FIXED
1—Trix .0001-microfarad, 1/- (or Graham-Farish, Lissen).
1—T.C.C. .0002-microfarad, type SP, 2/4.
5—Hydra 1-microfarad, 10/-.

CONDENSERS, VARIABLE
3—Ormond .0005-microfarad, friction control type with pointer dial, type R/372, 28/6 (or Cyldon, Igranic).
1—Polar .0003-microfarad (each side), differential type, 8/6 (or Lotus, Pye).

EBONITE
1—Becol panel, 24 in. by 8 in., 11/6 (or Parfait, Resiston).
2—Terminal strips, 8 in. by 2 in. and 10½ in. by 2 in.

HOLDERS, GRID-LEAK
2—Bulgin holders, type G6, 1/6 (or Ediswan, Lissen).

HOLDERS, VALVE
2—Marconiphone antimicrophonic, 3/6 (or Clix, W.B.).
2—Parex screened-grid, short type, 4/- (or Keystone, Colvern).

PLUGS
2—Belling-Lee wander plugs (marked : G.B.+, G.B.—), 7d. (or Clix, Igranic).

RESISTANCES, FIXED
2—Ready Radio 600-ohm, with holders, 5/6 (or Wearite, Climax).
2—Ediswan 20,000-ohm, grid-leak type, 3/- (or Lissen, Loewe).

RESISTANCES, VARIABLE
1—Lissen 15-ohm rheostat, 2/6 (or Igranic, Varley).

SCREENS
3—Parex screens, 10 in. by 8 in. (two with holes for S.G. valves), 8/6 (or Ready Radio, Peto-Scott).

SUNDRIES
Insulated wire for connecting.
Short length rubber-covered flex.
1—Pair Ready Radio panel brackets with clip for grid-bias battery, 2/6.

TRANSFORMER, LOW-FREQUENCY
1—Ferranti, ratio 7 to 1, 30/- (or Lewcos 5 to 1, Igranic 7.2 to 1).

ACCESSORIES

BATTERIES
2—Siemens 1½-volt cells, 3/- (or Hunt, Ever Ready).
1—Ever Ready 120-volt high tension, high-capacity type, 42/6 (or Lissen, Columbia).
1—Ever Ready 16-volt grid bias, 3/6 (or Lissen, Siemens).
1—Exide 2-volt 60-ampere-hour, type 1CZ6, 17/6 (or Oldham, Lissen).

CABINET
1—Pickett, upright type, with 10-in. baseboard, 40/- (or Camco, Ready Radio).

LOUD-SPEAKER
1—Brown Duplex, type V10, £5/10/- (or Celestion, Amplion).

VALVES
2—Mazda 215SG, 45/- (or Marconi S215, Osram S215)
1—Mazda HL210, 10/6 (or Marconi HL210, Osram HL210).
1—Mazda P240, 12/6 (or Marconi P240, Osram 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

favouring good detection, as I have pointed out before. The reaction control is good.

I have now described the chief features of the set, the coils having been fully discussed in the October and November numbers.

There is a further point of interest, however. Both anode high-frequency transformers have reaction windings. Only one is used for reaction purposes, this being the winding provided on the transformer coupling the second high-frequency and detector valves.

In Series with Primary

The winding on the first intervalve transformer—that is, the one coupling the first and second valves—is not used for reaction; but I have found that when extreme selectivity is not required it may be joined in series with the primary winding. There will seldom be any advantage in this, however, except when the valve happens to be of more than normal impedance.

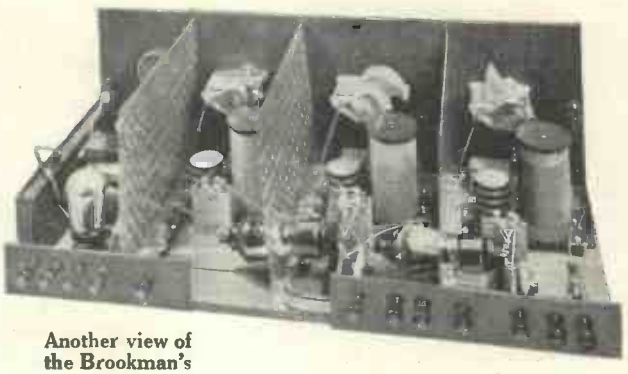
To deal now with the construction, we will first see to the panel. There are three tuning condensers mounted upon it, and also a filament resistance and reaction condenser. Below the three tuning condensers are the wave-length range switch knobs as indicated in the blueprint.

These parts should be carefully arranged, particularly when other patterns than those illustrated are being used. There is ample room for the parts fitted to the baseboard.

It is best, probably, to fit the 1930 Binowave coils first, then the metal screens, and finally the valve holders and fixed condensers, choke, and transformer. These parts fall naturally into place, the fixed condensers being near the valve holders and coils and the stopping resistances. When they have been fitted the panel should be taken away from the baseboard, as it is much easier to wire the parts on the baseboard when they can be reached from both sides.

Three Hours' Wiring

The complete wiring took me exactly three hours and is, therefore, quite straightforward. A number of



Another view of the Brookman's Four

The Brookman's Four—*Continued*

the wires pass through holes in the shields, whilst others are connected to the shields by nuts and bolts.

Best Wire to Use

Some of the wires are continuous through several connecting points, loops being formed at suitable places and the wire continued instead of being cut. A fairly thin connecting wire is best with sleeving, as it is easily shaped and fitted to terminals or soldered.

Wires from the coils to the tuning condensers can be provided before the panel is fitted and afterwards be cut to length and the connections completed. The two grid-bias cells lie on their sides, and may be held by a length of wire whose ends are fixed by screws to the baseboard. They normally last for at least a year.

The terminal strips are arranged to suit the wiring of the set. There are the usual two aerial terminals, and one for the earth. Then come the battery terminals, so placed as to avoid unnecessary crossing of wires. They should therefore be carefully noted.

There is room for a 16-volt grid battery in the set, it being held by the clip part of the panel bracket.

The valves needed are two of the shielded type, one of moderate impedance, such as about 20,000 ohms, for detection, and one power. The power valve should, of course, be of as large a size as possible, and the high tension can with advantage be 180 volts.

Naturally, the usual 120-volt supply is perfectly satisfactory, but for the best quality and ample volume I recommend that the highest voltage possible be used. The higher voltage does not appreciably increase the magnification, but it does enable more power to be obtained from the last stage without overloading; consequently the quality is better.

Various H.T. terminals were provided for the reason that a high-voltage battery or a mains unit might be used. A minimum of 120 should be applied to the anodes of the shielded valves and a little more than the makers suggest to the shields, as explained previously.

Detector Anode Voltage

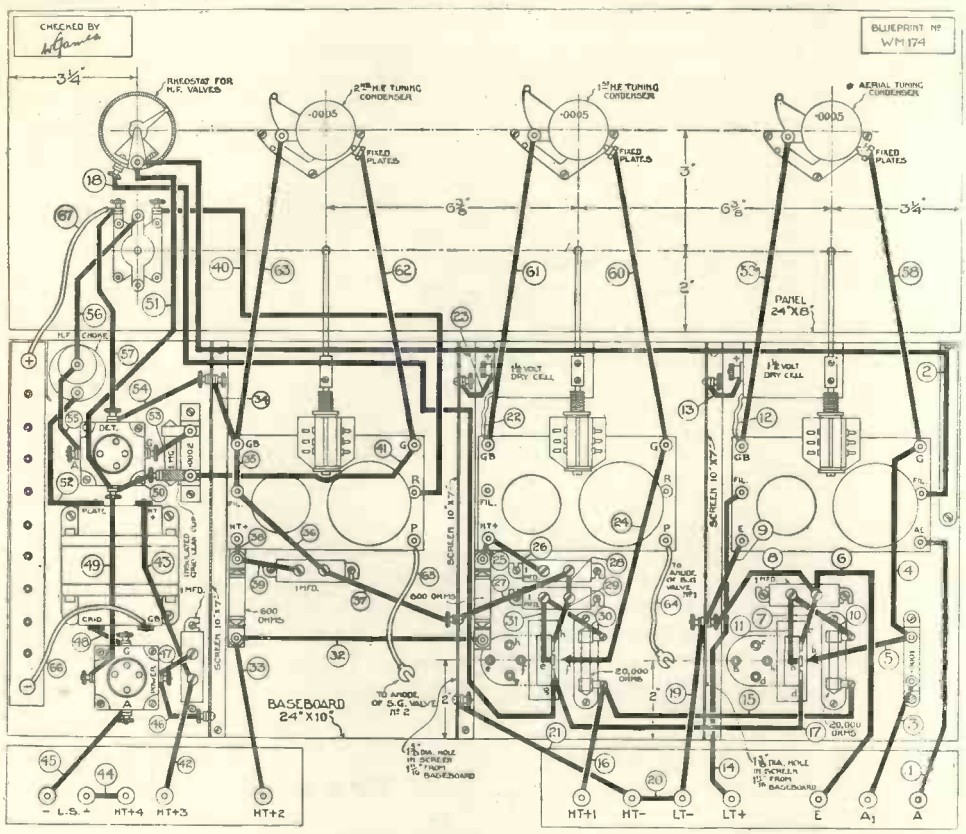
Apply about 100 volts to the detector and the full voltage, of course, to the power valve. Do not overlook the grid bias for the last stage.

The filaments are switched on or off by the switch of the aerial coil. With all switches pointing to the left the set is on and the short-wave coils are connected. When they point to the right the long wavelength stations may be received. When receiving on the lower broadcast wavelengths the aerial should normally be connected to the aerial terminal joined direct to the coil, but if the aerial is a short one the other connection should be tried, and it will normally be used when receiving the long wavelength stations.

Small Aerials

The effect may also be tried of short-circuiting the .0001-microfarad condenser, as this is not needed when the aerial is very small. A large number of stations will be received clearly and with ease, full reaction not normally being required. Owing to the selectivity of the set, a large aerial may be used, and it is sensitive enough to provide excellent results when a short one is fitted. A full test report with operating instructions will be given in the next issue.

DO NOT OVERLOOK ANOTHER ARTICLE BY W. JAMES WHICH APPEARS ON PAGE 618 OF THIS ISSUE



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 January 31. Ask for No. WM174. Wire up in numerical order

UNDER MY AERIAL

Halyard's Chat on the Month's Topics

Sketches by Glossop

Christmas, 1929

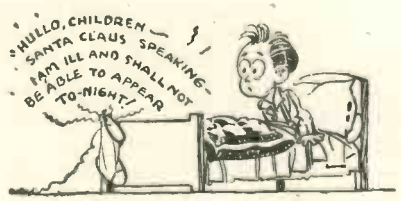
HELLO, everybody! Here we are once again at the festive season of the year when the whole world tunes in to mirth and merriment. All the good old wishes from the same old Halyard, who still writes to you from under the same old aerial.

MERRY CHRISTMAS, EVERYBODY, AND A HAPPY NEW YEAR!

May Christmas, 1929, be the best of wireless seasons to all of you—crystal users, one-valvers, two-valvers, three-valvers, four-valvers, five-valvers, and multivalvionnaires alike! May the New Year bring forth wireless blessings for you all such as you have never known before!

What a grand thing wireless is to us at Christmas! Have you ever thought of the way in which wireless connects us at Christmastime to the distant parts of our own country, to other countries, and even to the lands across the seas? Strange, isn't it, how this wireless link has crept into our lives? And even stranger, isn't it, how it adds to the mysterious charm of our Christmas?

Well, with luck, you will be reading these notes of mine a day or two before the twenty-fifth; so here are two last hints for your 1929 Christmas. Don't forget to have your *spare* accumulator charged, as well as the other ones, this week; and don't forget to hang your wireless stocking up, so to speak. You never know, you know.



Hang your wireless stocking up

◆ ◆ ◆

A Useful Present

If you are still wondering what you might ask for in the shape of a wireless present from somebody or other this Christmas, let me suggest you ask for a milliammeter. You would find such an instrument a most valuable addition to your wireless equipment, and it is very suitable for a suggestion for a Christmas present, since it is unlikely that you would buy one for yourself in the ordinary way.

I have had a milliammeter in use now for a considerable time, and I do not know how I should get on without it in some of the work I am doing. Only this last week I have had a most interesting example of the value of a milliammeter in wireless constructional work.

For the work I was carrying out, I required a high-frequency amplifier, and I rebuilt an amplifier having two stages of screened-grid valve amplification. According to the usual practice, I put my milliammeter in

I required a high-frequency amplifier

the negative high-tension lead. On testing the set before I put the valves in position, I found I was getting one milliampere of high-tension current through somewhere.

I immediately suspected that one of the large capacity condensers connected from screening-grid lead to common negative was faulty. By disconnecting them, one at a time, I soon found the offender.

Just imagine what I should have been doing if I had not had my milliammeter in circuit. One milliampere out of six running to waste without my knowing it.

Yes, I can recommend a milliammeter to you for a Christmas present. Put it on your list at once and pass the word round, and see that someone gets one for you. Failing that, you might buy one for yourself for an extra Christmas present.

Features of the Year

What has been the chief wireless feature of the year which is now almost at an end? I wonder if you could answer this question straight off the reel. It isn't an easy question

There are so many sides to wireless

to answer, is it? There are so many sides to wireless that, when you are endeavouring to decide upon the year's chief feature, you may be weighing up an exceptional broadcast item against a new type of valve, or the inauguration of a new broadcasting station against a new super-circuit.

If you take the different sections of wireless separately, however, the question becomes a good deal simplified. Let us have a look at these different sections for 1929, and see if we can decide on the chief wireless *features* of the past year.

Taking broadcast items first, which particular broadcast item do you consider to have been a wireless feature of the year? I would give my vote in favour of the Boat Race broadcast. Yes, I know that popular opinion would vote in favour of the Schneider Trophy broadcast. The Cup Final? Of course, I had forgotten that excellent affair, and how they ran from the Stadium to the—er——. Now, really, I—er—let's get on to the next section.

On the side of technical progress we have several important features to choose from—the opening of Brookman's Park, the start of the building of the palatial headquarters of the B.B.C. in London, and the start of the building of the new Pennine regional station. Oh, yes, the new Broadcasting House, Piccadilly, Manchester, certainly deserves our consideration.

Under My Aerial—*Continued*

And now what about the most important section: wireless in the home? Here I have a very definite suggestion to offer. I am of the opinion that the new screened-grid valve is the most important feature of the year in this section. You see, I have been working steadily for the last six months with these valves, so I know what I am talking about.

◆ ◆ ◆

In Prophetic Vein

"What are you going to do in the way of prophecies this year?" asked

A combination umbrella and portable set

George last night after we had taken particular notice of the severity of the broadcast weather forecast.

"If you mean prophecies of wireless development in 1930, the answer is nothing, George," I replied. "I have not forgotten the way you snubbed me a couple of years ago over my attempts at wireless prognostication. I did nothing at all of the kind last year, and I shall do nothing this year."

"Then I shall have to do it for you."

"Very well. Carry on."

"First of all, during the year 1930 we shall see the end of the outdoor aerial."

"As we ought to have done in other years, according to the prophets."

"But we did."

"How do you mean, we did?"

"We saw the end of the outdoor aerial in previous years, and we shall see it again in 1930—every time we look at it."

"Now, look here, George——"

"Second item, 1930 will see the metal panel displace the ebonite panel."

"Possibly, George, but——"

"Third item, in the early autumn of 1930 somebody will hear America in the twilight. Fourth item, the pentode will come into its own. Fifth item, John Henry will return to the microphone."

"I hope you are right over your fifth item, George."

"Sixth item, valves will be reduced in price——"

"Splendid, George!"

"But rates will go up."

"Rates?"

"Yes, charging rates. Seventh item, and last, the summer of 1930 will see the introduction of a combination umbrella and portable set."

"That will do, George. Next year I think I had better do the prophesying myself."

◆ ◆ ◆

Regional Views

Have your views on the new regional scheme undergone any great change since Brookman's Park became the main transmitter of the London station? I suppose your answer depends on whether you live within ten miles, or twenty, perhaps, of the new London transmitter.

Several of my wireless friends who live in North London have acquired very antagonistic views against the regional scheme since Brookman's Park came on the British ether. I have tried to point out to these friends of mine that the regional scheme has not yet been tried as far as 2LO is concerned, and that the scheme will not receive a trial until Brookman's Park transmits alternative programmes on two different wavelengths.

All that has been done up to now in the London area is that the Oxford Street transmitter has been replaced by a new and more powerful transmitter at Brookman's Park.

From what I have heard and from

A high-power transmitter in the vicinity

what I have read, it seems to me that most of the opposition to the regional scheme at present is, in reality, opposition to the placing of a high-power transmitter in the vicinity of a populous area. The greater the power of a transmitter, the greater the wipe-out area, and therein lies the mischief.

At the present time, I think we ought to exercise a little patience and give the new high-power station a fair hearing. After all, it would be a simple matter for the B.B.C. to *reduce* the power of a high-power station, it if were found expedient to do so.

◆ ◆ ◆

The Piano Tuner

So many unkind things have been said by leading musicians throughout the whole world against wireless, and other forms of "mechanical music," that I am extremely glad to pass on to you a little story about the gentleman who comes to my house periodically to tune my piano.

I daresay you are not very fond of piano tuners. Neither am I in the ordinary way. You can't listen to your wireless set comfortably when the piano tuner is at work on the piano in another room in the house,

You can't listen to your Wireless Set

can you? Tong-Tong—Tong—Ting-Ting—TONG! No wonder you don't like piano tuners in general; but you will like my piano tuner.

When my piano tuner had tuned my piano on the occasion of his last visit, he was asked why he didn't finish up by playing real music instead of—er—just scaling up and down the keyboard in haphazard fashion.

What do you think his reply was? I'm certain you would never guess. He said this:

"I am afraid I am sadly out of practice and I would hardly like to attempt to play anything. I used to play a great deal at one time, but since I took up wireless I have had no time to play.

"You see, I personally very much prefer to listen to the playing of music by others, and I get all the music I could possibly desire from my wireless."

What do you think of that, now? Do you like *my* piano tuner?

Halyard's Chat on the Month's Topics

Short-wave Work

I wonder if you have thought of turning your attention to short-wave work this winter. If you did so, I am

Your enjoyment of wireless

certain that you would add more than you can possibly imagine to your enjoyment of wireless. Reception on the very short waves may be something of a gamble, but it is a fascinating gamble. You never know what you are going to get, and when.

You know that I have been so busy with my screened-grid high-frequency amplifying work that I have had no time for other work the last few months. I fully intend to return to short-wave work, however, before the winter is over.

My previous experience of short-wave work leads me to say that it is best to build a special receiver for such work. It is possible to adapt an ordinary receiver for reception on the short waves, but a separate receiver gives you the most scope.

As is my invariable custom with regard to all wireless matters, I have discussed short-wave work with George.

"Do you think it is really worth while building a special short-wave receiver, George?" I asked.

"Most certainly I do, if only to hear the fellow who bangs the mantelpiece with his frying pan as an interval signal," replied George.

Short-wave enthusiasts will have no difficulty in recognising the station to which my technical adviser referred.

◆ ◆ ◆

Wireless and Crime

If there is one class of person to whom wireless must have become a

The ordinary policeman on his beat

hateful innovation these days, it must be the criminal. All over the world police are using wireless more and more to aid them in the apprehension of the wrong-doer.

Chicago is perhaps the city which has made the greatest progress in the use of wireless as a police weapon if one can judge from the fact that several other American cities are now taking steps to copy the wireless system of the Chicago police.

Detroit is another city which has made great progress in this new application of wireless and, by means of the efficient wireless system of the Detroit police, arrests have been made within half a minute of the receipt of the alarm at headquarters.

I have found the descriptive accounts of these wireless systems of the American police most interesting from a technical point of view. Each system involves a transmitting station and a large number of motor cars fitted with receiving sets.

The Detroit police designed their own receiving sets, which employ no less than six valves. The police wireless experts of this city are now at work on the design of a portable set for the use of the ordinary policeman on his beat.

Perhaps somebody will write a

book some day on the use of wireless in the detection and prevention of crime, and in the speedy apprehension of the criminal offender.

◆ ◆ ◆

Wavelength Classification

"What do you think of the new wavelength classification, George?" I asked my technical adviser as he sat down in his usual armchair on the non-draughty side of my reception-room fire.

"Not heard of it," replied George.

"Glad to be able, then, to tell you something you do not know about wireless, George. This new wavelength classification has been drawn up by the International Consultative Committee of the Radio-Electric Conference——"

"What a big door they must have to their offices."

"Big door, George?"

"Yes, to get all that on it. But go on."

"The classification is as follows, George. Three thousand metres and upwards are long waves; two hundred to three thousand metres medium; fifty to two hundred, intermediate; ten to fifty metres, short; below ten metres, ultra-short."

"I don't like it."

"Why, George?"

"First of all, I do not agree to the grouping together of all wavelengths from two hundred to three thousand metres. Why, such a grouping puts the two Daventries in one group!"

"That is a point, certainly, George."

"Again, the word 'super' does not

Cannot expect America to understand

come in the classification. Hence you cannot expect America to understand such a classification."

"Where would you include the word super, George?"

"At the bottom of the list. I should call all waves below ten metres super-short waves. From ten to fifty, I should call short waves."

"What would you call waves between fifty and a hundred metres, then?"

"Oh, just shortish!"

"I see. And from a hundred to two hundred metres, shall we say?"

"Low."

"Two hundred to five hundred metres?"

"Whistlers."

"Five hundred to a thousand?"

"High."

"A thousand to three thousand?"

"Very high."

"Above three thousand?"

"Commercial."

"Very good, George. We'll adopt your wavelength classification, if nobody else does."

How Strong is a Good Signal?

A Special Article by
J. H. REYNER, B.Sc., A.M.I.E.E.

Portable equipment used for check tests on signal strength at the Furzehill Laboratories, Elstree

FOLLOWING my recent article on the measurement of the field strength of Daventry in Cornwall, I have received one or two letters from readers inquiring for further particulars.

It appears that the idea of showing definitely what field strength one may expect from a given station finds favour in many quarters, for, as one reader puts it, one's receiver is called upon to handle all ranges of signal between the strongest likely to be obtained from a powerful station close at hand to a weak signal which is on the border line of satisfactory reception.

Measuring Grid Voltage

One reader, indeed, asked for details as to how the strength of field can be measured in terms of the voltage delivered to the grid of the first valve. This, however, is rather a cumbersome proceeding

The experimental work necessary on my own apparatus before it was in a fit state to take away with me to Cornwall occupied many weeks, and the various little details to which attention had to be paid would not make interesting reading to the majority of listeners.

What will, I think, be of interest is the average order of field strength corresponding to various classes of signal and the method by which these field strengths may be converted into actual voltages applied to the input of one's receiver.

Let us consider, first of all, the question of field strength. A wireless wave consists of rapidly moving belts of electric field. This is a state of strain in the ether caused by a difference of potential. If, for example, we consider a very large condenser having two plates separated by some distance and charged with electricity, then between the two plates we have a vertical belt of electric field, as shown in Fig. 1.

If we pass a vertical wire across the condenser from one side to the other, as indicated in the diagram we shall have a voltage induced in this wire by the field due to the motion of the wire. The voltage depends upon the length of the wire, the strength of the field, and the speed with which we move the wire through the field.

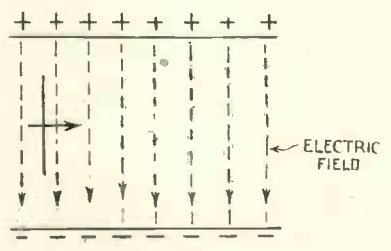


Fig. 1.—Moving a wire across a stationary field

In the case of a wireless signal, the electric field is not stationary, but is moving. We start at the transmitting end with a stationary field somewhat like that shown in Fig. 1, but when we set the aerial in a state of oscillation, we shoot portions of this field off like bullets from a gun, and they travel outwards in ever-widening circles at the uniform and very high speed of 186,000 miles per second.

If the Field Were Visible

At any distant point, therefore, an observer, if he could actually see the field, would notice belts of electric field, first in one direction and then in the other, shooting past him with incredible rapidity.

We cannot actually see these fields, but we can detect them by setting up a vertical wire which we call an aerial. We do not have to move this, because the field itself is moving in this instance, and the passage of each belt of field leaves a voltage behind in the aerial system.

The effect is exactly the same as moving the wire across the stationary field shown in Fig. 1, only in this case the wire is still and the field is moving. Therefore, the same laws apply, namely, that the voltage induced is proportional to the length of wire, the strength of field, and the speed of the movement of the field. This last factor, in our case, is fixed and does not come into the calculation.

We are left, therefore, with the height of the wire and the strength of the field, and to facilitate calculation this latter quantity is measured in terms of millivolts per metre.

What a Millivolt Is

One millivolt is 1/1,000th of a volt, and a field having a strength of 10 millivolts per metre would induce 10 millivolts in a wire having an *effective* height of 1 metre. It will be seen that the nomenclature, therefore, is very simple and lends itself to rapid calculation.

This question of effective height is

a matter of a certain amount of difficulty for, strictly speaking, the simple rule just given only applies where we have an aerial in which the whole of the capacity is concentrated at the upper end and the connecting wire has no capacity or inductance of its own.

Continual Capacity Effect

This is not the case in practice, for there is a continual capacity effect to earth which gets greater as we get nearer to the earth and, at the same time, the wire has a certain amount of inductance, in consequence of which a vertical wire, say 10 ft. high, behaves as if it were an ideal wire only some 7 ft. high. In other words, it has an effective height which is about 70 per cent. of its actual height.

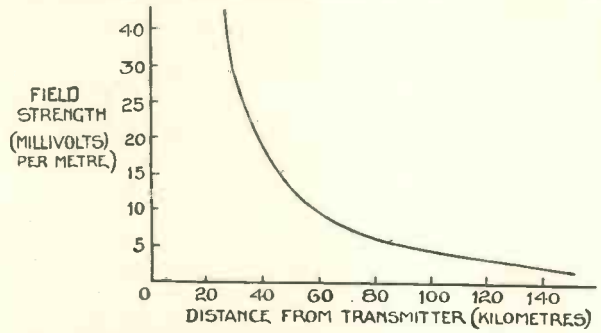


Fig. 2.—Curve given by Eckersley, showing probable signal strengths from a regional station

In any calculation which is made, we must know the effective height of the aerial system, and this is bound to be to a large extent a matter of guesswork, for it requires rather elaborate apparatus to obtain even an approximate measurement of this quantity

Similar Characteristics

Fortunately, most aerials are of a similar character, and we may take as a fair approximation the effective height of the customary broadcast aerial to be 50 per cent. of its actual height. If a single vertical wire only is used, the effective height is rather more than this and may reach 60 per cent. or 70 per cent., but most people have a small percentage of horizontal top, and this reduces the effective height quite considerably, so that the figure of 50 per cent. just quoted is a fair average for normal conditions.

Therefore we may say first of all that, knowing the signal strength in millivolts per metre with which we are to deal, the voltage induced in our aerial system is obtained by multiplying this figure by the effective height of our aerial in metres and, for all practical purposes, we can take this as one-half of the actual height (not the total length of wire, but simply the height to the horizontal portion).

The question now arises as to what constitutes a good signal. Here numerous measurements made by the B.B.C. and confirmed by myself during experiments extending over the past few months give us a fair indication

All normal signal strengths come within the category shown in the table quoted herewith. This table is self-explanatory and gives an immediate impression of the strength of signal required under various conditions. Signals weaker in intensity than are shown on the table cannot be considered to be satisfactory, even if one is prepared to put up with a good deal of interference.

The signal strength received in the extreme west of Cornwall is as low as 1 millivolt per metre, and the reception is, indeed, of a very poor quality compared with what the city dweller is used to

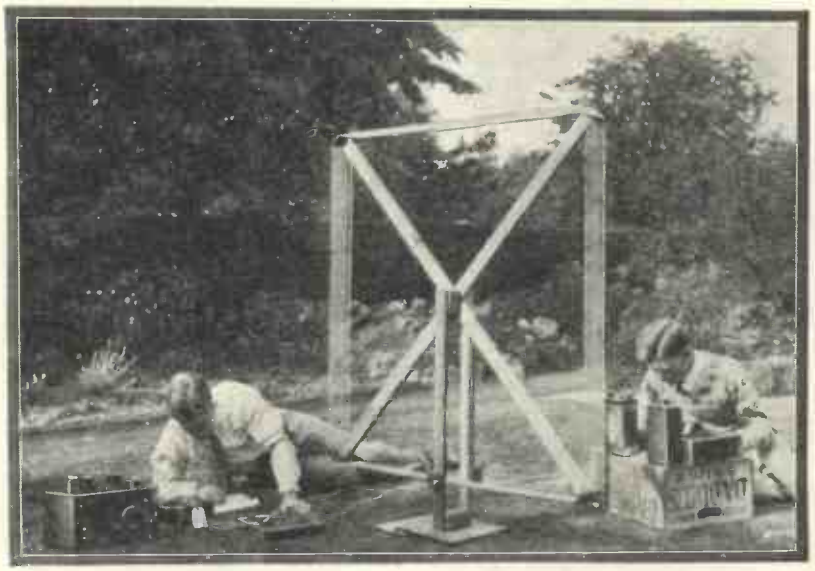
At the other end of the scale, we begin to approach the wipe-out signal

TABLE OF SIGNAL STRENGTHS

Signal Strength (millivolts per metre)	*Character of Signal*
10	Good strong reception, even above electrical interference from trams, electrical signs, normal atmospherics, and morse.
5	Good reception, but liable to interference from the worst forms of disturbance.
2.5	Fair reception, subject to interference by the sources stated above. Atmospherics especially troublesome.
1	Lowest strength capable of giving reasonable service. Liable to interruption for prolonged periods —lasting ½ minute to 1 minute in severe cases.

A signal strength of from 10 to 20 millivolts per metre is uncomfortably strong and requires considerable skill in tuning it out in order to receive other stations.

When we get to signal strengths of 30 millivolts per metre, we reach a state of affairs where a single tuning circuit, no matter how good, is unable to tune out the station, and two circuits at least must be used. The signal strength of Brookman's Park at Elstree is distinctly above this value, producing a very considerable wipe-out effect



Part of the incidental work in J. H. Reyner's field-strength tests. Measuring the absolute field strength from 5XX at Elstree

What Strength is A Good Signal?

An impression of J. H. Reyner—after a round of golf!

In order to give some idea of the probable signal strength from a regional station a curve is given in Fig. 2, which is taken from a paper by Eckersley, showing the results to be expected from a regional transmitter.

At the moment I have no information as to whether the strength from Brookman's Park is above or below that shown by this curve, but at any rate it will serve to give some approximate indication of what may be expected.

The next phase of the operations is the calculation of the voltage developed across the grid and filament of the input to the set. This is not the same as the voltage induced in the aerial system, owing to what is known as the magnification of the tuned circuit.

Great Voltage Developed

When we tune a circuit to resonance, the voltage developed across the tuning condenser is many times greater than the voltage induced in the circuit. It is, indeed, this property of tuning which enables us to pick one station out from another one, for actually all the stations in the vicinity induce their quota of voltage in a receiving aerial and we only select those which we require by virtue of this property of tuning.

The magnification of the circuit depends entirely upon its efficiency. It is obtained from the expression:

$$\text{Magnification} = \frac{1}{R}\sqrt{\frac{L}{C}}$$

where L = inductance in microhenries,
C = capacity in microfarads,
R = H.F. resistance of circuit.

Thus, for an average circuit having an inductance of 200 microhenries, tuned with a capacity of .0002 microfarad and having a high-frequency resistance of 5 ohms, the magnification would be 200.

Therefore, if we have, say, 10 millivolts actually induced in the aerial to start off with, the voltage applied across the grid and filament of the first valve would be 2 volts.

In evaluating this magnification, it is necessary to take into account all the damping factors in the circuit. It is not sufficient to allow for the coil resistance only. We must take into account the damping introduced by the valve itself or by the aerial system, or even allow in some way for the negative damping introduced by a reaction effect.

Small Valve Damping

Where we apply our signals to a high-frequency valve, or to an anode-bend rectifier, the damping imposed by the valve itself is not large and we can consider virtually that the resistance of the circuit is made up wholly of the resistance of the coil and of the aerial.

Now this latter resistance, again, is a somewhat indeterminate quantity, since the effect of the aerial on the tuned circuit depends upon the manner in which the aerial is coupled to the set. Generally, however, if the aerial is coupled in a fairly loose manner, and it is of a reasonably efficient character, it will not increase the resistance of the coil by more than 30 per cent. to 50 per cent.

If, therefore, our coil has an actual resistance of 10 ohms, we could assume that the total resistance was 15 ohms, and we should probably be approximately correct.

Where we are considering the case of a detector valve, it will be found that the damping introduced by the detector is very much more serious and, indeed, swamps the effect of the aerial almost completely.

I cannot discuss in the present article the method of making the necessary calculation, but I propose to do so in a further article dealing not only with this subject, but with the question of the input which can be handled by a given detector without overloading.

It only remains to deal with the case of a frame aerial.

Frame-aerial Equivalents

A frame aerial can be considered as equivalent to a vertical aerial of height

$h = 6.28\ NHL/\lambda$ metres.

where H = height of frame in metres,
L = length of side of frame in metres,
λ = wavelength being received in metres,
N = number of turns on the frame.

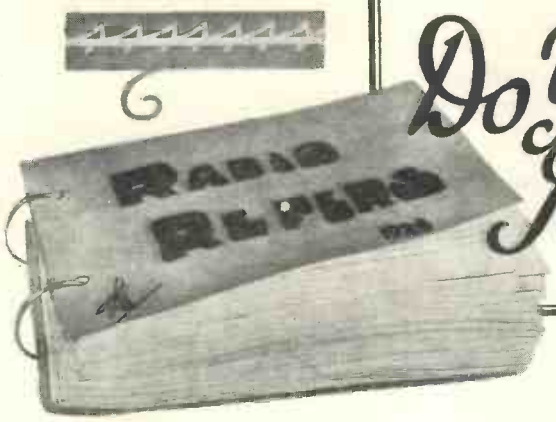
Therefore, for one's frame aerial, it is first of all necessary to work out this equivalent height—which, by the way, will be found to be ridiculously small, so do not be surprised if it comes out at some small fraction of a metre—and then to multiply the field strength by this effective height. This gives the voltage induced in the frame.

Multiply this by the magnification factor of the circuit in the manner already discussed in order to obtain the actual voltage applied across grid and filament. In the case of a frame aerial, the aerial effect itself is not appreciable and the only extra effects which we have to consider are the possibility of damping imposed by the first valve.

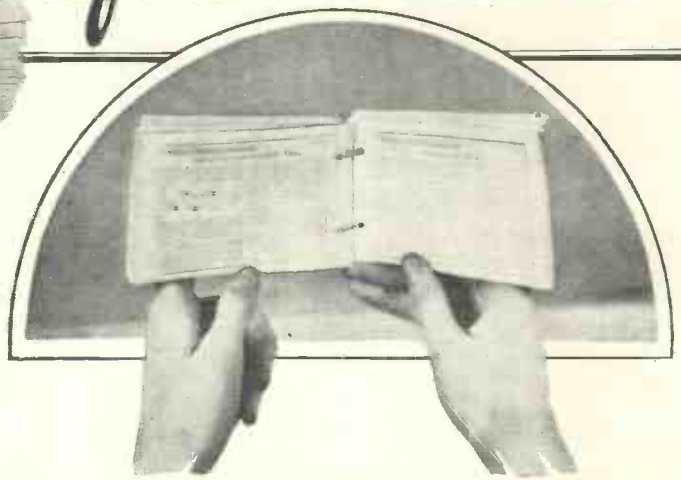
Actual Resistance of Frame

Since this is nearly always a high-frequency valve, we may take the effective resistance of the frame as equal to its actual high-frequency resistance. This particular case, therefore, is somewhat simpler than the outside aerial case.

Having derived the voltage applied across the input of the receiver, it is then a fairly straightforward matter to determine the voltages in any other part of the receiver. The magnification in the high-frequency stage can be calculated in terms of the constants of the circuit and hence the voltage applied to the detector can be deduced.



Do You Use Our Reference Sheets?



EVERY month we publish in these pages five reference sheets that contain invaluable information for the amateur. Do you make use of them?

A simple method of filing them is illustrated by the photographs, which show the system adopted by a Chichester reader, who makes the following comments :—

For Experimenters

"As one who spends a large amount of time on radio experimental work, I would thank you for the Reference Sheets, published by you in each month's WIRELESS MAGAZINE.

"These sheets are extremely valuable to one who has not the time available to search through standard works. Indeed, up-to-date text books are absolutely *non est* in the new science. You deserve the thanks of all enthusiasts for such carefully chosen data.

"I enclose a copy of a handy reference file I have made in case you would care to describe it in your publication.

"You will observe it is made from cheap postcards, punched to take copper rings, which allow any card to be abstracted for reference without disturbing others."

If you are not already collecting them, follow this reader's good example and compile your own data book month by month.

Can You Beat This Record with Your Set?

HAVE you ever tried keeping a record of *all* the stations you pick up on your valve set?

If not, try it, and (provided that your set is an efficient one) you will probably be astounded at the number of transmitters logged in the course of, say, a year—especially if you can read morse and are in the habit of exploring the short waves as well as the ordinary medium and long wavebands.

On A Two-valve Set

I have kept a record for several years past of the stations picked up on a favourite two-valve set of mine, which I use as a stand-by for headphone reception of Continental broadcasting or morse transmissions, etc., whilst the other members of the family are enjoying the B.B.C. programmes.

On adding up the number of stations in this log the other day I was surprised, to say the least of it, when I discovered the total to be 1,676 !

Analysing this total, I found that it included 694 amateur and experimental stations, 422 fixed and land stations, 144 broadcasting stations (including short-wavers), and 62 commercial aircraft. Among the latter are the call-signs of one or two ill-fated machines that now, alas ! can be heard no more, having met with an untimely end through crashing.

Of the amateurs received, the majority, of course, are British, French, Belgium, Dutch, German, etc., but the record also includes many stations in more distant places, such as Egypt, Iraq, Canada, and the United States.

Naturally, I do not bother to record the call-signs of all the ships' transmitters which butt in with their spark morse when I am trying to get distant broadcasting !

But I make an exception in the case of ships sending TR messages, reporting their position, etc., as it is interesting to find out the distance over which the transmissions can be heard. The ships from which I have picked up these reports number 354, completing the total given above.

Use of Published Lists

Instead of keeping a written list of stations received, I have an amateur-station call-book and the official lists of radio-telegraph stations, and in these I simply place a mark against the call-sign of each station I hear. In the case of unlicensed amateur stations (of which there seem to be hundreds on the Continent) not mentioned in the printed list, I jot down the call-signs in the margins.

A record of this kind is very interesting, because it provides quite startling evidence of what can be done with even a simple type of receiver by anyone who listens regularly and explores a wide range of wavelengths.

W. O.

STATION NAMES :: DETECTORS :: B.B.C. TESTS :: H.T. SOURCE

Re-naming the Stations

ORIGINAL SUGGESTIONS

IT is suggested in various quarters and for various reasons that the time has come to re-name the broadcasting stations, and give them all worthy names.

One suggestion is that they should be named according to their area. Thus we would have such stations as N.E.E. station, N.N.E. station, and S.S.E. station among others.

Going the Whole Hog

Why not go the whole hog and give names that cannot be misunderstood. London may mean anything. *Londohm* could only mean one thing. A suffix could be added in some instances so as to make *Cardifferentiation, Bournemoutherm, Birminghampres*.

The prefix would help with *Knobelfast, Gridaventry*, and *Dialeeds*. The enthusiasts who are extreme fans and demand the inclusion of a prefix and a suffix could be satisfied with *Diaphramanchesterminal*.

Aberdonians would be grateful for the *change*. But critics cannot agree what it should be.

(E. B. R.)

Choosing A Detector

TWO-VOLT ADVANTAGES

GENERALLY speaking, it is a bad plan to "mix" valves in a set; that is, so far as the L.T. voltage is concerned. "Two's," "four's" and "sixes" are used, but most amateurs employ all values in one set requiring the same low-tension potential.

Two-volters Most Popular

"Two's" are, at present, undoubtedly very popular, though valve manufacturers' figures show that the four-volter is by no means defunct and forgotten. Two-volters are most popular, presumably, because the initial cost of the accumulator and the continued accumulator-charging costs are less.

Six-volt valves have the greatest length filament of the three, and the emission is consequently greater.

"Are six-volter's better, then, than 'two's' or 'four's'?" is a natural question to ask. The correct answer cannot simply be given as "yes" or "no." So much depends on the purpose for which the valve will be used. For low-frequency amplification, there seems to be little doubt but that the extra emission is an unquestionable advantage. In some instances and with some circuits, the same is true of the H.F. side.

But it can be most definitely proved that the two-volt valve (of the correct type, of course) makes a noticeably better detector than its "four," or "six" brethren. The difference in one or two cases may be sufficient to make it worth while using a two-volt detector with six-volt valves in the other stages.

A tapping may be made to one cell of the accumulator, but, far better, a series resistance may be inserted.

(D. A. T.)

The Tatsfield Tester

B.B.C.'S TEST STATION

TATSFIELD, Surrey, sounds a long way from Keston, Kent. But actually Tatsfield, whereat is the new B.B.C. testing and relaying station, is only about three miles from our old friend, Keston.

It is of interest, too, to note that the site at Tatsfield is adjacent to one which was considered, but subsequently turned down, when the Keston tester was being planned early in 1924.

The main work of Tatsfield is divided. Relaying of American and European programmes is one branch, and in one room there are many sets devoted to this work. The second big job is sub-testing the Brussels wavemeters by means of which many Continental stations are able to keep, more or less, rigidly to the Prague Plan.

A valve-controlled tuning-fork oscillator forms part of the frequency-testing apparatus, and cavity walls and hot-water and electric radiators in the two mains rooms at Tatsfield maintain the temperature at a more or less constant level—an important feature with such delicate apparatus of this kind.

There are five short-wave sets at Tatsfield, so some interesting experiments should be carried out on the "wavelets" during the forthcoming season.

(B. E. S. S.)

A Quaint H.T. Source

USE OF LARGE CONDENSERS

DURING the war, I remember, we used to experiment a great deal with strange methods of getting H.T., both for receivers and low-power field phone transmitters. This was the time when dry batteries were uncertain quantities: stores were so often liable to be "*Minnied.*" Accumulators were out of the question for H.T., and I don't think any of the services were provided with them—at least, not the type now used as the H.T. for receivers.

I remember one quaint H.T. source which—I see no reason why not—might be adapted to present-day broadcast needs. A little explanation will be needed.

Charging a Condenser

If you charge a large fixed condenser by placing a D.C. supply across it temporarily, it should hold the charge until the insulation leaks. If you put two condensers in *series*, and charge each one separately from a 250-volt source, the total output from the condenser series terminals (the outside ones) will be about 500, not allowing for losses.

This is the principle of the "condenser-commutator" system of H.T., which I think might be adapted nowadays for obtaining H.T. from the L.T. battery. We had a whole bank of condensers in series, and a small motor-driven commutator was arranged to charge each in turn from a standard 10-volt accumulator box.

Ripples in Current

There were many "snags," of course. The current taken to drive the commutator caused ripples in the charging current for the accumulator bank. The only successful way was to have two accumulators.

CRYSTALLINE FINISH : SHAKESPEARE UP-TO-DATE : TERMINALS

The condensers—thenadays—were not very efficient, particularly in the extreme damp and cold, and we had to have a bank of fourteen—if I remember rightly—to get an effective voltage step-up of 100 volts from a 10-volt accumulator.

Capacity-time Formulae

It was difficult to eliminate ripple, because if the condensers were too small, the commutator period was noticeable; on the other hand, if the condensers were made too big they were not charged up in time. We devised wondrous and ponderous capacity-time formulæ to cope with this final snag, but they did not cure it! We might have better luck nowadays! HIGH TEN SHUN.

That Crystalline Finish

RESULT OF AN ACCIDENT

THE crystalline enamel finish, so familiar on wireless loud-speakers, cabinets and transformers was, like many other valuable discoveries, the result of an accident.

Owing to the very high prices ruling for linseed oil some few years ago, paint and varnish manufacturers were obliged to look round for a cheap adulterant. The most suitable appeared to be a Chinese wood oil, which could be used in varnish up to the high proportion of one part to three of linseed oil.

This varnish was satisfactory in itself, and as the medium for household paints. But one firm tried it as the medium for a black stoving enamel, that is, one which requires to be dried by heat in a stove.

Consternation!

As customary, samples from the bulk were tested in the laboratory stove, but when the result was seen, consternation reigned. The painted surface had curdled or "crystallised," and this effect was traced to the action, under heat, of the wood oil on the pigment in the enamel. Consequently the whole vat was useless.

But a little later, one far-seeing member of the firm had an inspiration. He saw possibilities in this crystalline surface as a decorative finish. Experiments were carried out until consistent effects could be guaranteed, and samples of the results were sent round to various important consumers. Gradually, one after another, the wireless manufacturers adopted the new finish.

Other paint firms soon began to make crystalline enamels, and various shades were produced to satisfy an ever-growing market. Now, ironically enough, the formerly cheap Chinese wood oil has become, as a result of the largely increased demand, more expensive than the linseed oil it once replaced. J. S. P.

THE AGES OF WIRELESS

(With Apologies to Shakespeare's Set.)

THE FIRST SET

The age of the Announcers	Marriage
,, ,, ,, ,, Farmers' Bulletin	Tillage
,, ,, ,, ,, Children's Hour	Cribbage
,, ,, ,, ,, Sunday Evening Sermon	Parsonage
,, ,, ,, ,, SOS	Message
,, ,, ,, ,, Women's Talks	Sausage
,, ,, ,, ,, Variety Programme	Rummage

THE SECOND SET

The age of the Grid	Leakage
,, ,, ,, ,, Valve	Damage
,, ,, ,, ,, Waves	Mileage
,, ,, ,, ,, Set	Poundage
,, ,, ,, ,, Musical Broadcasts	Bandage
,, ,, ,, ,, Aerial	Wreckage
,, ,, ,, ,, Circuit	Shortage

THE THIRD SET

The age of the News Bulletin	Shrinkage
,, ,, ,, ,, Cricket News	Average
,, ,, ,, ,, Weather Forecast	Drainage
,, ,, ,, ,, Certain Play	Plumage
,, ,, ,, ,, Gramophone Records	Breakage
,, ,, ,, ,, Morse Code	Dotage
,, ,, ,, ,, Rugby News	Scrummage

E. B. R.

Screwing Down A Wire

A FORGOTTEN TIP

THERE are quite a number of very useful time-saving hints and tips which would have been well known to listeners in the early days, but which, with the large influx of folk who care little for technicalities, are, perhaps, almost forgotten.

Which Way Round?

Take just one simple thing. If you are putting a wire on a terminal of the usual screw-down type, which way do you twist the wire-end round the terminal shank? So many people seem to think that it doesn't matter, which is, of course, quite wrong.

If the terminal head is to be tightened in a clockwise direction, which is normal, the wire should be twisted also in a clockwise direction around the shank. If put on the other way it will tend to spread and possibly slip off.

Can You Think of Any?

There must be many other tips which are so obvious as sometimes to be overlooked. Can you think of any? BIM.

Wireless Troubles on the South Coast

MY experiences of wireless reception on the south coast during a recent holiday have left me with the impression that, however delightful that part of the country is in other respects, it can hardly be described as a paradise for wireless enthusiasts!

Quick Aerial Corrosion

Their troubles begin when they erect an aerial. The salt sea-breeze quickly corrodes all exposed metal parts such as earthing switches, etc., and if ordinary bare copper aerial wire is used, its pristine gleam departs in a few hours and the wire turns greener than the sea itself—which cannot be said to improve its efficiency!

Curiously enough, comparatively few of the listeners in the district where I was staying seemed to have resorted to the obvious remedy of using enamelled wire.

On exposed parts of the coast, aerials cannot be slung up in the haphazard fashion that one sometimes sees elsewhere. No, they have to be well and truly erected, and the mast (if there is one) very securely guyed, for otherwise the owner thereof is likely to wake up in the morning after the first real Channel gale to find the whole outfit lying flat on the lawn!

There is, however, one consolation about being on the coast; as wireless waves travel so much better over water than over land, reception from Continental stations to the southward is very good.

Radio Axioms

The radio experience that costs nothing is worth nothing.

Study your set while it works well.

It is better to play with the ears than the tongue.

New wireless sets beget new friends.

A man is a man though he uses a headphone.

He that knows little about radio soon repeats it.

After dinner sit awhile, after supper walk the dial.

A fool cannot be still, even when he's got a good spot.

But even the sea has its drawbacks from a wireless point of view, for the sea means ships, and ships mean morse—and often, unfortunately, broadly-tuned "spark" at that.

To add to the continual background of interference on medium-wave broadcasting caused by the ships, there are those coast stations (such as FFB of Boulogne—a particularly bad offender) still retaining obsolescent but powerful spark transmitters which seem to spread themselves over half the medium waveband.

Nuisance of the South Downs

To complete the list of troubles, there are the South Downs, beautiful to look upon, but quite a nuisance if one's aerial happens to be under their shelter, because they tend to "screen" off signals from the northward—which include, of course, those from 5GB.

The one reliable stand-by for the coastal dweller is 5XX, whose signals seem to be very little affected by either "screening" or morse interference, and invariably come in well.

W. O.

High-power Television Broadcasts

C. FRANCIS JENKINS, the well-known television expert of America, has seen the fruits of his labours brought to a successful conclusion with the opening of his own high-power television broadcasting station.

The station, the first of its kind, so far as the power is concerned, is located in the capital of the United States, Washington, D.C., and broadcasts visual images on a wavelength of 103.4 metres with 5,000 watts. The aerial system is supported between two lattice steel masts each 128 ft. high, spaced 200 ft. apart, and is of the cage type with a counterpoise earth system.

Daily Schedule

The station is actually functioning at the present time with a daily schedule, transmissions being given between the hours of 8 p.m. and 9 p.m., and sends out moving pictures by means of the Jenkins' system.

The whole station and studio are housed in a building of the bungalow type. In the studio there is a motion-picture projector with its film reels, together with the usual television scanning discs, photo-electric cell equipment, and radio amplifier.

The last is employed for the purpose of magnifying up the feeble electric impulses produced by the photo-electric cell from the light variations falling on it from the moving film.

In the adjoining room is located the actual radio transmitter, which is capable of dissipating 5,000 watts. Its design is slightly different from the ordinary broadcast transmitter in that special care has been taken to meet the particular requirements desired for the faithful transmission of images on carrier waves as compared with those necessary for sound transmissions.

A 5-kilowatt water-cooled valve is employed for generating the wireless waves, and it is anticipated that with this valve signals will be received over the whole of the eastern half of the United states.

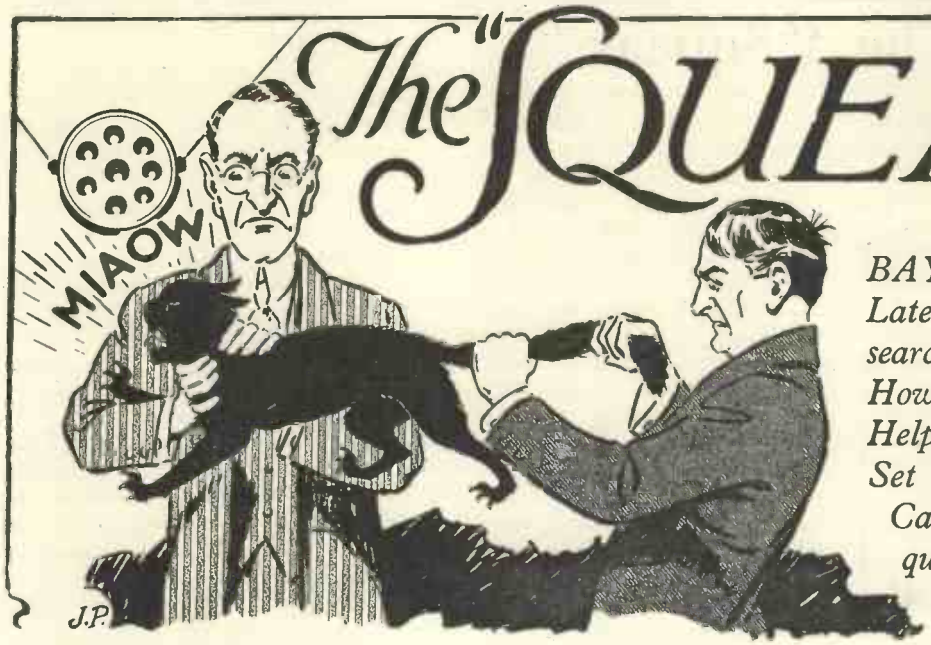
First Transmission

The first broadcast establishing this new service was the transmission of a silhouette showing a small girl bouncing a ball. Apparently this scene depicted a romantic side of Jenkins' work in that this was one of his first efforts in connection with the television art. This was followed by a long film entitled *Call It Love*.

A further studio is being erected at the station, whence it is hoped that by means of his latest apparatus, likeness of living objects will be able to be broadcast, which is television as we know it in this country.

H. DE A. D.

The "SQUEAK"



BAYNHAM HONRI, Late of the B.B.C. Research Staff, Explains How the B.B.C. Could Help You to Test Your Set by Transmitting Calibrated Low-frequency Oscillations

IT is a curious circumstance that the B.B.C. is strongly averse to broadcasting anything in the nature of radio technicalities. The radio talks given to children, young and old, by cheery "Jack Frost" have long since disappeared, and the voice of Captain Eckersley is now never heard.

"Our public are more interested in 'Passe Partout as a Pastime for Zulus' than wireless," say the "talkie" powers-that-be, and the blue pencil traces its inevitable course across the draft of a radio talk item.

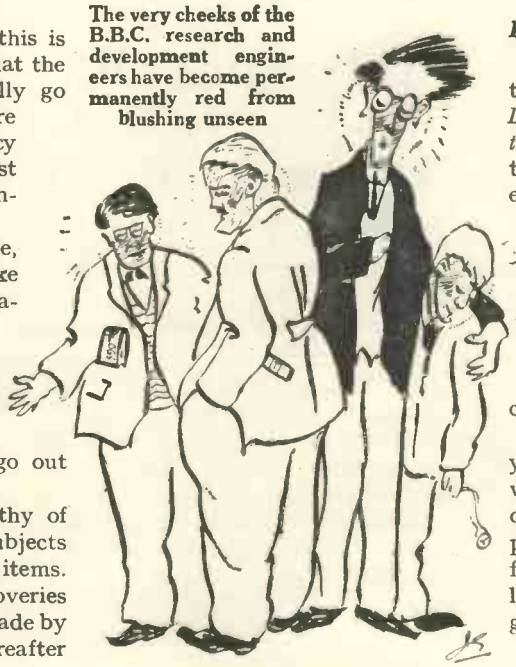
Pink at the Gills

When such an attitude as this is taken up, it is not surprising that the Savoy Hill talk-gentry literally go pink at the gills at the mere suggestion that low-frequency calibration signals be broadcast for the benefit of radio constructors and experimenters.

In their colossal ignorance, these good people probably take the word "low" as being indicative of the type of transmission to be expected. "Those Knox-like news bulletin hoaxes always cause a panic," they add, as they take off their paper cuff-covers and go out to lunch.

Nor is this peculiar antipathy of the B.B.C. to technical subjects confined to actual broadcast items. Many highly important discoveries and developments have been made by the B.B.C. engineers, and thereafter hidden from public gaze. The very cheeks of the B.B.C. research and development engineers have become permanently red from blushing unseen.

Even our mild-and-bitter friend, Thermion, of *Amateur Wireless*, has spoken vaguely of draw-bridges, pass words and plumber's disguises in connection with his voyages of discovery to the B.B.C. Research Laboratory at Clapham! He did not hire his false beard and wig from Clarkson in vain, however, for he succeeded in tracking down an extraordinary apparatus which the engineers called, evidently in their secret code, "The Squeak."



The very cheeks of the B.B.C. research and development engineers have become permanently red from blushing unseen

Forgetting even to take a dog's ticket for his faithful bloodhound, Pedro, he rushed back to the offices of *Amateur Wireless* and has been "song-plugging" the virtues of this peculiar contraption ever since.

Having retired from the sheltered cloister of the B.B.C. Research Department some months ago, I may be able to tell you a little bit more about this mysterious apparatus which is a veritable death-ray on distortion. Let us get down to brass tacks and examine it in the cool light of the valves it houses, together with the wires that make them work *that* way.

Function of the "Squeak"

The function of "The Squeak," or, to give it its full academic name, the *Low-frequency Oscillator for the Generation of Pure Fundamental Tones*, is to produce sound frequencies of equal strength in any part of the audible range.

It can give a perfectly pure note, free from harmonics, of any frequency from one per second to twelve thousand per second. The average person's audible range of fifty to ten thousand is thus easily covered.

I don't think that anybody has yet heard a *pure* fifty-cycle note that was not reproduced from a "Squeak" on a moving-coil loud-speaker. The pedal notes of a large organ have a fundamental frequency which is very low, but harmonics are present which give them their characteristic tone.

It is these harmonics which the

The "Squeak"—*Continued*

majority of loud-speakers reproduce, thus deluding the owners into believing that the "pukka" pedal note is coming over. Once heard, *pure* notes of the order of fifty cycles will never be forgotten! They are dull, oppressive, booming and thoroughly awe-inspiring.

Notes of a lower frequency are even more "striking"—they are felt more than heard—and if one is a certain distance away from a loud-speaker reproducing a twenty-five cycle note strongly, the shaking-up process is almost as bad as a Channel crossing!

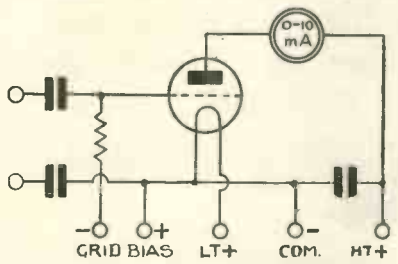


Fig. 1.—Circuit of simple valve voltmeter

These extremely low notes will make some kind of noise on common or garden types of loud-speakers, but the loud-speakers themselves will set up mechanical rectification and give first and second harmonics only.

Fundamental tones are important, but harmonics are even more important. Most voices and instruments can be recognized when reproduced on a receiver and loud-speaker which entirely suppress the fundamental tones of the sounds.

Loud-speaker Limitations

Most horn loud-speakers, for instance, are incapable of reproducing frequencies lower than 250, and yet in many cases the broadcast of a piano is quite pleasantly reproduced.

This seems rather strange, in view of the fact that middle C of the piano has a fundamental frequency of 256 cycles per second. It seems even more strange when one realises that about seventy-five per cent of the "power" in the sound is taken up with frequencies below 250. Considerably more "horse-power" is required to "drive" the sound of an organ pedal note, a bass drum or baritone voice, than for a violin or a soprano.

It is only by having the use of a pure-tone source such as the "Squeak" that we can tell what our receivers and loud-speakers are actually doing to the various notes of the musical scale. On ordinary music and speech, strong harmonics, other notes and general mush hide the many little deficiencies which may often be cured.

By attaching the "Squeak" to the set and running the pure note over the musical range, all kinds of little "blind-spots" and resonances will be shown up. These may be in the loud-speaker or the set, and if on the latter, can be tracked down by the use of a simple valve-voltmeter, such as shown in Fig. 1.

This is, in effect, an anode-bend rectifier with a milliammeter in the plate circuit. The grid is biased to give a reading which is just not zero when the maximum permissible high tension is applied to the plate of the valve, which should be of LS5B or similar type.

When the valve-voltmeter is connected on the output of the set instead of the loud-speaker, a reading will be obtained of the "strength" of the output. Speech and music will flick the needle of the milliammeter, but the steady note of the "Squeak" will give various readings according to the particular note of the musical scale that is being generated.

The ideal set will give a steady reading over the whole range of frequencies; resonances and blind-spots in the response of an imperfect set will show up as rises and falls of the needle.

A set having a resonance on 1,000 cycles, for instance, might give a reading of .5 ma. on 100 cycles, 2 ma. on 250 cycles, 6 ma. on 1,000 cycles and 2.5 ma. on 5,000 cycles. The owner of such a set could then try the effects of various shunt resistances, condensers, and/or filter circuits in his amplifier until the "curve" was straighter.

When he is satisfied that the response is as even as possible, he can replace the valve-voltmeter with the loud-speaker and make any necessary alterations to that according to the audible reproduction strength. Rattles on certain individual notes will be shown up and, in most cases, cured.

Rather Complicated Apparatus

"The Squeak" itself is a rather complicated apparatus, a simplified circuit of which is shown in Fig. 2. The valve A is a fixed oscillator, B is a variable oscillator, and C is a rectifier coupled to both circuits. The oscillator circuit A is tuned to about 3,000 metres, and the oscillator B may be tuned from 3,000 metres to about 3,300 metres (90,000 to 100,000 cycles). The two oscillations heterodyne and are rectified by the valve C, a filter circuit suppressing the unwanted radio frequency.

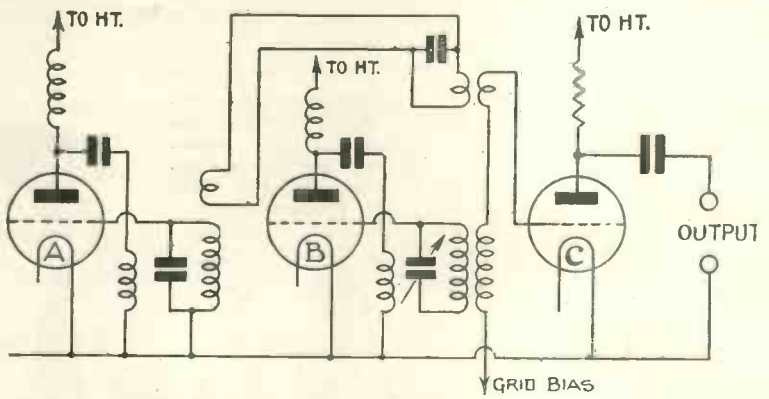


Fig. 2.—Simplified circuit of the "Squeak" or low-frequency oscillator

When the condenser of the variable oscillator is turned, a note is produced of any frequency from zero to 12,000 cycles per second.

Various complicated tricks and extremely careful layout and screen-

Baynham Honri Makes A Suggestion

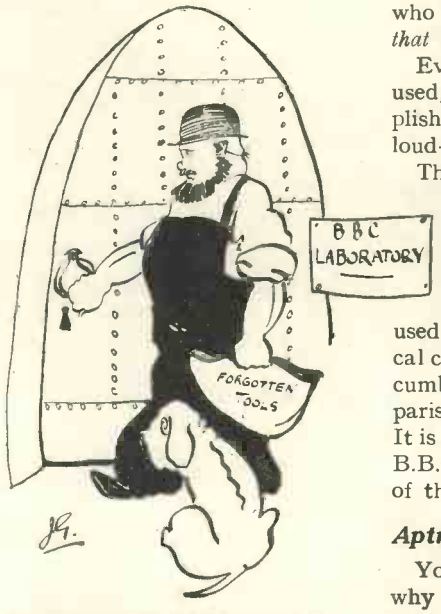
ing play their part in keeping the strength of the ouput constant. The construction of a reliable "Squeak" should not be attempted by a radio novice, however optimistic he may be! And this is where the B.B.C. can give a helping hand.

B.B.C. Transmissions

While it is, of course, a distinct advantage to have control of a "Squeak" when you are carrying out testing, quite satisfactory results would be obtained if the calibration signals were radiated from the B.B.C. stations.

"Squeak" gramophone records are now being issued, but owing to the extremely uneven response of even the best pick-ups and the unreliability of the recording at the high and low audio frequencies, it is improbable that such tests would be of any great help.

On the other hand, the broadcast of, say, six notes of the frequencies of 50, 100, 250, 1,000, 5,000 and 10,000 for a period of a minute each, followed by several "runs" up and down over the whole range, would be of very definite use to all amateurs who want to make their sets just *that* much better.



Even Thermion has spoken of drawbridges, passwords and plumber's disguises used on his voyages of discovery

Even if a valve-voltmeter is not used, much good work can be accomplished judging by ear alone on the loud-speaker reproduction.

The B.B.C. Research Department have developed "Squeak" apparatus to a fine degree of perfection, surpassing the best efforts of American and Continental radio engineers. The gear used by one leading American electrical corporation, for instance, is both cumbersome and inaccurate in comparison with the B.B.C. apparatus. It is a pity that we, subscribers to the B.B.C., are unable to take advantage of the efforts of our engineers.

Aptness of the Name

You will probably be wondering why the engineers gave this apparatus the queer name of "Squeak." Well, I can only say that you will appreciate the aptness of the soubriquet when you hear it—*if* the B.B.C. ever allows you to hear it!

Getting Away from the Regionals!

INCREASED ADVANTAGES OF SHORT-WAVE RECEPTION

"WHAT do *you* think about this regional-station business?" asked Harold.

"I think that it will make certain listeners take much more interest in short-wave reception than they have ever done before," I replied.

"But *why?*" demanded Harold. "I can't see the remotest connection between regional stations and short-wave work. *Is* there one?"

"Indirectly, yes. Let me explain what I mean."

"Do," said Harold. "Your theory certainly needs explaining!"

"Wipe-out" Areas

"Well, it's this way; around each of the regional stations there will be a fairly large 'wipe-out' area in which it will be almost impossible, except on elaborate and therefore expensive sets, to bring in distant stations on the ordinary broadcast wavelengths without a serious background of interference from the regionals transmissions."

Harold nodded, but still looked rather mystified.

"That means," I continued, "that people within those areas who have two-valve or three-valve receivers of the popular but unselective detector-and-L.F. type, which used to enable them to take their choice of stations all over Europe, will in future be tied down to the programmes from the regional."

"Unless, of course, they choose to invest in a super-selective receiver which will cost them a lot in initial outlay and a good deal in upkeep?" suggested Harold.

"Quite," I agreed. "So you see it is evident that, if they want to enjoy distant reception, listeners who happen to live near a regional station and who can only afford a simple type of receiver must seek it elsewhere than on the ordinary broadcast wavelengths."

"Ah!" exclaimed Harold. "Now I'm beginning to see your point. You mean that there's nothing left for them but the short waves?"

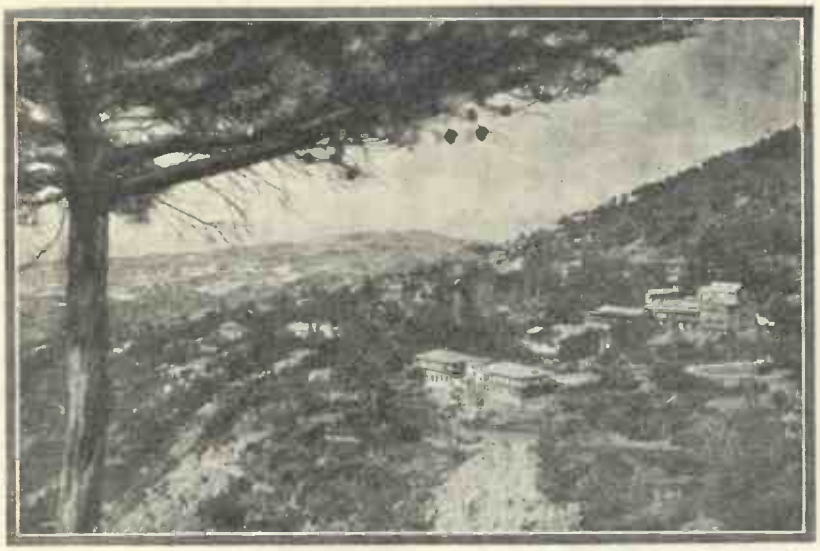
"That's exactly what I mean," I replied. "When one gets down below about 50 metres, tuning is so sharp, as you know, that an unselective set is really better than a selective one. A detector-and-one-L.F. set designed for short-wave work is capable of distant reception with a vengeance, seeing that it will bring in American or even Australian short-wave broadcasting when conditions are at all favourable!"

Ideal Field of Reception

"Yes, and then, of course, there are plenty of European short-wave stations to be heard now. So I suppose that the short waves really do provide an ideal field of reception for people with fairly small sets who are keen on long-distance work but have been forced to abandon it on the ordinary broadcast wavelengths since the regional scheme came into being."

"They certainly do," I agreed "and therefore I think there will be a big increase in the number of short-wave enthusiasts in the near future!"

W. O.



A typical summer hill station in Cyprus [Cyprus Trade Commissioner

The Island of Fifty Listeners

Difficulties That Face the Radio Fan in CYPRUS

CYPRUS is ideally situated for reception and owners of sets, with some exception, get much fun out of their investments. It is unfortunate, however, that the number of receiving sets all over the island is not more than fifty.

Little Appeal to Greeks

The main reason for this very small figure is the fact that the programmes that are captured do not appeal much to the Cypriot majority, who are Greeks, and in sympathy only with what is of Greek origin.

Another reason to account for the few sets is our distance from main broadcasting stations. This, of course, necessitates the employment of sets with four valves and over, and the poor class, of which there are a great number, is reluctant to spend sums of £15 and over simply to get music and speech in strange languages.

However, it is gratifying to learn that the Government in Greece is contemplating the erection of a very modern high-power station, which, although technical details are still not to hand, it is hoped will serve Cyprus as well.

Greater Interest Probable

When this station comes on the air and loud-speakers announce in their own language, it is highly probable that more interest will be shown towards wireless by the Cypriots.

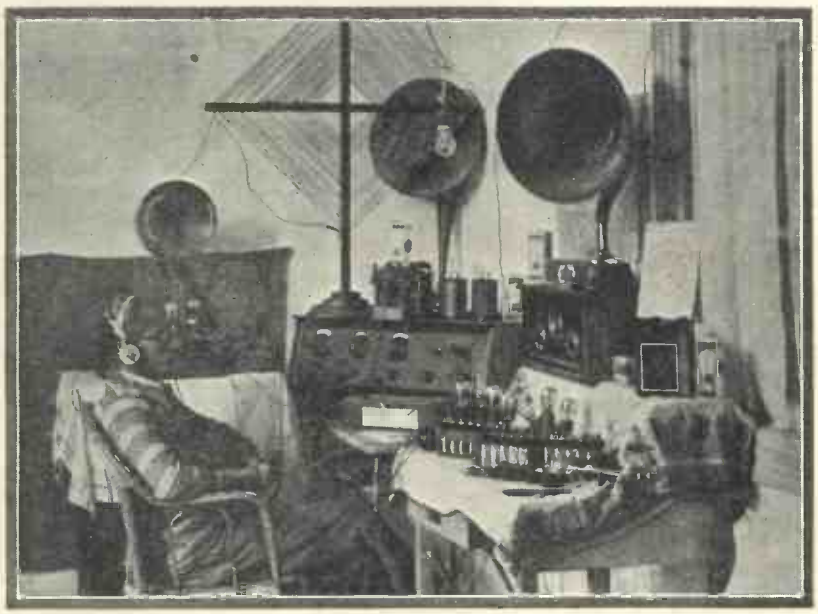
The few existing sets are of British and Continental makes. It must be gratifying to British manufacturers of wireless sets to learn that their sets are absolutely the best ever seen here and even the cheapest four-valvers compare very favourably with the costly five- or six-valve Continental makes.

As a matter of fact, only a few days ago a gentleman from Egypt, the owner of a set which cost him over £80, confessed to me frankly that he was not getting as much from his expensive set as I got from my little four-valver and when I said that this set cost me just a little less than £20 I am sure he thought I was pulling his leg and would not be convinced until I offered to sell him my set for £25.

Recently the club at Larnaca installed a well-known British all-wave set. In my opinion the set is giving very good results, although some of the members showed disappointment from the first day that the set was installed. They argue that, having an all-wave set, they should be able to tune in a jazz band whenever it is their pleasure; or a certain station which they want to hear, although that station does not happen to be broadcasting at the time!

Time will soften them one day and they will come to learn to hear whatever is available.

The law governing wireless in Cyprus is the same as in England. No amateur senders exist here for the present, and, in fact, there is not a single transmitting station, morse or otherwise. In cases of emergency, the wireless gear of a boat that happens to be in port is used by the authorities.



The fine collection of apparatus belonging to the author of this article

Mentioning the boats, recalls me to the very serious interference that is sometimes experienced all over the island from morse transmitters. Contrary to wavelength limitations, the waveband from 200 to 2,500 is always infested with this pest of the listener-in, the worst being the band of from 450 to 650 metres.

All Over the Dial

Especially foreign boats of French and Italian nationality never stick to the wavelengths allotted to them, and although I am not a student of Mr. Morse, I remember occasions when the same signals have been repeated for hours at a time (they were not SOS signals, as I have ascertained), all over my dial, long and short.

Small French gunboats that visit our port of Larnaca two or three times during the year are our *bête noire*. When they transmit in port, which is absolutely forbidden by the authorities, the only thing one can do is to switch off the set and go to bed. There is very little chance to hear anything else for the rest of the night.

How many WIRELESS MAGAZINE readers know where Cyprus is? It is a British Colony in the Eastern Mediterranean, 240 miles North of Egypt, 60 miles West of Syria and 40 miles south of Asia Minor.

Its area is 3,584 square miles. The greatest length is 140 miles and the greatest breadth 60 miles.

Read this interesting article about radio conditions in Cyprus by an enthusiast who lives there.

One night a Frenchman interfered when we were listening to a particularly fine programme from Vienna. I had a very powerful home-made five-valver which had come to me for minor repairs. Immediately I switched on this set and oscillated as much as I could on this ship's wavelength. This had a very beneficial effect as the morse stopped at once and we were not bothered any more!

In other respects, as I mentioned above, reception is very good, even during mid-summer, and static is not really so very annoying. There is practically no electrically-propelled machinery save for a cinema or two in every town, but interference from them is negligible and hardly worth mentioning.

So far Vienna and Budapest are the favourite stations. During winter they come in as early as 6 p.m. and the quality leaves nothing to be desired. Moscow comes in very strong even in day-time, but we get Russian speech for most of the time, which does not appeal, but their music, at times, is very agreeable.

Cyprus is served by the Russian stations of Kharkov, Leningrad, Tiflis, Baku, etc., better than any other stations, with the two exceptions mentioned above. The new wave plan has made us lose at least two good stations, those of Paris and Baku.

Distance getting is much tried here. I have had under my care, one time or other, several five-valvers of various makes. The farthest station that I could reach with any of the so-called long-distance sets of German origin was Breslau, while with an all-British four-valver, a cheap and very popular one in England, I have a choice of over thirty stations, including 5GB and 5XX, 2,000 miles distant, as the crow flies!

At times very loud reception is got from the British stations, but there are very occasional fadings as well, and the German station at Langenberg is interfering very much, especially during the early part of the night.

This year I had occasion to try the reception conditions among the mountains, over 4,000 feet high, when we had moved to our summer house in the middle of June. For three or four nights my efforts were not at all successful. The set was very selective, but failed to give satisfactory results and body-capacity was much in evidence.

Changing the earth from the water main to two petroleum tins buried about 5 ft. deep and enlarging the aerial wire to 100 ft., with 30 ft. of lead-in, brought about the desired effect.

The dial readings were the same as in town, on the seashore, with the regulation aerial. I was followed by an American gentleman from Egypt, who brought a Continental all-wave set of the latest type employing an S.G. valve in the circuit.

So far there is no regular service for wireless. Accumulator charging is very dear, anything from 5 to 15 shillings (prices differ in different towns), regardless of capacity. No stock of wireless parts is kept and even a wander plug has to be ordered from abroad.

[*Cyprus Trade Commissioner*]

Tekke (Shrine) of Umm Haram, at Larnaca, Cyprus

Electric-lighting current is 220 volts D.C. all over the island, and daily service is maintained only in Nicosia, Larnaca, Limassol, Famagusta and Paphos, all sea-ports are served only during nights. The unit costs from 8d. to 1s. The public is forbidden to touch the lighting installation in their homes.

High-tension Accumulators

Until lately, most of the sets used dry batteries for the high tension, but now accumulators have replaced them to much better advantage. Eliminators have not found favour and I would rather stick to my Exide blocks than try anything else.

V. M. MOSDITCHIAN.

The CELERITY THREE

QUICK TO BUILD :: QUICK TO TUNE

The best possible results with a minimum of trouble in construction and operation . . . that is what this set will give you.

It has been specially designed by the WIRELESS MAGAZINE Technical Staff and represents all that is best in modern radio practice.

There is only one knob to tune and the arrangement of the parts is so simple that any beginner can carry out the construction without difficulty.

The completed set mounted on a pair of Belling-Lee Radio Legs

AN efficient set is nothing if it has complex controls, for one of the first requirements of a modern set is simplicity of operation. No longer is a radio set the sole property of the enthusiast who builds it—the rest of the family want to be able to work it whenever they please

Meeting Everybody's Needs

So, realising the need for a set with the simplest possible controls, the WIRELESS MAGAZINE Technical Staff decided to produce a model that would meet everybody's require ments in this respect.

Before the final design was adopted many schemes were considered and tried out. Simplicity of control to the bare minimum inevitably means a reduction in efficiency, and our aim was to produce a receiver which, while not difficult to tune, would meet average requirements as .egards results.

Most Satisfactory Compromise

In the Celerity Three a most satisfactory compromise has been reached Indeed, it is no exaggeration to say that the designers themselves were astonished by the good results obtained when the completed set was put on test.

There is no doubt that for simplicity of control and construction the Celerity Three meets every need. There are no complicated and expensive gang condensers to adjust; the cost can be kept low; and many parts already in the possession of most constructors can be utilised to good advantage. The set would make an ideal gift for non-technical listeners who desire satisfactory results with the minimum of operating difficulty.

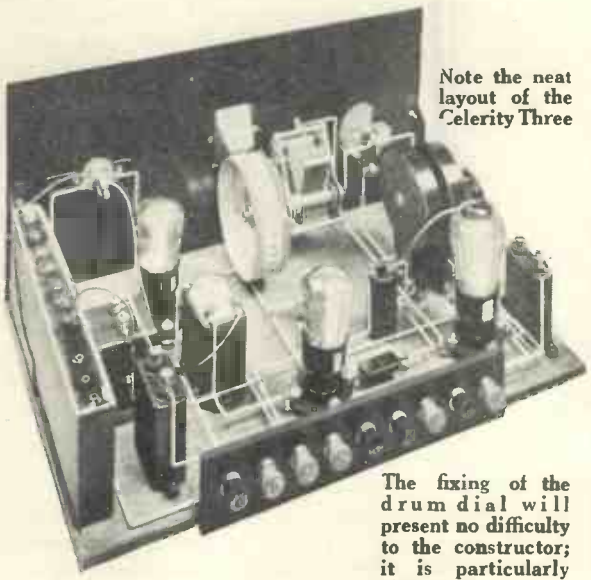
The question of cost was also borne well in mind when the design was being considered. For this reason standard two-pin plug-in coils were used, as many amateurs already have a stock of these and are waiting for a modern set in which they can make use of them.

Satisfactory Reception

Although a large number of listeners insist on dual-range tuners in their sets, it was realised that many are satisfied with the number of stations that can be obtained on just one of the two wavebands used for broadcast transmission, especially as the two main British alternative transmissions (5GB and 2LO) are on the lower waveband.

Those living on or near the south coast will probably be able to get all the stations they want by using the set with long-wave coils. In any case, the two coils required are easily changed when it is desired to go from one waveband to the other.

In this case the attainment of simplicity of operation has also resulted in great simplicity of construction—so that listeners have here an ideal receiver for normal use.



Note the neat layout of the Celerity Three

The fixing of the drum dial will present no difficulty to the constructor; it is particularly pleasing to tune

The circuit finally adopted is shown in detail on this page, while the simplicity of the layout is evident from the photograph on page 613. The construction of this set is well within the capabilities of the beginner who is, moreover, assured of good results as soon as the receiver is connected up to the necessary batteries and loud-speaker.

So that the set can quickly be adapted to give the best results with any particular aerial, a semi-fixed or pre-set condenser is provided in the aerial lead. If desired, this can be replaced by a fixed condenser of, say, .0001-microfarad capacity.

Diminishing Interference

The adjustment available with the semi-fixed type, though, is a valuable asset in cases where interference is experienced, as by its manipulation all unwanted signals can be reduced to a minimum.

A double-tapped two-pin coil is used for aerial tuning, again so that the maximum selectivity can be obtained. Each tap of the coil should be tried so that the one giving best results with a particular aerial and in a particular locality is used for reception

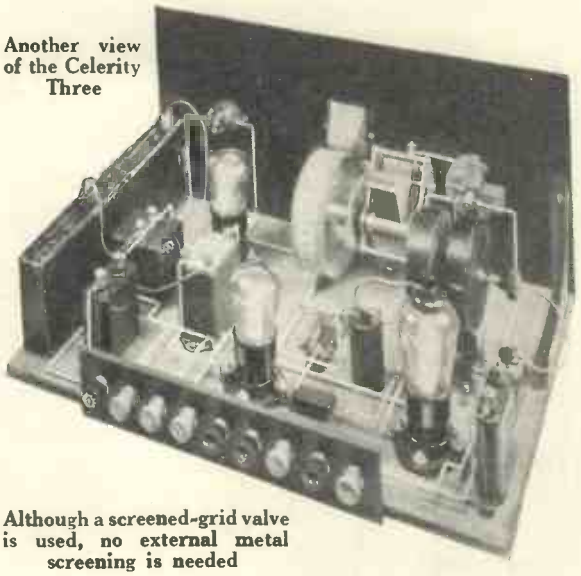
This coil is tuned by a .0005-microfarad variable condenser, which is controlled by a neat drum dial; this has the merit of being attractive in appearance and cheap in price (see the list of components on page 614)

There is no actual tuning coil or transformer in the anode circuit of the screened-grid valve, a high-frequency choke forming the coupling to the detector valve, which is of the leaky-grid type for greatest sensitivity.

Of course, some form of tuned-anode circuit would be more efficient than the aperiodic choke, but as has already been mentioned, the results with this untuned coupling are astonishingly good.

The function of the choke is to set up a potential difference in the anode circuit which is passed on to the next valve. If a tuned circuit is provided, the potential set up across it by a signal (of the particular frequency for which the tuning is adjusted) is very much greater than is set up across an untuned choke.

Against the loss of efficiency, however, must be set the simplicity of the choke compared with a tuned circuit consisting of coil or high-frequency transformer and variable condenser, and its much lower cost. For the particular type of receiver it has been our aim to produce in the Celerity Three, the disadvantage of lower efficiency is more than compensated by the advantages mentioned.



Another view of the Celerity Three

Although a screened-grid valve is used, no external metal screening is needed

In order to get the greatest possible magnification from the arrangement, use has been made of a screened-grid high-frequency valve which has an amplification factor of the order of 200. The screen or shield prevents feed-back of current from the anode to the grid circuit, with consequent loss of efficiency.

No External Screening

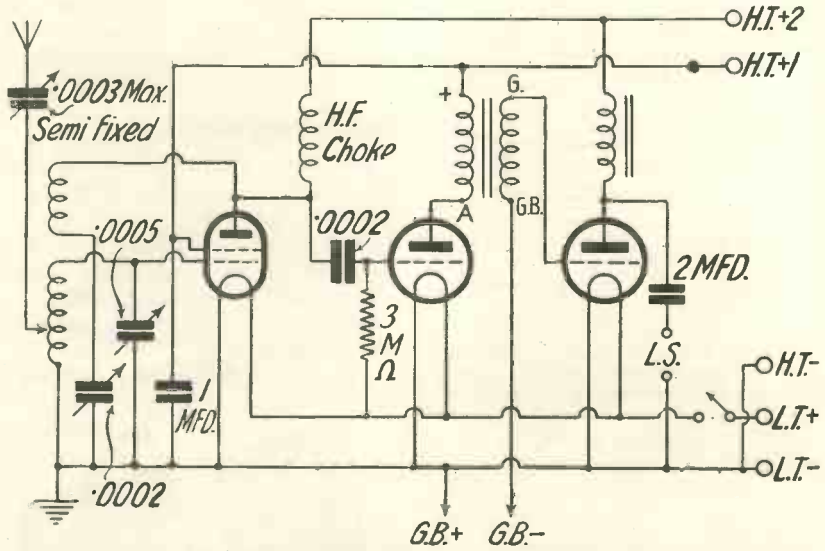
Although the shielding inside a screened-grid valve is practically perfect, it is necessary usually to provide external magnetic and capacity screens to prevent interaction between the external anode and grid circuits. In this case such screening is not necessary, as there is no tuned coil in the anode circuit, such as might give rise to feed-back effects.

It will be seen that a 1-microfarad fixed condenser is provided between the screen of the valve and low-tension negative to by-pass high-frequency currents to earth.

Maximum Sensitivity

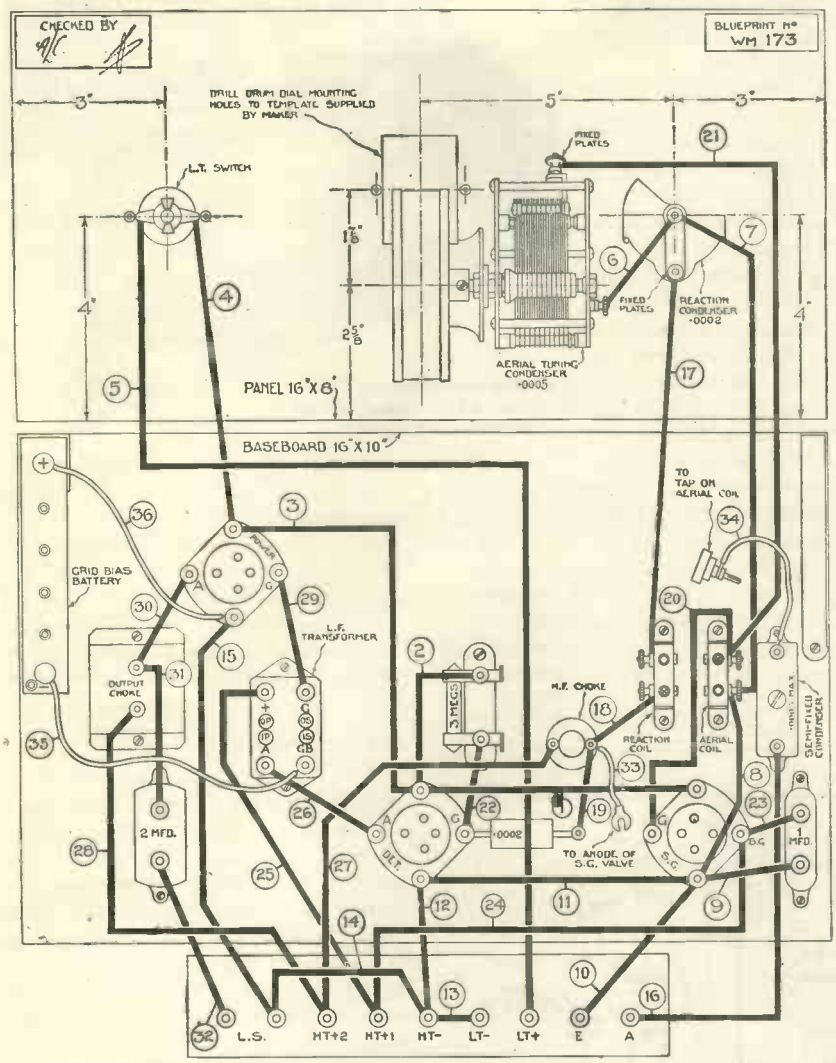
The values of .0002-microfarad and 3 megohms respectively for the grid condenser and leak give the maximum sensitivity and selectivity. It will be noted that one end of the grid leak is connected to low-tension positive and not low-tension negative.

Adequate low-frequency amplification for all normal purposes is provided by a transformer-coupled stage following the detector valve. Use has been made in the original set of a new transformer that gives particularly pleasing reproduction;



Circuit of the Celerity Three, which uses standard two-pin plug-in coils

The Celerity Three—*Continued*



This layout and wiring diagram of the Celerity 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 January 31. Ask for No. WM173. Wire up in the numerical order indicated

actually, any good make of instrument can be used.

In order to protect the loud-speaker windings from possible damage a choke-capacity output circuit is provided. This is a refinement that many people consider a waste of money, but our experience proves that it is well worth the cost, which in this case is surprisingly low.

Effect of Low-frequency Choke

Between the anode of the last valve and high-tension positive is connected a low-frequency choke. This allows the passage of direct current from the battery, but offers a high resistance path to the low-frequency impulses which are converted into sounds by the loud-speaker.

On the other hand, the 2-microfarad fixed condenser connected between the anode of the valve and low-tension negative affords no passage at all to the battery current, but provides an easy path to the low-frequency impulses.

As the loud-speaker is connected at the points marked "L.S." on the circuit, it will be seen that no steady current from the battery, which may be comparatively heavy, flows through the loud-speaker windings, which therefore cannot become damaged or demagnetised by this means.

Two high-tension positive points are provided; these are marked H.T.+1 and H.T.+2 respectively. The first supplies the shield or screening grid of the high-frequency valve, and needs from 60 to 80 volts normally. The second terminal provides current for the anodes of all three valves and needs a minimum of 120 volts.

Grid-bias Arrangement

Two points are also provided for applying grid bias to the power valve. The grid-bias battery is conveniently mounted on the baseboard of the receiver, one of the panel brackets incorporating a special type of battery clip.

Particular mention must be made of the on-off switch used in the original set. This is provided with a twisted-section shank which, when moved (as when the knob is pulled out or pushed in), rotates a disc bearing the words "On" and "Off," one of which shows through a slot in an attractive metal cover-plate.

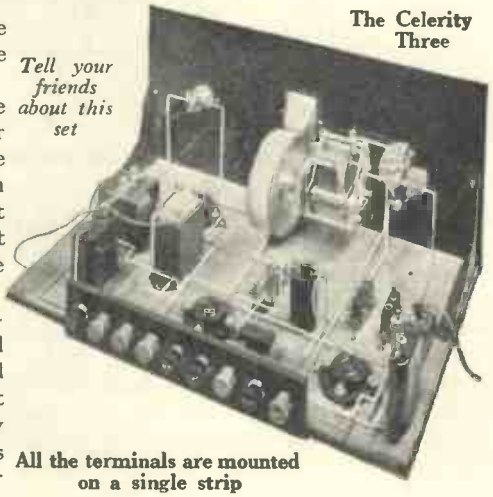
Convenience in Use

The convenience in use of this type of switch needs no further emphasis.

No listener should have any difficulty in constructing the Celerity Three from the details reproduced in these pages. There are many, though, who prefer to work from a *full-size* blueprint template, layout, and wiring diagram.

Tell your friends about this set

The Celerity Three



All the terminals are mounted on a single strip

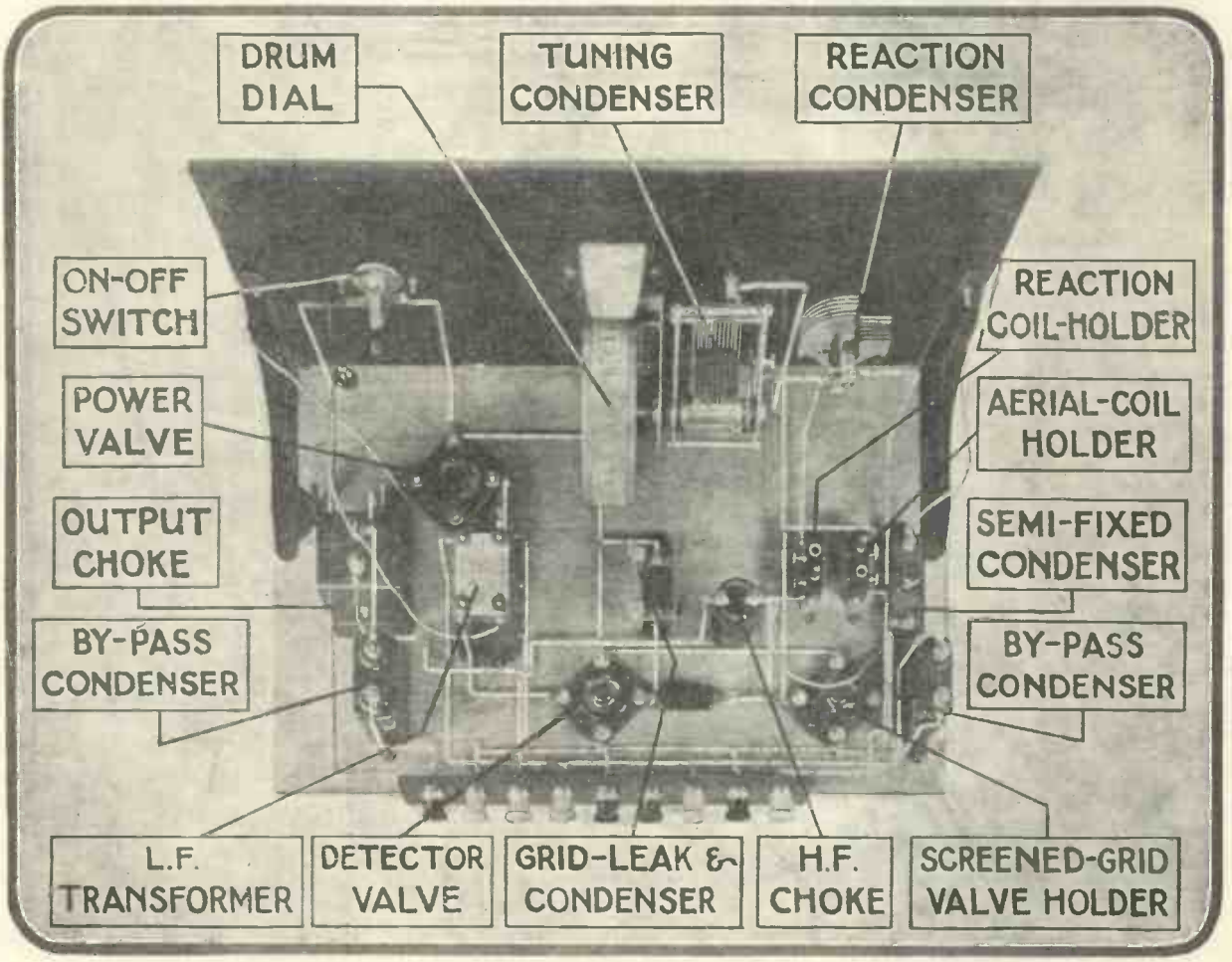
Quick to Build :: Quick to Tune

Those who desire one can obtain a full-size blueprint for half-price (that is, 6d., post free) up till January 31 if they use the special coupon on page iii of the cover. Ask for No. WM173 and address your inquiry to Blueprint Department, WIRELESS MAGAZINE, 58-61 Fetter Lane, E.C.4.

It will be found best to start the construction by drilling the ebonite panel. This will present no difficulty if use is made of a full-size blueprint. the blueprint (or the reduced reproduction that appears on page 612) must be modified if any other makes of components than those used in the original set are utilised.

When all the panel holes have been drilled the components should be screwed in position—that is, the reaction condenser, drum dial, large tuning condenser, and on-off switch.

The panel can then be fixed firmly to the baseboard by means of the



This plan view of the Celerity Three shows clearly how all the components are arranged. No difficulty will be experienced in the construction

Simply lay that part of the print which represents the panel over the sheet of ebonite and mark through with a sharp point the centres of all the holes to be drilled.

The slot for the drum dial can be cut from the template supplied by the makers. It may be pointed out here with advantage to the beginner that the drilling points indicated on brackets. Take care that the bracket provided with the clip for the grid-bias battery is placed at the left-hand side of the panel, looking from the back of the set.

Baseboard Components

The remainder of the components can next be fixed to the baseboard in the positions indicated. No difficulty will be experienced in this respect even if other parts than those specified are used.

How to Wire the Set

When everything has been firmly fixed into position, wiring up can be started. This will prove equally simple if the layout and photographs are followed On the blueprint and the reduced reproduction on page 612 every wire is numbered in the best and most convenient order of assembly.

For instance, first connect wire No. 1, mark through this number on the wiring diagram, and continue with wire No. 2; carry on in the proper numerical sequence.

Leads No. 1 to No. 32 should be of stiff insulated wire, but leads No. 33 to No. 36 must be of rubber-covered flex. The plug attached to

The Celerity Three—*Continued*

The Celerity Three

lead No. 34 is for tapping on to the aerial tuning coil.

Before the set is connected up, insert the appropriate valves and coils in the holders. Suitable valves and the best sizes of coils are indicated in the list of components. For the medium waveband use a No. 60 tapped coil in the aerial holder and a No. 40 plain coil in the reaction holder; for the long waveband use a No. 200 and No. 100 respectively.

Put the on-off switch in its "off" position and connect up the batteries. By the way, although two-volt valves have been specified, four- or six-volters of corresponding characteristics can be employed (see the tables on pages 576 and 578 of this issue).

The external connections are very simple. A obviously refers to the aerial and E to the earth connection. L.S. indicates the loud-speaker connections, whilst L.T.+ and L.T.— designate the accumulator leads.

Beginners should note that the terminal on the accumulator bearing a red mark is always positive, whilst a black or blue mark indicates the negative point.

The three H.T terminals are connected to the high-tension battery. H.T.+2 should be connected to the 120-volt tapping and H.T.+1 to 60-80 volts, the best value being found by experiment when the set is in use.

For most two-volt power valves it will be necessary to apply 6-9 volts negative grid bias; so see that the wander plugs attached to wires Nos. 35 and 36 on the wiring diagram are inserted in the proper sockets of the battery on the baseboard.

Two Flexible Leads

Two other points that need attention are the tapping to the aerial coil and the connection to the top of the screened-grid valve. Lead No. 34 must be attached to one or other of the tappings on the aerial coil; if it is not connected no signals will be heard.

Lead No. 19 is connected to the terminal at the top of the screened-grid valve. As this wire is connected direct to the high-tension battery,

(*Continued on page* 680)

COMPONENTS REQUIRED FOR THE CELERITY THREE

CHOKE, HIGH-FREQUENCY
1—Keystone, type SG, 5/- (or Lewcos, Lissen, Bulgin).

CHOKE, LOW-FREQUENCY
1—Climax, Capital type, 8/6 (or Pye, Ormond, Igranic).

COILS
2—Lewcos two-pin coils, Nos. 60 and 200, tapped, type 7B, 11/3 (or Igranic, Atlas).
2—Lewcos two-pin coils, Nos. 40 and 100, plain, type 6, 8/- (or Igranic, Atlas).

CONDENSERS, FIXED
1—Ormond .0002-microfarad, 7d. (or T.C.C., Marconiphone, Igranic).
1—Dubilier 1-microfarad, 2/6 (or T.C.C., Hunt, Hydra).
1—Dubilier 2-microfarad, 3/6 (or T.C.C., Hunt, Hydra).

CONDENSERS, VARIABLE
1—Lotus .0005-microfarad, type LC5, 5/9 (or Formo, Cyldon).
1—Formo .0002-microfarad, Midget type, 2/9 (or Cyldon, Bulgin).

DIAL, SLOW-MOTION
1—Keystone drum dial, 5/- (or Lotus, Jackson).

EBONITE
1—Raymond, 16 in by 8 in., 5/- (or Becol, Keystone).
1—Terminal strip, 9½ in. by 2 in.

HOLDERS, COIL
2—Lotus single-coil holders, type CB/70, 1/4 (or Magnum, Bulgin).

HOLDERS, VALVE
3—Benjamin Vibroholders, 4/6 (or Lotus, Formo)

PLUGS
2—Belling-Lee wander plugs (marked: Grid+, Grid—), 7d. (or Clix, Igranic).

RESISTANCE, FIXED
1—Lissen 3-megohm grid leak with holder, 1/6 (or Dubilier, Peto-Scott).

SUNDRIES
Glazite insulated wire for connecting up short length of rubber-covered flex.
1—Pair Ready Radio panel brackets with clip for grid-bias battery, 2/6.

SWITCH
1—Gripso on-off switch, 1/9 (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—Gecophone, type BC710, 21/- (or British General, Philips).

ACCESSORIES

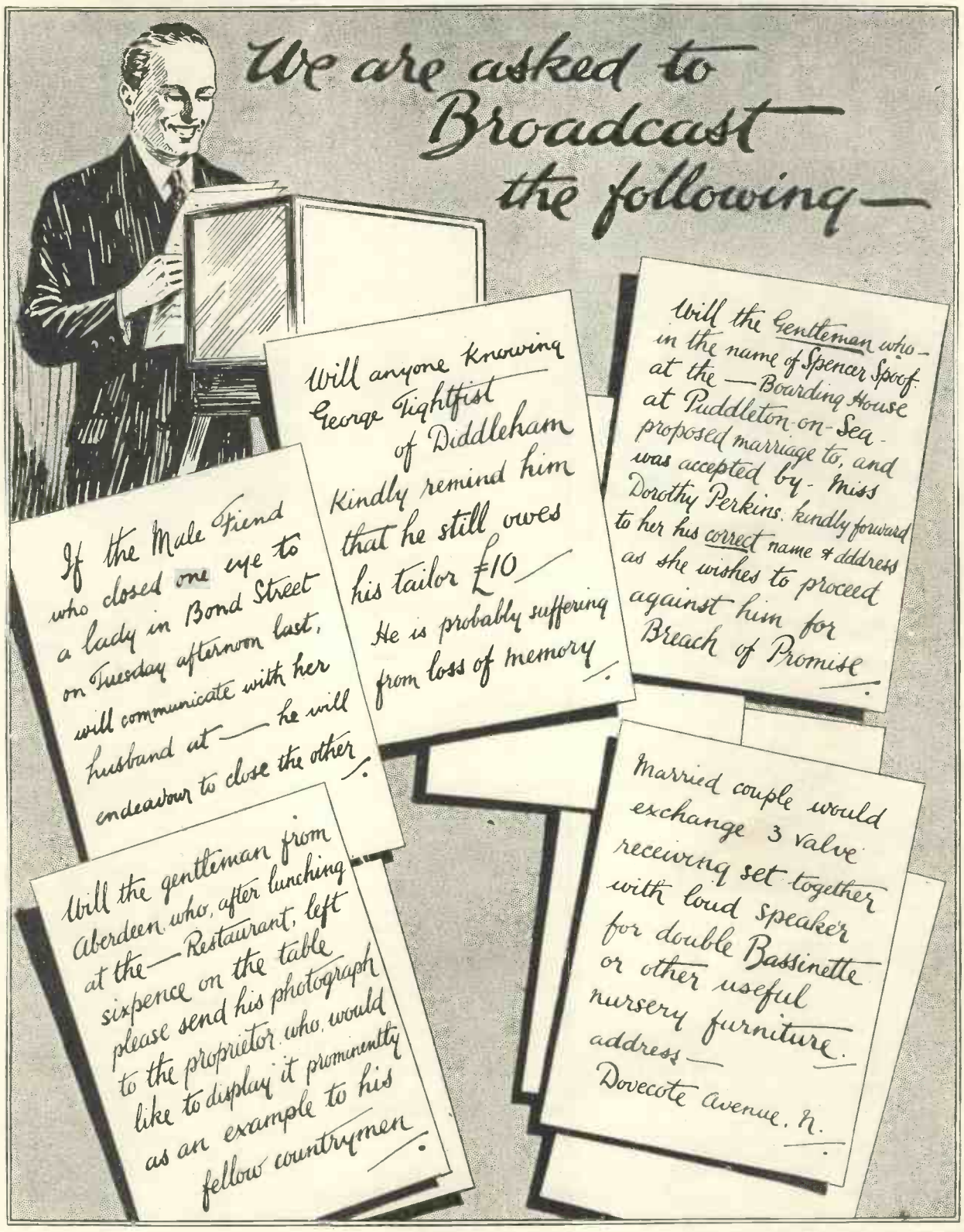
BATTERIES
1—Siemens 120-volt high-tension, brown label, 20/- (or Ever-Ready, Obeta).
1—Siemens 9-volt grid-bias, Popular type, 1/6 (or Ever-Ready, Obeta).
1—Marconiphone 2-volt 40-ampere-hour, 16/- (or Lissen, Tudor).

CABINET
1—Raymond, upright type, with 10-in. baseboard, 17/6 (or Pickett, Clarion).

LOUD-SPEAKER
1—MPA cone, Popular Cabinet type, 45/-

VALVES
1—Cossor 220SG, 22/6 (or Marconi S215, Mazda 215SG).
1—Cossor 210HF, 10/6 (or Marconi HL210, Mazda HL210).
1—Cossor 220P, 12/6 (or Marconi P240, Mazda P220).

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



SOS MESSAGES WE HAVE NOT YET HEARD!

Can you find the loud-speaker? It is on the hearth rug, with a cigarette box on top We believe that this type of loud-speaker has never been put on the market, in this country at any rate.

IT is an extraordinary coincidence that the word *listen* and the word *loud* come from the same source. *Listen*, in Anglo-Saxon, was once *hlistan*, from *hlust*, the ear; *loud* was originally *hlud*—and both words are derived from the Greek verb *kluo*, to hear. So that we ought, one would think, to *listen* to our *loud*-speakers.

Are we doing so? Do we give the attention to—at least—the better type of music that is broadcast for our benefit?

Those Musical Evenings!

It is not so long since the days when we used to congregate in the houses of our friends to endure that form of purgatory known as the musical evening. We all remember how everyone was expected to do something, whether they were qualified or not—to play, to sing, or to recite. It was generally a case of the survival of the fittest in the audience, and often amongst the "artistes" also.

So far as the latter were concerned, only he (or she) who had sufficient personality (or effrontery) to "get over" could restrain the audience from continuing its conversation as if nothing had happened to make it do otherwise.

A pianist stood not even the proverbial dog's chance; he generally had to perform upon an upright piano on which ornaments and photo-frames rattled their disapproval, and was forced to be seated with his back to his hearers. No matter what he played or how he played it, the audience accompanied him vocally with loud and animated conversation.

The vocal aspirant fared a little better; he could at least face his audience (so long as he knew his words or had an extra copy of the song) and generally managed to keep his victims in better order.

They were queer days, those; the seeds of a bad habit were undoubtedly sown, and we, in these enlightened times, are reaping what others sowed for us. *We are not listening.*

If we go to Covent Garden, of course, we are *made* to listen. We dare not do otherwise. The man is not yet born who would dare to light a cigarette or chew a chocolate during the performance of an opera. We listen quite respectably at Queen's Hall, at Wigmore Hall, at Aeolian Hall. It is only when we go to the Albert Hall that we fidget and talk.

But then, the Albert Hall has a tame devil in it who runs round the boxes to make us chatter. Then he trickles down into the stalls to make us cough.

Rachmaninoff knows about him. Did you not read in the papers that he sat in silence at the piano until the Albert Hall devil had gone to Hyde Park or somewhere, and the audience also had begun to sit in silence? Then he played, not before. Quite right; no one can blame him. It is time someone had the courage to protest.

I suppose it is only reasonable to realise that one is more at liberty where wireless music is concerned because one is at home (or in someone else's home) and because, as one cannot see or be seen, it does not greatly signify.

When we *like* somebody, we may find ourselves at a loss; we cannot recall him. But when we do *not* like him, we can rudely push in the knob which controls our set and consign him to the four corners of the earth.

Natural Carelessness?

Perhaps it is only natural that we should become careless in the matter. Being at home, amid domestic influences, we may find ourselves listening to a Beethoven symphony while the table is being laid or the dog being washed. All the same, I am not sure that it is really good for us. We can easily take a bath and take in most of a fox-trot without either losing the soap or blowing up the geyser; but we cannot take in a Beethoven symphony and do something else at the same time. It simply cannot be done.

For this very reason there is some-

thing to be said for earphones; we do stand some chance of keeping our ear on the ball, so to speak. Of course, if we begin reading novels at the same time the less said the better. I have seen *that* done!

With a loud-speaker we are apt to do things by halves. My study of psychology tells me that this is not good; one of the operations must suffer; but any remarks which follow here must be taken, of course, to apply only to serious music. I hasten to add that I do not wish to appear to belong to the section of the public generally known by the name of high-brow; I appreciate fully the uses of light music.

Its Great Value

That generally heard in a restaurant, if suitably subdued, is of great value. It mingles with our conversation; it forms a misty mirage to our musings; it is incidental music to our unwritten plays. If it becomes definite it also becomes a nuisance; it interferes with our conversation and probably with our digestion also.

The wireless is just the reverse; our untimely conversation interferes with our reception and "digestion" of it. It is unreasonable to suppose that we can be expected to remain in one position for the whole of an evening—even though we do so at a concert; but it is quite within the dictates of commonsense to suggest—as a piece of psychology—that if we study the programmes and take the trouble to select some attractive-looking item and *listen* to it, we shall derive considerable benefit from the mental activity involved.

There used to be a notice in the corridors outside the studios at Savoy Hill to the effect that if the words of a song were not said, and well said, the song was lost. The injunction was obviously intended, from the B.B.C. point of view, for the broadcaster; it would have been a truism to have written: "Say your words so that your audience cannot *avoid* hearing them, *remembering that very few really listen.*"

Straining—to Train

Not many of us *care* to listen—by which I mean that we act as though we imagined that it is as injurious to strain the ears as it is to strain the eyes in an indifferent light. It is not so. The more the ears are strained the more they are *trained*, consequently the more acute they become. If we wish to hear the grass grow we must begin by hearing the wind in the grass first.

There is no doubt that we are becoming so used to wireless transmission that we are falling into the habit of turning it on during meals, during periods when our friends visit us, and during the evenings we spend alone with an attractive novel.

I do not attempt to try to persuade you (or myself) that there is any actual harm in it; but I do feel inclined to urge that we ought to make suitable selections from the broadcast repertory for occasional *serious listening*.

If I may presume to preach to those who know so much more about wireless construction than I do myself, and who build sets from what I want to call *recipes* in this journal, it will be to suggest that it is easily possible to become so interested in the reception in the *technical* sense that the reception in the *artistic* sense is practically missed altogether.

I know more than one man thus affected. I know an enthusiast who has (I believe) a five-valve set of considerable power. He can, apparently, "get" every station on earth; he has a small fleet of loud-speakers in the room where his sets live; and what he does not know about wireless from that point of view is scarcely knowledge.

Yet he never takes the trouble to remember the name of a work or of its composer; to recognise a composer by the style of his music; to remember the name of more than one singer in ten, or to take the slightest interest in the quality of what he hears from the artistic point of view. He has developed an absorbing interest in wireless, not in wireless art.

I suppose he would say that I am just the opposite. I confess to abysmal ignorance of wireless technically. I know what to do to my set if it will not do what I want it—up to a point. I fidget with the knobs until the thing stops howling like a diseased dervish and music floats into the room. When the tone is satisfactory I settle down—and *listen*. I can honestly say I do that.

Benefited by the Best

I maintain that the best of what the B.B.C. gives me benefits me, whatever its second and third best may do for me.

I think the whole point of view may be summarised in this way: music was not written *by* fools, nor yet *for* fools. Music is a powerful influence, one of heaven's greatest gifts to earth. We can now send it from the flood into the world's end; we can call the world; we can speak, sing, and play to millions. It is a bit of a thrill, when we come to think of it.

We should not be the intelligent race we are if we were deprived of art. But because it is unseen, and additional strain is thereby imposed upon us, there is no argument for our not standing up against that strain. After all, it is only for the time being.

I say that advisedly, for the time is coming, slowly but none the less surely, when we shall *see* those who sing and play in the studios.

Quickening Our Perception

Then, perhaps, we shall begin to listen. In the meantime it will be to our great advantage if we seek to quicken our perception by taking in as much as we are able through our ears alone. Television is a thing of the near future. It is going to revolutionise art; it is going to make it possible for the eyes of the world to be upon a single speaker or singer; it is going to make it possible for one single soul to *stand in full view of mankind.*

Said Colton: "Were we as eloquent as angels, yet we should please some men, some women, and some children, *much more by listening* than by talking."

Said Thoreau: "It takes two to speak the truth—one to speak, and *another to hear.*"

Said Keble: "Give us grace to *listen well.*"

WIRELESS PROVERBS

Hang no clothes on the aerial that gives good results.

New sets get new stations.

Mendings are honourable.

A great aerial has a great fall.

An old man with a headphone is a good sign.

The sound of the receiver is better than it looks.

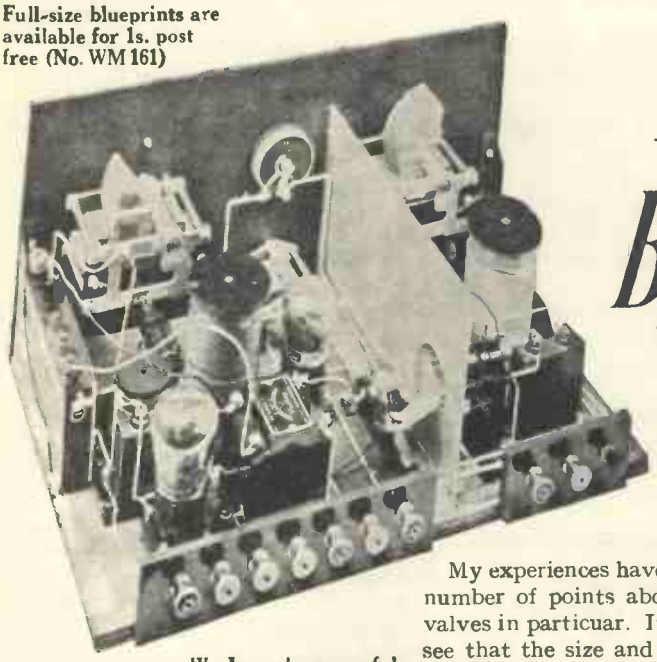
The higher the plum tree, the better the plum; the higher the aerial, the better the tune.

Civility when tuning-in costs nothing.

Full-size blueprints are available for 1s. post free (No. WM 161)

Better Results with your Brookman's Three

W. JAMES Gives Some Useful Hints to Owners of this Famous Set.



W. James' successful Brookman's Three

SINCE describing the Brookman's Three in the October Number of the WIRELESS MAGAZINE, I have had numerous opportunities of testing the set in various parts and using all sorts of aerials.

As I write, I have in front of me a letter from an amateur living in Manchester who has received over forty stations at full loud-speaker strength, within a day or two of the completion of the set.

Thirty to Fifty Stations

Many other instances have been reported to me of the reception of from thirty to fifty stations, which all goes to prove what I knew to be true —that my original claim of twenty stations under normal conditions was modest.

Experience has shown that a beginner may build this set with ease and obtain the results that he has a right to expect.

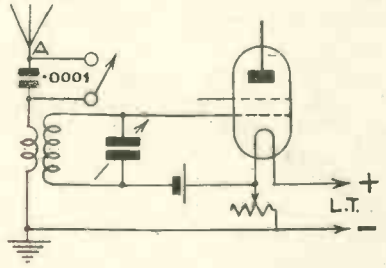


Fig. 1.—Arrangement of the aerial circuit

My experiences have brought out a number of points about aerials and valves in particuar. It is not hard to see that the size and position of an aerial and, of course, its electrical efficiency, play a vital part in the overall performance.

There is, for example, the man with a small aerial, living, perhaps, in a flat in town; another will have a small outdoor aerial, because he is not many miles from a broadcast station.

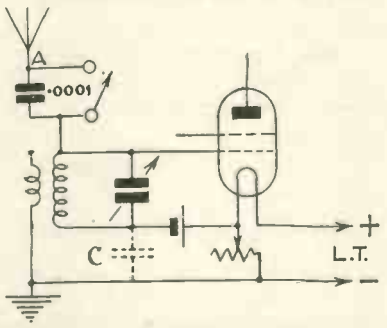


Fig. 2.—For use with small aerial, when interference is not experienced

Yet another will have a large aerial out in the country somewhere, where interference is seldom experienced.

Then, again, there is the listener living in a part where the signals seem normally weak, such as parts of Cornwall where Daventry 5XX is the only station to be received with some sets.

In considering these various working conditions, I have been struck by the impossibility of a single aerial circuit being best suited to all of them. When originally developing the Brookman's Three, I had, of course, tried various aerials and had decided upon the best arrangement for average conditions.

But what I propose to show now is how to adapt the aerial circuit for extreme conditions, both in regard to the aerial and its position. The high-frequency intervalve transformer being designed to suit the shielded valve alone, does not need adjustment, as it provides the maximum amplification with good selectivity.

We will therefore confine our attention to the aerial circuit, a simplified diagram of which appears in Fig. 1. This diagram shows the aerial connected either directly with the aerial coil or through a .0001-microfarad condenser, and the set is wired in this manner. The fixed condenser is included in the circuit when additional selectivity is needed and normally will be cut out of circuit by the switch.

Now an amateur having a *small aerial*, who is normally not troubled with interference, may find the tuning rather too sharp with this aerial circuit. What he should try, therefore, is the arrangement of Fig. 2, where the aerial is joined to the grid of the valve, instead of to the aerial terminal of the coil unit.

If the aerial is a very small one, this change in the connections will result in a large increase in the signal strength and the tuning will be a little more broad.

Improved Results

The effect is, therefore, greatly to improve the results. Those who use the wiring diagram should note that it is wire No. 38 which is taken out, a fresh one being taken from the .0001-microfarad condenser to the terminal on the coil base having wires Nos. 3 and 4 joined to it.

An examination of the circuit as it now stands will show that the grid-bias battery and the volume control are both in the earth circuit. They ought really to be shunted by a 1-microfarad condenser, although if

one of this size is not available, a mica condenser of .001-microfarad or more may be used.

The aerial connections just described will not suit those having *a medium or large aerial*, because on the medium waves, in particular, both volume and selectivity will be lost.

For Medium-size Aerial

Those having an aerial of medium size should, however, try the connections of Fig. 3. In this arrangement, it is intended that when receiving medium wavelength stations, terminal A shall be used, and terminal A1 for the long waves.

Thus the medium-wave primary winding is used; this allows the selectivity and voltage step-up of the transformer to be fully utilised. On the long waves the best results may be obtained with the .0001-microfarad condenser in circuit, or short-circuited, according to where the set is used, and the characteristics of the aerial.

The easiest way of testing is by removing wire No. 38 from the fixed condenser and putting in a temporary one from the fixed condenser to the terminal on the coil base having wires Nos. 3 and 4 joined to it.

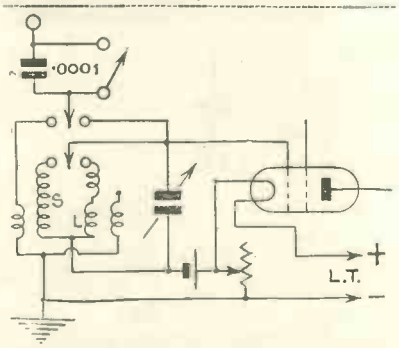


Fig. 5.—Alteration of switch connections

If a test shows that the results are improved by this change, the aerial circuit should be altered as in Fig. 4, which shows a further aerial terminal. One will be used for the medium waves and the other for the long waves. There is plenty of room for the new aerial terminal, and if the aerial wire is fitted to a plug, changing over will be the work of only a moment.

These alternative aerial connections may be tried by anyone with profit. A few minutes spent in experimenting will show how the selectivity and the volume vary as the circuit is altered.

It is, of course, possible to alter one of the wires going to the switch to provide the circuit of Fig. 5. All that has to be effected is the removal of the wire from the long-wave aerial coil to the switch contact, this contact then being joined to the grid side of the long-wave grid coil.

A number of amateurs are using in the shielded-valve stage a valve they happened to have on hand, and the question has been asked whether the shield voltage may be set at a value different from that suggested by the makers.

My tests show that a valve whose shield voltage is rated at 60 may be

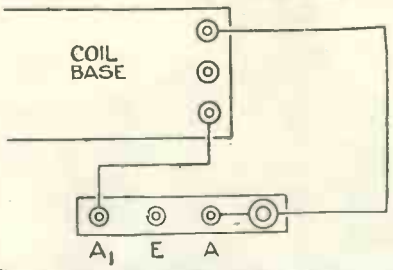


Fig. 4.—Position of the additional aerial terminal on set

supplied with from 50 to 90 volts, instead of the 60. The voltage of the shield should be adjusted, as valves vary in their impedances, and by this means the best working value may be found experimentally.

Some valves are supposed to have a shield voltage of 90, but this, too, is best adjusted from, say, 60 to 100, for the purpose of obtaining the best results.

The effect of increasing the voltage of the shield is usually to lower the impedance. This may raise the magnification a little, and will certainly have the effect of making the tuning less sharp. However, a few trials will soon show the best value.

One or two constructors have made the mistake of reversing the grid-bias plugs, G.B.+ and G.B.+1, wires Nos. 43 and 41 respectively. Their reversal has the effect of cutting down the signal strength and of almost stopping the reaction.

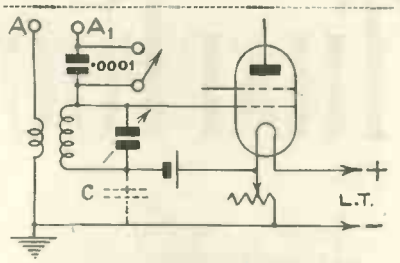


Fig. 3.—Best arrangement for medium-sized aerial

One or two others have used a transformer following the detector valve having a fixed condenser built into it, instead of the type recommended in the list of parts. This also stops reaction, as a high-frequency choking coil is not used.

How to Tune the Set

There are various ways of tuning this set, but a method which I have found satisfactory is as follows: Put the filament resistance two-thirds on and make the circuit oscillate by advancing the reaction condenser for a moment. It is quite safe to do this, as the oscillations do not reach the aerial circuit. Now adjust the right-hand tuning condenser, and when a squeak is heard, turn the left-hand condenser to bring the squeak up to its maximum strength.

This puts the aerial circuit in tune with the intervalve circuit. Now reduce the reaction until the station is properly heard. If it is rather weak, turn up the volume control and, at the same time, slightly adjust the reaction.

This method of tuning takes only a few moments and has the advantage that interference is reduced to the minimum. Although there are two main tuning controls, reaction and volume, the tuning is quite easy as the controls are practically independent of one another

Front view of W. James' Brookman's Three

THAT FOOTBALL BROADCAST!

By DAVID LYSTANER

This clever sketch of what might happen in a small dealer's shop during the broadcast of a football match will interest and amuse all listeners.

THE scene is a wireless shop in a busy town. Behind the counter is the proprietor, Mr. Smith. In front of the counter is a lady customer. Several other customers are standing about in the shop, and there are casual callers from time to time. On the counter is a loud-speaker, tuned to a station which is transmitting a Saturday afternoon football broadcast.

MR. SMITH: I am very sorry, madam, but I have not received the new coil from the manufacturers.

LADY CUSTOMER: It is most annoying. We can only listen to 5XX with the one coil, you know. We like the other stations and we like to have a choice of programme. Besides, we have not yet been able to listen to Brookman's Park. Have you written about the coil, Mr. Smith?

MR. SMITH: Written about the coil? Yes, madam, I have written—twice—and I distinctly told the makers—of the set——.

LOUD-SPEAKER . . . . a beautiful centre, right across the mouth of the goal Will he get——.

LADY CUSTOMER: You were saying, Mr. Smith?

MR. SMITH: One moment, madam.

LOUD-SPEAKER: . . . gets to it. What a chance! He shoots. Oh! what a shot! A poor finish to a beautiful movement.

MR. SMITH: As I was saying, madam, I distinctly told the makers of the set that the coil——.

FIRST CASUAL CALLER: Any score yet, Mr. Smith?

MR. SMITH: I'm pretty busy, John, this afternoon, but I've heard nothing about a goal either side yet. Yes, madam, I told the makers of the set that—the—medium—wavelength—coil——.

LOUD-SPEAKER: . . . penalty. Now I wonder what that was for. Foul charge, presumably, although I did not see anything of the kind from here.

SECOND CASUAL CALLER: Any score yet, Mr. Smith?

MR. SMITH: There will be in a minute if you'll keep quiet.

LOUD-SPEAKER: . . . takes the kick——.

LADY CUSTOMER: You were saying, Mr. Smith?

MR. SMITH: One moment, madam.

LOUD-SPEAKER: . . . no chance at all. The score now is——.

THIRD CASUAL CALLER: Any score yet, Mr. Smith?

MR. SMITH: One goal from a penalty.

THIRD CASUAL CALLER: Who scored it, Mr. Smith?

MR. SMITH: No idea. Business comes first, you know. I told the makers, madam, that the coil was required urgently and I am expecting it——.

LOUD-SPEAKER: . . . grand run down the wing, but fails to centre the ball. Goal kick.

MR. SMITH: . . . expecting the coil every post. As soon as ever that coil comes to hand, madam, I will send my man over to fix it for you.

FOURTH CASUAL CALLER: How's the game going, Mr. Smith?

MR. SMITH: I'm very busy this afternoon and I can only give half an ear at the most to the game. Somebody scored a penalty awhile back, but I didn't notice who. This isn't a television set.

LOUD-SPEAKER: . . . another penalty— .

LADY CUSTOMER: I suppose you cannot lend me a spare coil, Mr. Smith, by any chance?

MR. SMITH: . . . spare—penalty. One minute, madam.

LOUD-SPEAKER: . . . kicks it right at the goalkeeper ——.

CHORUS OF CUSTOMERS: Ah—h——h——h!

LOUD-SPEAKER: . . . the first penalty saved on the ground this season. The score still stands——.

LADY CUSTOMER: I asked you if you could lend me a spare coil, Mr. Smith.

MR. SMITH: Yes, madam, if you will excuse me one moment, madam, I will see if I have a spare coil in another set of the same make.

Mr. Smith turns the loud-speaker round as he passes it on his way to the end of the counter. He disappears behind a large fixture, which contains valves, variable condensers and other wireless component parts.

LOUD-SPEAKER: . . . was off the mark with a first time effort from twenty yards out. Goal kick.

FIFTH CASUAL CALLER: Any score yet, Mr Smith?

MR. SMITH: Listen for yourself, my boy. Now I wonder where that set is. I saw it here yesterday.

LOUD-SPEAKER: . . . free kick given against——.

ANOTHER CUSTOMER: You might get me a high-tension battery, 60 volts, if you put your hand on one behind there, Mr. Smith.

MR. SMITH: Right you are, sir.

LOUD-SPEAKER: . . . has it in front of goal. Can he shoot? Yes, a magnificent shot. Oh! well done——.

SIXTH CASUAL CALLER: Any score yet, Mr. Smith?

MR. SMITH: Shut that door somebody and I don't mind if you bolt it. Talk about interference——.

LOUD-SPEAKER: . . . a great goal from twenty yards out. A magnificent shot——.

SEVENTH CASUAL CALLER (*opening door*): Boss's compliments, Mr. Smith, and is there any score yet?

MR. SMITH: Score? Let me see now, I seem to have heard mention of three goals.

SEVENTH CASUAL CALLER: How many of the three have the boys got, Mr. Smith?

MR. SMITH (*coming from behind the fixture*): Now you're asking me a question. What with local heterodynes and such like, reception isn't what I like it to be at such times.

LADY CUSTOMER: Did you find the coil for me, Mr. Smith?

MR. SMITH: Bless my life, what with one thing and another now, I—er—as I was saying—I explained to the makers——.

LADY CUSTOMER: Don't trouble any more about the coil just now, Mr. Smith. I'll call in again later. What I came in for really was to ask the score for my husband. I promised him I would call in and ask. You really have no idea of the score, have you, Mr. Smith?

MR. SMITH: Well, I'm—er——

LADY CUSTOMER (*going out of the shop*): I'll tell him two—one, Mr. Smith. That seems about the likeliest figure. Good afternoon, Mr. Smith. I'll call about the coil later.

Milking Cows by Radio

THEY milked cows by radio at the Dane County Fair at Madison, Wisconsin, held recently; and that doesn't mean just to the accompaniment of radio music. Radio-controlled automobiles were piloted about the race track, pianos were played, water was pumped, and other farm apparatus operated by radio waves.

This was the first radio-control performance ever shown at Wisconsin Fair, and is considered by fair officials as an even greater feature than a refuelling demonstration given by two aeroplanes at the same fair. F. P.

A Little Interference from the Local Station

Big Ben from KDKA

THE voice of Big Ben has been synthetically reproduced in the United States by station KDKA, of the Westinghouse Electric and Manufacturing Co., Pittsburgh.

KDKA first introduced the sound of the old timekeeper to its listeners by relaying it from London through a short-wave receiving set. Hearing these mellow sounds coming from his loud-speaker, Dr. Frank Conrad, assistant chief engineer of the Westinghouse Co., conceived the idea of reproducing the same sound artificially.

His idea was handed over to Mr. V. E. Trouant, radio engineer, for application, and as a result the replica of Big Ben is broadcast by KDKA exactly upon the hour F. P.

We Pick Out the Best of the

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 are given on receivers that do not reach this standard; indeed, every month we have to return to the manufacturers receivers which do not reach this standard. It will be understood, therefore, why the reports that do appear in these pages never condemn a set.

KOLSTER-BRANDES THREE-VALVE ALL-MAINS SET

Maker: Kolster-Brandes, Ltd.

Price: £17 10s. (complete with valves).

Power Supply: A.C. mains of all voltages.

Valve Combination: Screened-grid, detector, and pentode.

LAST month one of our contributors exhorted those with electric light to use a mains set; we have no doubt this good advice would be more universally acted upon if such sets were less expensive. We give it as our opinion that most of the mains-operated sets now on the market are too expensive for the listener of average means.

Good Value for Money

This statement does not carry with it the inference that such sets are not good value for money—they are. But so is a Rolls-Royce car, yet that does not make it any less difficult for us to buy one.

A notable exception to the ruling prices for mains-operated sets is the Kolster Brandes model K.B.169 three-valver; complete with valves, this set can be bought ready for use for £17 10s. This set is several pounds cheaper than any other set of similar capabilities and is, we happen to know, enjoying great sales.

In view of its low cost, special interest will be taken in this report on its performance. Our tests were carried out not only in the WIRELESS MAGAZINE test laboratory, but also in two homes, one in south-west London, the other in Middlesex.

Apart from our standard series of tests, which we apply to every receiver, we always have in mind the final function of a set, which is to give good-quality reproduction from a number of stations. In the first test in the laboratory the Kolster Brandes mains set was operated from a 240-volt A.C. supply.

In the early evening, the long-wave stations, such as Radio Paris, Daventry 5XX and Hilversum, came in at excellent strength. We were impressed by the selectivity on the long waves; there was no appreciable interference between any of the stations tuned in.

On the medium wavelength band, Toulouse, Barcelona, Langenburg, and, of course, London and 5GB were brought in; the set is very lively on the medium waves. Reaction, we found, was rather fierce; it needs getting used to. There is no "stop" provided for this control.

On the score of general convenience, the controls are well arranged. All controls, with the exception of the mains on-off switch, are mounted on a large escutcheon plate. The wave-range switch is mounted on the left and corresponding to it on the right is the reaction control.

Centrally disposed on the escutcheon plate are three thumb-control discs. That on the left is the aerial tuning control, on the right is the high-frequency tuning control; in between the two is a vernier tuning control. It is a good idea, this vernier control, since it gives a very delicate auxiliary control to the high-frequency tuning.

The Kolster-Brandes set reviewed on this page is housed in a substantial oak cabinet

The omission of a vernier for the aerial tuning is quite permissible, since this is never really critical. The number of controls is completed by a volume control mounted immediately beneath the tuning discs and the mains on-off switch at the bottom of the set.

Inserting the Valves

The whole of the back of the set is readily removable for the insertion of the screened-grid, detector, and pentode valves. The receiver occupies the top section of the cabinet, the mains equipment being housed in the separate lower compartment. The accessibility of the set is notable. For example, the aerial and earth terminals, loud-speaker terminals, mains connecting plug, and the jack for gramophone reproduction are all very conveniently placed.

The layout of the Kolster-Brandes set is neat and conforms to modern practice in every respect

Further tests of the set under the different conditions already mentioned go to show that the selectivity is of a high order. The set should function excellently near regional transmitters. The vernier control of tuning was found to be necessary when bringing in some of the more distant stations. Many of these could be picked up on an indoor aerial which, incidentally, adds to the selectivity.

Good Earth Advisable

No appreciable mains hum was noted, except when the earth lead was removed. This reminds us that with an A.C.-mains set, of any description, a good earth is always advisable.

That variable factor we call quality of reproduction is quite pleasing with the Kolster Brandes set. A lot depends on the loud-speaker used; for the laboratory test the Amplion standard cone was tried with satisfactory results.

We have no hesitation in recommending this set to listeners of modest means

New Sets for Your Guidance

who would like to acquire a reliable A.C. mains-operated set. The low price appears to have been achieved without materially affecting the performance. We think the Kolster-Brandes people are on the right track in making their sets from raw materials instead of from standard components. A close inspection of the constituent parts of the set reveals the fact that cost of production has been cheapened in a perfectly legitimate way by using metal and insulating materials, a practice that is not possible in a home-constructor's set.

Superior Reproduction

As this is a mains-operated set, the provision for gramophone reproduction is useful. Provided a good loud-speaker is used, the resulting reproduction by electrical means of gramophone record is superior to that given by a medium-priced gramophone. The makers advise purchasers of their set to use a Kolster-Brandes loud-speaker, which includes a loud-speaker transformer. We can see the point of this because no output transformer is incorporated in the Kolster-Brandes set.

It is advisable to use an output transformer between the set and loud-speaker if the loud-speaker is not of Kolster-Brandes manufacture. It would, we think, have been of more general utility had the set embodied the output transformer. Possibly this may be done later.

The metal case of the Burndept set is attractively finished

Two models of the set tested are provided for A.C. supply mains of widely differing voltages. For supplies between 100 and 120 volts the K.B. 161 should be ordered. For 200- to 250-volt supplies, the correct model is the K.B. 169. Although we have not yet tested it, there is a similar Kolster-Brandes set for battery operation, model K.B. 163. Judging by its price, namely £10 15s., including valves, this set maintains the Kolster-Brandes reputation of value for money.

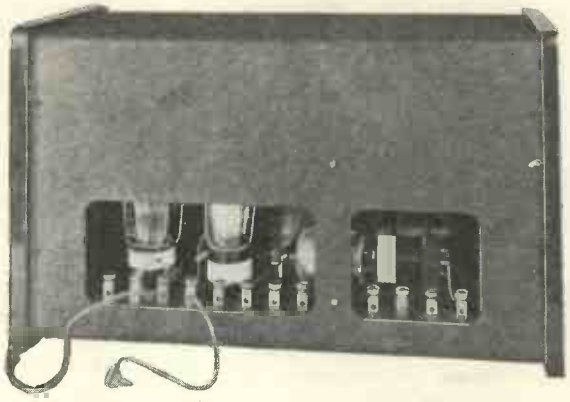
BURNDEPT SCREENED ETHOPHONE

Maker: Burndept Wireless (1928), Ltd.

Price: (with valves), £11 8s.

Power Supply: Batteries.

Valve Combination: Screened-grid, detector, and pentode.



Note the opening for inserting the valves in the Burndept receiver

FOR most broadcast listeners, a three-valve set is probably of the greatest all-round utility; and one of the best examples of a three-valve broadcast receiver deriving its power from batteries is the Burndept Screened Ethophone. The price is moderate and we are now able to say, from personal experience, that the performance is excellent.

Embodying a widely used sequence of valves, namely, screened-grid, detector and pentode types, this set should appeal more especially to those who, lacking an electric-light supply, are anxious to equip themselves with a battery-operated set that will give them ample volume from a number of alternative stations.

Speaking of stations, it is interesting to record that Budapest, on 550 metres, was the first station to be tuned in on the Ethophone. The left-hand dial reading was 74 degrees, and the right-hand dial reading 98 degrees for the reception of this station. The volume was quite good and so was the quality of reproduction; morse interference marred what would otherwise have been an excellent Continental concert.

The full 100-ft. aerial erected outside the laboratory was in use at the time; on changing over to the 60-ft. indoor aerial, Budapest could still be heard, although the strength was reduced to about two-thirds of that previously obtained.

How a set is operated always seems to us rather an important matter; in the Burndept Ethophone, two tuning dials have to be rotated before a station can be tuned in. The makers have arranged the knobs so that they turn in opposite directions. This is a little confusing until one gets accustomed to it. As there are no stops at the end of each condenser dial scale, it is possible to overstep oneself and so start again at the bottom of the tuning scale.

Handy Reaction Control

We liked the handy reaction knob; and since this knob has often to be used, its handiness is quite important. The reaction variation is pleasantly smooth; the strength of weak stations is greatly increased as the reaction control is brought into play.

The on-off switch also combines the function of wavelength changing. The

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 and kit set :—

Also, on page 632, there is a list of more than 250 sets arranged in convenient price groups.

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

DECEMBER

Brown Three-valve Kit Set
Gecophone Short-wave Set (Three-valver)
Lewcos Three-valve Chassis
Regentone Mains Units (A.C. and D.C.)
Ekco-Lectric SGP3 (D.C.)

★ ★ ★

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.*

We Pick Out the Best Sets—*Cont.*

three positions "off," "210-to-550" and "650-to-2,100" are engraved with commendable clearness.

This first preliminary test left a good impression; there is a pleasant "feel" about all the controls. Sensitivity, we concluded, is remarkably good for such a straightforward layout. Budapest at the top of the scale and Cologne near the bottom came well up to strength we are accustomed to get from our standard sets.

Some Measurements

Some of the measurements we took will interest WIRELESS MAGAZINE readers. The two wavelength ranges for medium and long waves were checked up with our standard wavemeter; the long wavelength limits were found to be 655 metres to 2,090 metres. On the medium wavelength band, the set tuned from 250 to 555 metres. The tuning range is, therefore, adequate to cover present conditions.

Using the Mullard valves specified, which include screened and pentode types, the total anode-current consumption was 25 milliamperes. This result was obtained with a maximum anode voltage of 145 volts, and a screened-grid voltage of 80 volts, derived from Columbia super-capacity batteries, and later from a Regentone D.C.-mains unit. The low-tension current consumption was moderate, being only .55 ampere.

From these readings we learn that if the specified valves are to be used, a super-capacity dry battery will be required for high-tension supply, and the 2-volt accumulator for low tension supply will last a long time between charges. If this is a 30 ampere-hour capacity, we can expect to get between 50 and 60 hours' reception for each charge.

Use of Small Power Valve

Not every one is prepared to go to the expense of a super-capacity dry battery; knowing this, we tested the set with an Osram P215 small power valve in place of the pentode. A standard-capacity high-tension battery of 120 volts was then connected up. The total anode-current consumption was then found to be just over 9 milliamperes. Naturally, there was an appreciable diminution of volume; but it is consoling to be able to record that Budapest and Cologne could still be tuned in with plenty of volume and good quality.

In these "regional" days we are all making rather a fetish of selectivity; many of the inquiries we receive about this or that set have to do solely with selectivity.

Selectivity, if not inherent in a set, can often be partially achieved by using a critical length of aerial wire. Our tests with the Burndept Ethophone will illustrate this; using the outdoor aerial and connection A2 (which is the most direct aerial connection on the set) Brookman's Park only *entirely* disappeared just before 5GB was tuned in. In other words, the powerful regional station covered a large portion of the dial.

Using the alternative aerial connection A1, and the same aerial, Brookman's Park disappeared entirely at degrees 60 and 62 on the left and right dials respectively. The tuning point for maximum signal strength from Brookman's Park was 42 and 44 degrees for the left- and right-hand dials respectively. The spreading effect was, therefore, considerably reduced and the selectivity rendered quite good.

With this alternative aerial terminal, an appreciable diminution of signal strength of all stations other than 2LO, 5GB and 5XX was noted. But this was off-set by the fact that other stations previously swamped by 2LO could be brought in clear of interference.

DO NOT OVERLOOK THE LIST OF SETS—ARRANGED ON A PRICE BASIS—WHICH APPEARS ON PAGE 632 OF THIS ISSUE

Reverting to the A2 aerial connection, we brought the indoor aerial into use. Selectivity was not quite so good as with the outside aerial and connection A1; but signals were generally a little stronger. As always, the user must compromise between volume and selectivity. We recommend a progressive reduction in the length of the aerial wire until the point is reached when the reduction in signal strength becomes too marked.

Omission of Volume Control

We think that the quality of reproduction from this set will satisfy most listeners. Stations that are too strong have to be reduced in intensity by detuning; the only notable omission from the Ethophone is a volume control. Doubtless this was in the interests of simplicity and low cost; all the same, we think a separate volume has ceased to be a luxury in present-day broadcast receivers.

The general design of the set is really clever. The cabinet is almost a one-piece job. The set is an excellent example of a manufacturer's efforts to get away from the mere assembly of components into the more profitable and ultimately more efficient process of making sets from materials instead of from parts.

As a general-utility broadcast receiver, we can add the Burndept Ethophone to that growing list of sets which, having passed successfully through our laboratory, carry with them our wholehearted recommendation.

COSSOR MELODY MAKER

Maker: A. C. Cossor, Ltd.
Price: £8 15s. (including valves).
Power Supply: Batteries or A.C. mains.
Valve Combination: Screened-grid, detector, and power valves.

Three-valve Battery Set, Mains Set and Kit

DURING the last few weeks, we have assembled no less than three 1930 Cossor Melody Maker sets in the course of our test work; we feel justified now in claiming to know quite a lot about this constructor's kit. There are, as we have once before remarked, two things most constructors want to know about a kit set; whether it is easy to assemble and whether, when assembled, it will give satisfactory results. We find it difficult to say which is the more commendable in the Cossor Melody Maker—ease of assembly or performance.

Ingenious Assembly

On the whole, we think it fair to place ease of assembly first; this process really is ingenious. The main component, if it can be so called, is the Cossor synchronised control unit, which consists of a gang condenser, long- and short-wave tuning coils and wave-changing switch.

By boxing in these components and supplying the constructor with the whole of the tuning system already wired and matched, the makers have really done half the work of assembly. Besides the control unit, the remaining components seem almost trifling; they consist of the low-frequency transformer and such components as valve holders, fixed condensers and terminal strips.

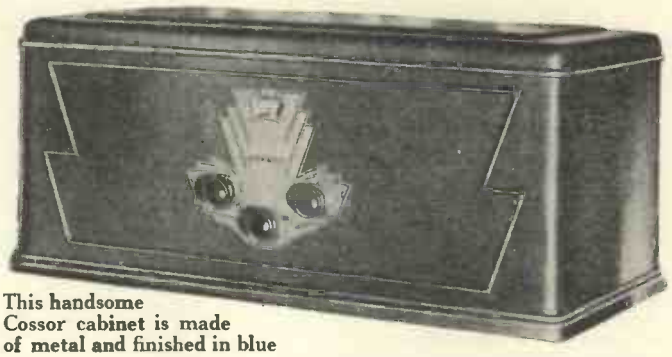
The whole assembly is placed within a well-finished one-piece metal cabinet. There is nothing objectionable about this cabinet which, with its oxidised-silver-finished escutcheon plate, has a handsome appearance. Ample space is available inside this metal cabinet for all the necessary batteries or mains equipment.

The provision for mains operation is another Cossor Melody Maker development; a special power unit has been produced, which supplies 120 volts rectified high-tension current and A.C. at low voltage for the filaments of the mains valves. The maker's thoughtful provision for mains operation should clear up a difficulty that must be confronting many constructors.

Simple Mains Conversion

Some of them, we know, are expecting to be in a position to use the mains quite soon, but, in the meantime, are forced to use a battery-operated set. By building the Cossor Melody Maker, those so placed can, with the minimum of expense, convert their set from battery to mains operation when desired.

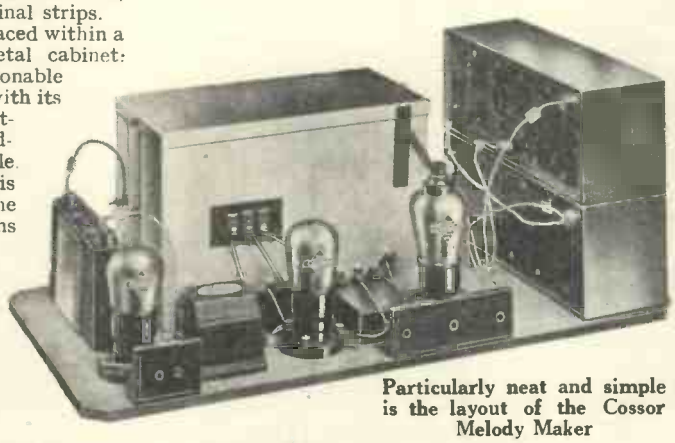
Unpacking the parts of the Melody Maker is a revelation in real simplicity; there are only three parcels to be undone. The assembly is completed in three simple stages; firstly, the components have to be mounted on the baseboard. Then the baseboard wiring is done; it is here that the Cossor set reveals its true simplicity.



This handsome Cossor cabinet is made of metal and finished in blue

All the leads are very short and are so clearly marked and numbered that it is almost inconceivable that anyone could make a mistake. In the third stage of the assembly, the battery leads are added. The complication of a terminal strip is avoided by taking the battery leads direct to the components concerned.

Our tests for WIRELESS MAGAZINE readers have been confined to the Cossor Melody Maker for battery operation. Later we will give our experiences with the mains-operated model



Particularly neat and simple is the layout of the Cossor Melody Maker

In its completed form, the Cossor Melody Maker has three small knobs projecting through the escutcheon plate. In these lies the whole operation of the set. Tuning is done with the right-hand knob and the volume or sensitivity is adjusted by the knob on the left. Between these two is a knob combining the function of on-off switch and wave-range switch. These controls are conveniently placed and easy to handle; the switch knob is a little too stiff in our opinion, but it is quite positive in action.

The behaviour of the set on the medium wavelength band was especially impressive. The selectivity is well above the average and is more than adequate to cope with transmissions from regional stations. We found that, apart from the reception of the local station, the volume control had to be advanced to give adequate loud-speaker signals from more distant Continental broadcasters.

The long-wave performance is not quite so good as that on the medium waves. Five or six long-wave stations could be heard at fair strength on the loud-speaker

New Process Valves

For this test, the three specified Cossor valves were used, these being the new-process 2-volt types. A 120-volt high-tension battery was connected up and the total measured anode current consumption was found to be 8 milliamperes. Economy of working is therefore a feature.

Used in conjunction with the new Brown Duplex loud-speaker, the quality of reproduction was up to standard. The detector valve seems to work very well with the Cossor transformer.

We think that the assembly of a Cossor Melody Maker is quite within the capabilities of the non-technical listener, for whom it was primarily designed. Moreover, we can say that the Cossor Melody Maker, when assembled, will give results well up to the standard to be expected from the Cossor valves it employs.

The A.C. Mains Unit for the Melody Maker

A test report of this unit will appear in a future issue

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

We Pick Out the Best of the New Sets—*Continued*

VARLEY ALL-ELECTRIC TWO

Maker : Oliver Pell Control (Varley), Ltd.

Price : 16 guineas.

Supply : A.C. or D.C. mains.

Valve Combination : Detector and power valve

VARLEY—a name hitherto associated with a range of high-class components—must henceforth also be remembered in connection with complete radio sets. In addition to simple all-electric two-valvers, the Varley people are now making elaborate console radio gramophones and other de luxe instruments.

Our first experience of the new Varley sets has been particularly pleasant; we have been using the Varley two-valve set for A.C. mains operation.

Is it Worth While?

As this is a type of set that appears to have a debatable utility, this report is of special significance. A question that is often put to us is whether the necessary expense of mains equipment is justified for a simple two-valve set. Our experience goes to show that such a combination is quite worth while, because the use of mains valves increases the efficiency of a two-valve receiver to a considerable extent.

An all-mains two-valve set for A.C. mains supply can be relied upon to give full loud-speaker strength from the local station, with the strong probability that two or three other loud-speaker signals will be heard.

What May be Expected

As a guide to what may be expected in reception from such a set, an evening's log, taken on November 13, 1929, will be useful.

We started on the long-wave-length band and got Radio Paris at 95 degrees on the tuning dial, at moderate loud-speaker strength. This was with a 70-ft. aerial erected under the rafters of an old house in south-west London. There was no interference from Daventry 5XX, the absence of which we thought rather remarkable.

The high-power German station, Zeesen, came in at 92 degrees with about the same intensity of sound as Radio Paris. Here, some interference was experienced from 5XX, which at 83 degrees came in at a very good loud-speaker signal. There was an unknown station on 10 degrees, which came in with great power.

On the medium-wavelength band, we bagged a German station at 5 degrees. This was really good loud-speaker strength, as was a Frenchman at 40 degrees. 2LO at 60 degrees and Daventry 5GB at 85 degrees both provided two excellent loud-speaker signals. Using the correct aerial terminal (three are provided), the 5GB reception was not marred by interference from 2LO.

Here we should emphasise the fact that the absence of interference was due, as much as anything, to the comparative *shortness* of the aerial.

Several good points about the Varley two-valve set attracted us during this test. One was the smooth action of the tuning dial, which is easy to read and positive in its movement. The switch for changing wavelengths is clearly marked for medium and long wavelengths; we mention this clear marking because a good many of the sets so far tested have had anything but clear engravings.

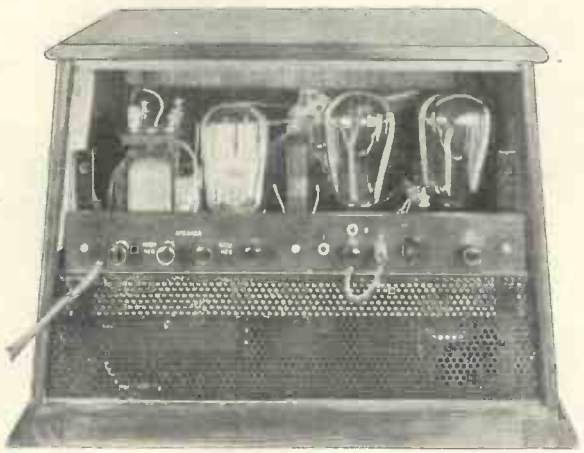
The knob of the wavelength-changing switch is large enough to handle with comfort; we have a strong aversion to miniature knobs on a set. The reaction knob is equally well engraved and quite handy. Reaction builds up rather rapidly and the set goes very suddenly into oscillation.

There is a bit of "back-lash" in the reaction; this may be attributed to the characteristics of the mains detector valve. Reaction has to be used for every station received, but there is no need to work right up to the point of oscillation for any of the stations logged

As this set is entirely mains operated, for it derives high-tension, grid-bias, and low-tension supplies from the A.C. mains, the amount of audible hum had to be carefully noted. Listening 2 ft. from the loud-speaker we could only *just* hear a faint trace of hum, which did not appreciably increase as reaction was applied. The set appears to have an adequate amount of smoothing.

Headphones were subsequently used to check up the question of hum. It is perfectly safe to use headphones with this mains set, because a separate low-resistance output winding is provided, in addition to the high-resistance output winding for use with the average type of loud-speaker. With the phones connected to the low-resistance loud-speaker terminals, as they should be, practically no hum at all could be heard. This was a pleasant surprise.

Exceptionally handsome in appearance is the Varley All-electric Two



Accessibility for inserting the valves and rectifier is a feature of the Varley set

Special Utility

The unusual, but highly commendable, inclusion of two separate output windings has a special utility, which is not mentioned by the makers in their instruction booklet.

We have had more than one inquiry as to how a set can be arranged so that, while the family are listening to loud-speaker reception, the maid can listen on headphones, the Varley set provides a solution to this problem. We found that when the set was adjusted to give full loud-speaker signals from a loud-speaker connected to the high-resistance output terminals, this same adjustment gave pleasantly loud, but not deafening, signals in headphones connected to the low-resistance output.

The headphones should not be connected to the high-resistance output, because the signal strength from all stations is then much too great. Moreover, the hum becomes quite objectionable. Of course, when the headphones are used, many more stations can be heard than with the loud-speaker. But this Varley set is essentially a loud-speaker set, as the foregoing log definitely proves.

In view of the fact that reaction is

Read These Test Reports Before Buying A Set!

used for all reception, the quality of reproduction is good. The mains valves again prove their superiority over ordinary battery valves. Excellent quality was obtained when the set was connected to one of the new Ultra Air-chrome loud-speakers. Plenty of bass was evident and crisp top notes lent colour to the tone.

The cabinet of the Varley set is unusually handsome; it is a sorry fact that wireless cabinets are, as a rule, poor specimens of the cabinet-maker's art. The makers of the Varley set are probably good psychologists; they must know how easy it is to sway non-technical set-buyers by such considerations as cabinet work. The feminine element, especially, is liable to be put off by shoddy cabinet work, by "trady" name plates and other objectionable features that have little to do with the actual operation of the set.

Good Accessibility

The general accessibility of the set is good. On such rare occasions as may be necessary, the back of the cabinet can be removed to expose the two A.C. valves and the valve rectifier. To allow for the different supply voltages in this country, the mains transformer is fitted with three alternative sockets for 200, 220 and 240 volts. Accessibility is again good.

As a gramophone amplifier, the Varley set can be brought into use by inserting a plug from the pick-up into a conveniently-placed jack at the back of the cabinet. No plug is supplied, but then no manufacturer seems to worry about this little detail. We do not know why they should not supply a plug; it seems rather mean.

Insertion of the plug automatically gives the detector valve a negative grid bias, thereby making it suitable as the first amplifier for gramophone work. This bias is arranged to be most suitable when a Varley pick-up is used. But, provided that a good volume control is used externally, there is no tendency to overload the first valve, and excellent results are readily obtainable. This gramophone reproduction seems well worth while with a mains set, especially if the loud-speaker is a good one.

Varley's have made a notable advance in producing radio sets; we congratulate them on the example tested.

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

EDISWAN THREE-VALVE RECEIVER

Maker: The Edison Swan Electric Co., Ltd.
Price: £9 12s. 6d.
Power Supply: Batteries.
Valve Combination: Screened-grid, detector, and power valves.

IN purchasing a battery-operated set, one of the most important things is the maintenance cost. Dealers do not always make it clear that whereas a set may be quite inexpensive in first cost, the maintenance may be quite heavy. Battery-operated sets employing a pentode, for example, need super-capacity high-tension batteries; such a battery will cost twice as much as the standard-capacity battery frequently sold with the set.

The standard-capacity battery would only last a very short time and renewals would make the maintenance cost excessively high. A set taking up to six milliamperes anode current can be economically worked from a small standard-capacity battery; the 120-volt Ever Ready Winner type at fourteen shillings is an example.

Reminiscent of modern car practice is the fabric-covered metal case of the Ediswan receiver

One of the first things we did with the new Ediswan battery-operated set was to measure the total anode-current consumption; this was found to be just under 6 milliamperes. The set will, therefore, work for a long time from an inexpensive high-tension battery. This test was made when the set was operating with the specified valves, namely, an Ediswan 2-volt screened-grid, a Mazda detector, and a Mazda power valve. The maximum high-tension voltage was 120 volts, with lower voltages as specified for the other valves.

In these days of low-consumption valve filaments, the question of accumulator charging is not so important. The Ediswan set consumes .4 ampere from a 2-volt accumulator. If a 30-ampere-hour accumulator is used, over 60 hours' broadcast reception can be enjoyed between each accumulator charge. If used, say, for three hours a day, the accumulator will last for about three weeks before it requires re-charging.

The Ediswan set is obviously extremely economical in working, and when this is taken in conjunction with the moderate first cost of the set, the demand for it can be understood. Having satisfied ourselves about the maintenance question, we tried out the set on a 70-ft. indoor aerial, situated about 20 miles south-west of Brookman's Park. Quality of reproduction from this station, when using the new Blue Spot Goliath loud-speaker, was good; volume was more than enough.

Severe Quality Test

The quality test was fairly severe, since a piano recital was in progress at the time. There was plenty of good, strong bass; the top notes were quite pleasing.

Testing for sensitivity, we found that Daventry 5GB could be brought in at good loud-speaker strength without unduly forcing reaction. On the long wavelengths, 5XX was exceptionally good. The Eiffel Tower and Radio Paris stations were both received at good loud-speaker strength, quite free from interference from 5XX. Generally speaking, we should say that a fairly good aerial and earth system is needed to do this set real justice.

Control of the set is moderately easy; one excellent feature of the set is the robustness of the control knobs. Probably this appeals to us because we have such a strong dislike to small fiddling controls. Tuning is done with two thumb-controlled discs of ample size; they can be gripped by the thumb and rotated independently of each other. They vary the aerial and anode tuning circuits.

The discrepancy between the two dial readings is not great; for example, London comes in at 39 degrees on the left-hand dial and 37 degrees on the right-hand dial. The two readings for Daventry 5GB are 68 and 65 degrees. This close matching of the dial readings holds good on the long wavelengths; Daventry 5XX comes in at 56 and 58 degrees.

Comfortable Reaction Control

The reaction control, which has to be used for all stations except the local, is very comfortable to handle, thanks to the large knob. Reaction is a bit sudden in action, but this seems to be common to most sets we have so far tested. Possibly there is too much positive bias on the detector valve.

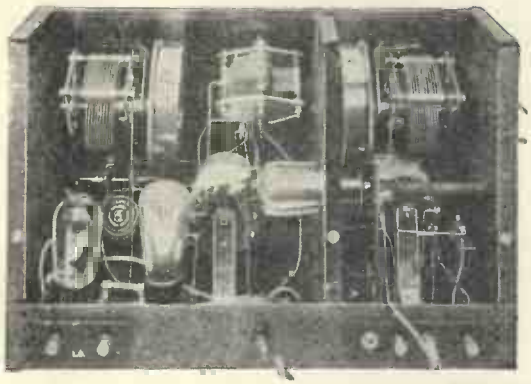
The leather-covered metal cabinet is an innovation in set production, upon which the makers are to be congratulated. It reminds us of a fabric-bodied car; the result is just as attractive. The batteries, which are external to the set, can be

We Pick Out the Best of the New Sets—*Continued*

very simply connected up to the clearly-marked battery cord supplied with the set.

Not every maker takes the trouble to supply a battery-connection cord with the set; we think all battery-operated sets with external batteries should be so supplied.

We are often asked about the selectivity of the sets we recommend; another of our tests of the Ediswan model had reference to this point. We find that the selectivity is of a high order; in fact, we think it is more than enough for the power available. Brookman's Park was tuned out within 4 degrees, which is very fine tuning.



Note the neat layout of the Ediswan set, which is fully discussed in these pages

The special selectivity provided in this set is valuable upon the long wavelength band where the usual swamping effect of Daventry 5XX has been overcome. It is a good thing to say of a set that it can get the Eiffel Tower transmissions at loud-speaker strength clear of Daventry.

MARCONIPHONE MODEL 39

Maker: The Marconiphone Co., Ltd.
Price: £13 (complete with valves).
Power Supply: Battery, A.C., or D.C. mains. (The price quoted is for battery operation.)
Valve Combination: Screened-grid, detector, power or pentode.

MAKERS of modern radio sets are beginning to appreciate the great selling point of an attractively finished cabinet; many non-technical set-buyers are undoubtedly swayed by such a consideration. The Marconiphone model 39 illustrates the new idea.

Ornamental Controls

The "scientific" aspect of the set has been reduced to the minimum; in its exceptionally well-finished mahogany cabinet the "39" set is housed so that the controls appear to be more than usually ornamental. The shape of the cabinet, with its rounded edges, is in keeping with ultra-modern furnishing styles. The "39" set will appeal to listeners of good taste.

It has the added attraction of inexpensiveness. For battery operation, the complete set, with batteries, is 15 guineas; a good loud-speaker and a suitable aerial and earth bring the total outlay up to about £20. This cannot be considered excessive for what our tests have proved to be a highly-efficient broadcast receiver.

For those listeners who are hoping to be blessed shortly with an electric-light supply, the "39" set has still another attraction: the batteries are very simply replaced by equipment suitable for A.C. or D.C. mains supply. The conversion from battery to mains operation is not expensive. The complete A.C.-mains set is listed at £21, and the D.C.-mains set at £17 15s.

Our experience of the "39" has, so far, been limited to the battery model, but later we shall give details of the results obtained with the A.C.- and D.C.-mains equipment. The set was connected up to a 70-ft. indoor aerial some 10 miles south of Brookman's Park. The specified 2-volt Marconi valves, for the screened-grid, detector and power stages were used, together with a suitable standard-capacity high-tension battery and 2-volt accumulator.

As the test started after 8 o'clock in the evening, a great profusion of broadcasting stations were heard with the wave-changing switch set at the "S.W." position. Good loud-speaker reception of medium-wave stations was heard at nine different settings of the two tuning dials. This was excluding Brookman's Park and Daventry 5GB. Some of the stations were quite as loud as Daventry.

The dial readings do not register any awkward discrepancy. For example, one German station came in at 10 degrees on the left-hand dial and 19 degrees on the right-hand dial. Another station came in at 21 degrees and 28 degrees. The discrepancy decreases towards the top end of the scale. Toulouse, for example, was tuned in at 60 degrees and 63 degrees on the left- and right-hand dials respectively.

At the "L.W." position of the switch, the long-wave stations were, if anything, more easily received than the medium-wave stations. Starting from the bottom of the scale and working upwards, Hilversum, Eiffel Tower, Daventry 5XX, Radio Paris, and Huizen were exceptionally well received on the loud-speaker.

The operation involved in the logging of these stations is comparatively simple. The most important control is the tuning, which is varied by simultaneously rotating two discs with the thumb. Most of the stations can be so received, and then increased in strength by separate adjustment of each disc.

The three octagonal knobs, mounted in a line below the tuning escutcheon plate, provide all the subsidiary control needed. The knob on the left switches the set on or off; it has a pleasing silky action. The centre knob has three positions, "S.W." for medium waves, "L.W." for long waves, and "Gram" for gramophone reproduction. The knob on the right is marked "Volume," but it is really a reaction control. It is the least attractive feature of a very attractive set.

Question of Selectivity

Selectivity, using the indoor aerial, is sufficiently good to cope with modern conditions. Toulouse was received at full loud-speaker strength, perfectly free from the interference often experienced with less selective sets from Brookman's Park. Radio Paris was equally well free from interference from Daventry 5XX. Nevertheless, we think a fairly short aerial, and the use of aerial terminal "A2," instead of "A1," is advisable.

Quality of reproduction was determined by the use of two entirely different types of loud-speaker. One was the Ultra Air-chrome loud-speaker using a linen diaphragm, and the other was the new Magnavox "X-core" moving-coil loud-speaker. Reproduction was good with both types. The Ideal low-frequency transformer works very well with the Marconi HL210 detector valve. The two together ensure good quality. The P215 power valve is quite adequate to deal with the signals from most

The octagonal control knobs of the Marconiphone set are very distinctive

A Feature of Real Value to the Set Buyer

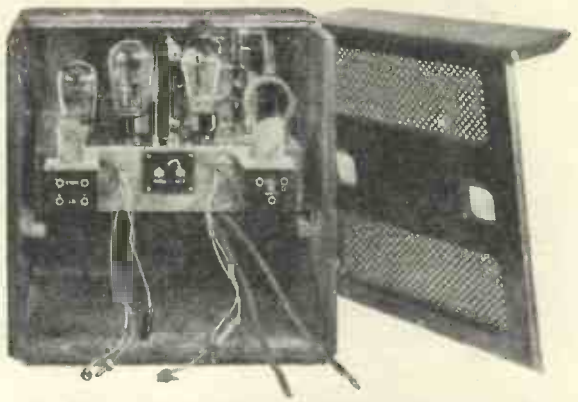
stations. It is very economical to run: the total anode-current consumption was found to be just over 7 milliamperes. Quite a small-capacity high-tension battery of 120 volts will, therefore, give long service.

Use of Super-power Valve

When the set is to be used for the reception of a very strong station, for most of the time, it would be an advantage to replace the P215 small power valve by a P240 super-power valve. The use of a pentode is not, in our opinion, necessary, because the overall amplification of the set is quite sufficient without.

If the loud-speaker is a good one, and the batteries are up to standard, the "39" set makes an excellent gramophone amplifier. An external volume control must be used, otherwise the detector valve, which in the gramophone amplifier function of the set becomes the first L.F. amplifier, will be overloaded.

This detector valve is given a suitable negative grid bias and when a suitable volume control is connected to the gramophone pick-up the reproduction is good.



The Marconiphone set has space for batteries or a mains unit underneath

Developing the New Form of Radio Drama

"EFFORTS have continued to be made," said the recent annual report of the B.B.C., "to perfect the technique of radio drama."

It is now some time since listeners to, and producers of, radio plays realised that the old method of presenting them, by interlinking acts with explanatory narrative, was cumbersome and artificial. Since then, many interesting experiments have been made in the search for a new technique.

The reflection of stage methods in the studio has become less obvious, and there have been borrowings from the art of film-making. A production of *The Prisoner of Zenda*, for instance, contained thirty-six short scenes with neither interval nor narrative.

Interesting Experiment

Perhaps the most interesting experiment, and one which may provide a lead for future work, was the introduction of symbolism into the play *Squirrel's Cage*. Out of six scenes, three developed the story in the ordinary way, while the other three, alternating with them, made use of sound effects, chorused voices and exaggerated speech to suggest forces at work on the characters of the story. The effect was vivid.

But while the producers at Savoy Hill work hard on this matter of technique, the solution is more than likely to come from the radio-dramatist himself. It was Ibsen, and not his producers, who in the first place brought about the change in end-of-the-century dramatic ideas.

A Genius Wanted

The great wireless playwright whose genius will master his medium, and who will set the standard of technique for lesser dramatists, has not yet appeared. On some grounds there is nothing alarming in this fact. Shakespeare did not bring his greatness to the theatre during its first seven years of existence.

Unfortunately, however, unless the whole policy of broadcasting has been overhauled and revised, the Shakespeare of wireless may not appear during the first seventy years! He has few incentives to do so.

As things are at present, a good broadcast play may not enjoy even a moderately "long run." It is here to-night and gone to-morrow. This is not the fault of any particular individual or individuals, and it is difficult to see how it could be otherwise. None the less, because of this drawback, writers are somewhat chary of submitting work which involves far longer in writing than in being "over and done with."

In another respect broadcasting deters the dramatist. Compared with the theatre, the "message" of a broadcast play receives little attention. A wireless audience, though probably totalling more in one night than that of a playhouse in six months is, by virtue of its daily programme-changes, more casual in its interpretations. And even in the matter of helpful criticism, the radio-playwright finds that help comes too late for him to profit much by it.

Question of Payment

Finally, there is the matter of payment. It is true that a genuine artist finds a great profit from the joy of his work. At the same time, his ordinary human nature is repelled by the "garret" idea of art. He has a right to—and asks for—as much material comfort as any other craftsman. But radio plays—written to the exclusion of other things—do not provide the means for getting such comfort. And, as has been said by others, the path of glory (unencumbered by money) leads to unpleasant ends.

So, until the conditions of presentation are more encouraging, the possible genius of radio-dramatic technique cannot be blamed if he turns his attentions to other literary fields. A. D.

THE LETTERS OF Priscilla Playne-Smythe

MORE MISADVENTURES AT LITTLE BODLEY

Stewcombe Manor,
Little Bodley,
Nr. Hurdham.
6/12/1929.

DEAR MR. EDITOR,

If I have not written to you for some time, believe me, it is *not* that I am taking a diminished interest in wireless matters, for I carefully peruse the pages of your valued Magazine from cover to cover, but for the sole reason that during the past month or so *much* of my time has been occupied in giving to less fortunate mortals an insight into the intricacies of radio, for which a wave of enthusiasm has swept over our district.

Too Lucid for Words

I find the explanations of Professor Megohm just *too* lucid for words and wonder greatly that the mind of so careworn and aged a man can still be so alert. He has *such* a kind face.

Possibly, on occasion, I may not have assimilated all the wealth of information he so liberally imparts to us every month, but I feel that I am personally indebted to him for much of my technical education and his lectures have helped me to give to my fellow creatures just that touch of homely assistance which is *so* great a benefit to raw beginners in this marvellous science.

London in the Background

A friend of my youth, Miss Robinson-Scarsdale—the Scarsdales of Yorkshire, you know—who lives in London wrote me recently that one evening, when listening to 5GB, in whose musical programme an acquaintance of hers was singing, she had been worried with a background of the London station transmitting at the same moment seventeen variations by Mukitupski on a well-known theme by Bluffitoff, a masterly performance she would have greatly enjoyed on any other day.

Acting upon the advice I had read in your columns, I suggested that she should purchase a wave-trap at the nearest dealers. She wrote me in reply that when she rang up Harridge's Radio Department and explained exactly—so she said—what was required, the assistant promised that he would send up a man to fit one to her set, but she later cancelled the order because in their abject ignorance the experts were not able to tell her what bait she should use.

From this you will see, dear Mr. Editor, how important it is that such matters should be made clear to the novice and also what a godsend your Magazine, so full of useful hints, must prove to the earnest student.

As a mark of gratitude to your staff, I lose no opportunity of making myself helpful to others whenever the occasion arises. It is unfortunate that such people do not consult me *before* the event, but invariably pass on their difficulties *after* trouble has occurred.

Such was the case, for instance, of dear Lady Fuzzletop of The Grange, who having been warned that it was wise to earth her receiver in the event of a thunderstorm went to the length of supervising personally the digging of a deep hole by her head gardener in order to safely *bury* her little crystal set. The poor old soul got thoroughly soaked to the skin during the process and has since kept to her bed suffering from acute rheumatic pains in her nether limbs.

I am told, also, by my maid, who is known to carry on a mild flirtation with the groom, that after having forcibly expressed his views on the matter in terms incomprehensible to her Ladyship, Binks, the gardener, tendered a month's notice, an incident which has created quite a stir in our otherwise placid little village.

It was *too* good of you to devote a few pages of your valuable space in the Magazine to special articles regarding gramophones and to those funny little pick-ups which have lately come into fashion. How ignorant you must have judged me when you received my last letter on the subject and how sweet of you to set me right in such a delicate manner.

I lent my copy of your publication to our local plumber, Mr. Stillbutt, a very worthy man and an active collaborator to our monthly Sunday School treats. He was *so* much struck with the idea of the pick-up that he forthwith sent his boy to Hurdham—our market town, you know—to secure three samples, "on sale or return," a step which I understand allows him to make use of them without payment for some indefinite period.

As it happened, stored in my attic, I possess an excellent gramophone, of an early pattern, which had been the delight of my dear brother Eustace, and I was only too willing, after carefully dusting it, to lend it for the purpose of so exciting an experiment.

The chauffeur at The Lodge happened to be in The Goat and Compasses at the time Mr. Stillbutt explained the vast possibilities of this new invention and volunteered to lend a valve receiver, accumulator and batteries which he considered would, as he very quaintly put it, "do the trick."

Then again, to help matters along, our Vicar, Mr. Jarndyce, always anxious that Little Bodley should uphold its reputation as an intellectual and enlightened centre, immediately called an extraordinary committee meeting to discuss the ways

and means of a special Fête—one of our Happy Evenings—to take place in the Parish Rooms and in the programme of which a musical entertainment would figure as a *pièce de resistance*.

It is a pity, I consider, that by the same opportunity we could not have given to the villagers a wireless demonstration including some of those delightfully bright talks broadcast from the Savoy Hill studios, but at the eleventh hour there was some difficulty in connection with the aerial.

Our Forgetful Curate

Mr. Blobbs, the builder, had kindly sent down two most excellent scaffold poles which, with the help of many willing workers, were erected in the village playground. After they had been hoisted and firmly secured, it was discovered that our forgetful young curate who was superintending this task had omitted to fasten his coil of wire to the pulleys on top of the masts.

Was it not a disappointment? The plumber's boy who volunteered "to shin up them poles," as he vulgarly expressed himself, does not appear to haved reached the necessary height, but on returning to terra-firma somewhat more rapidly than he anticipated encountered a nail on his way down which tore all the buttons off his waistcoat and split a very important seam in his nether garments.

As they were his only pair, his language called down upon him a well-deserved rebuke from our dear Vicar. I am sorry to say that no other volunteers could be found to continue the good work already half done, or as Mr. Bonecraft, the vet., more correctly termed, "half undone!"

Almost A Replica

Our special evening was *indeed* a happy one, for Mr. Stillbutt had carefully read and digested all the information given by the pamphlets wrapped around the pick-ups and with the assistance of the chauffeur had installed the most *wonderful* apparatus on a table at one end of the church room. It was quite imposing and I feel convinced that, in a small way, of course, it must have been *almost* a replica of a big broadcasting station.

It is true that most of the records used had seen better days—some of the more valuable ones had been contributed by our Vicar—but nothwithstanding some slight difficulty experienced by Mr. Stillbutt in regulating the—I forget exactly what it was—the noise was terrific and our little village echoed to old-time melodies.

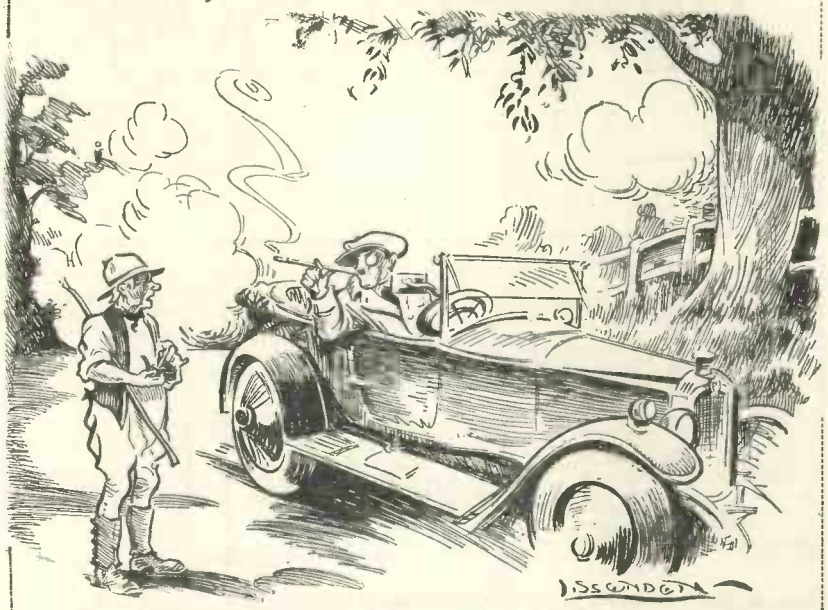
It was a matter of regret also that a very delightful duet entitled "When We Are Married," which I had not heard before, had been slightly marred by a crack and that two of the verses were regularly interrupted by a recurring click which my left-hand neighbour, Farmer Brown, compared to "the fit of hic-cups wot poor old Joe Wiggins died of."

You will be pleased to learn, however, that apart from one slight mishap the party was an unqualified success and did much to bring to the attention of our villagers the advantages of musical entertainments. Such delightful concerts, I feel, must necessarily exercise an elevating influence on the lower and more ignorant classes.

One of the last records played was a very tuneful melody called "Sonny Boy." Do you know it? It was encored four times and hummed by the entire audience; in fact, since that evening even my maid whistles it in the kitchen, and it should become *quite* popular.

The entertainment was curtailed by an accident—fortunately, not serious—which befell a member of the audience. Mr. Billberry, one of our churchwardens, who is inclined to *embonpoint*, but who had, nevertheless, lent a willing hand, was reaching across the table when he slipped, swept the loud-speaker to the floor and fell at full length on top of it. Mr. Pontifex had a clearer view of the incident than I and said that the horn had taken on the shape of a badly battered concertina. He added that "like Humpty Dumpty, the entire stud in the King's stable and all the troops in barracks"—he is a retired Colonel, you know—"couldn't set it on its feet again, what?"

Oh, Those Announcers!



Yorkshireman **(to motorist who has inquired the way): "Do ye coom from Lunnon?"**
Motorist: **"Yes."**
Yorkshireman: **"'A thowt so, ye talk just like t' man on t' wireless."**

Overloading the Loud-speaker

Tom, that very clever nephew of mine to whom I gave a description of the happy evening in my last letter, diagnosed the accident "as a sheer case of overloading the loud-speaker." He has *such* a technical mind.

You must forgive my writing, on this occasion, at this length, but I feel that as you are interested in radio, we have much in common and that the success of our scientific demonstration, dear Mr. Editor, was solely due to your inspiration. I can assure you that Little Bodley is very grateful to you.

Yours faithfully,

(Miss) PRISCILLA PLAYNE-SMYTHE.

"W.M." Set Buyers' Guide

A LIST OF UP-TO-DATE SETS ARRANGED CONVENIENTLY IN PRICE GROUPS

STANDARD BATTERY- AND MAINS-OPERATED RECEIVERS

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., P.
Lamplugh	Chassirad ..	£3/15/0	Bat.	D., P.
Lamplugh	Popular 2 ..	£4/2/6	Bat.	D., P.
Lamplugh	Chassirad ..	£4/15/0	Bat.	D., P.
Lamplugh	Popular 3 ..	£5/7/6	Bat.	D., 2L.F.
Eagle Engineering	Warwick 2 ..	£5/9/9	Bat.	D., P.
Lamplugh	Standard ..	£5/17/6	Bat.	D., L.F.
Pye	No. 232 ..	£6/0/0	Bat.	D., P.
Ormond	Two-valve Set	£6/3/0	Bat.	D., P.
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.
Lissen	**S.G.3. .. ..**	**£8/0/0**	**S.C. Bat.**	**S.G., D., P.**
Eagle Engineering	*Warwick 2 .. Pedestal	£8/5/0	S.C. Bat.	D., L.F.
Falk, Stadelmann ..	Wolfe ..	£8/7/6	Bat.	D., 2L.F.
Eagle Engineering	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.
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 Ethophone	£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	*2502 Type ..	£12/10/0	Bat.	S.G., D., Pen.
Philips	*Type 2515 ..	£12/10/0	A.C.	D., Pen.
British Radiogram	*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 Lectric 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.
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. P.**
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 Engineering	*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.
Cole, E. K. ..	*Ekco Lectric 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.

BETWEEN £10 AND £20 (*Continued*)

Maker	Name of Set	Price	Power Supply	Combination
Varley	***All-electric ..	**£16/16/0**	**A.C., D.C.**	**D., P.**
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	Pentode ..	£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.
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.	Four-valver ..	£21/0/0	Bat.	H.F., D., 2L.F.
Cole, E. K. ..	***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. Radiogram ..	*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	*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.
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 3 ..	£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.	
Regent Radio ..	Regentone ..	£27/10/0	A.C.	3D.G., D., Pen.
Burndept	Screened 4 ..	£27/18/6	Bat.	S.G., D., P.
McMichael ..	*Screened Dimic 3	£28/0/0	A.C.	S.G., D., 2L.F.
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.

For explanation of abbreviations, etc., see notes on page 634.

BETWEEN £30 AND £50

Maker	Name of Set	Price	Power Supply	Combination
Edison Bell ..	*Radio Gramo. Table Grand	£31/10/0	S.C. Bat.	S.G., D., Pen.
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.
Brit. Radiogram ..	*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.
Brit. Radiogram ..	*Model 42 ..	£42/10/0	D.C.	S.G., D., P.
Lamplugh	Radio Gramo.	£43/10/0	A.C.	2H.F., D., 2L.F.
Ormond	*Pedestal ..	£45/0/0	S.C. Bat.	D., 2L.F.
Brit. Radiogram ..	*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.

BETWEEN £30 AND £50 (*Continued*)

Maker	Name of Set	Price	Power Supply	Combination
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.
Marconiphone ..	Model 82 ..	£57/0/0	Bat.	Super-het.
Brit. Radiogram ..	*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.	—
Harlie	Radio Gramo.	£110/2/0 to £152/10/0	A.C., D.C.	H.F., D., 3L.F.
Brit. Radiogram ..	*Craigweil Radio Gramo.	£120/0/0	A.C.	H.F., D., 2L.F
Reproduction ..	*Rhapsody Twin	£131/5/0	A.C., D.C.	—
Brit. Radiogram ..	*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.

TRANSPORTABLE RECEIVERS—BATTERY- & MAINS-OPERATED

BETWEEN £10 AND £20

Maker	Type	Price	Power Supply	Combination
Edison Bell ..	Compact 3 ..	£11/15/6	Bat.	D., 2L.F.
Pye	275	£12/0/0	Bat.	D., L.F.
Edison Bell ..	Maison S.G.3	£14/0/0	Bat.	S.G., D., Pen.
Dyson	Cabinet Model 5	£16/16/0	Bat.	2H.F., D., L.F., P.
Pye	275/M ..	£17/10/0 (incl. valves & Royalty)	A.C.	D., L.F.
Trix	Portable 5 ..	£17/17/0 (plus Royalty)	Bat.	2H.F., D., 2L.F.
Burne Jones ..	Transportable 5	£18/18/0	Bat.	2H.F., D., 2L.F

BETWEEN £20 AND £30

Maker	Type	Price	Power Supply	Combination
Falk Stadelmann ..	Waterloo De Luxe	£20/10/0	Bat.	S.G., D., L.F., P.
Edison Bell ..	Console 4 ..	£21/17/0	Bat.	H.F., D., 2L.F.
Falk Stadelmann ..	Waterloo De Luxe	£25/0/0	A.C.	S.G., D., L.F., P.
Truphonic ..	Upright 5 ..	£26/0/0	A.C.	2H.F., D., 2L.F.
Columbia	Transportable	£26/15/6	A.C., D.C.	2H.F., D., 2L.F
McMichael ..	Super Range 4	£27/6/0	Bat.	H.F., D., 2L.F.
G.E.C.	All-electric ..	£28/0/0	A.C.	S.G., D., P.
Columbia	Transportable	£28/17/6	A.C., D.C.	2H.F., D., 2L.F

BETWEEN £30 AND £50

Maker	Type	Price	Power Supply	Combination
Edison Swan ..	Transportable	£31/10/0	A.C.	S.G., H.F., P.
Hart Collins ..	Screened Grid 3	£32/10/0	A.C., D.C.	H.F., D., P.
Burgoyne	M.A. Transportable	£36/15/0	A.C.	H.F., D., L.F., P.
Burndept	A.C. Screened 7	£37/16/0	A.C.	3H.F., D., 2L.F., P.
Burgoyne	M.A.G. Transportable	£42/0/0	A.C.	H.F., D., L.F., P.
Rialton	Melva ..	From £42/0/0	Bat. or Mains	3S.G., D., Pen.

OVER £50

Maker	Type	Price	Power Supply	Combination
Cantophone ..	Radio-Gramophone	£55/0/0	D.C.	D., 2L.F.
Selectors	All-electric ..	£65/0/0	A.C.	
Rolls-Caydon ..	A.M. and A.M.T.	£57/15/0	A.C.	S.G., D., 2L.F.
Igranic	Neutrosonic 7	£57/0/0 & £61/19/0	A.C.	2H.F., D., Pen.
Cantophone ..	Radio-Gramophone	£69/0/0 (incl. valves & Royalty)	Bat.	Super-het.
Selectors	Console Model	£89/5/0	D.C.	D., 4L.F.
		£99/15/0	A.C.	
		£157/10/0	A.C.	H.F., D.P.

PORTABLE RECEIVERS—BATTERY OPERATED

BETWEEN £5 AND £20

Maker	Type	Price	Weight in lbs.	Combination
Trix	Portette ..	£5/15/6	6½	D.
Trix	Portable 2 ..	£10/10/0 (plus Royalty)	16	D., Pen
Cantophone ..	Portable 2 ..	£10/10/0	10	D., L.F

BETWEEN £5 AND £20 (*Continued*)

Maker	Type	Price	Weight in lbs.	Combination
Henderson ..	Type U ..	£11/11/0	19¾	H.F., Pen.
Eagle	Junior 4 ..	£13/13/0	20	2H.F., D., Pen.
Read	Popular 5 ..	£13/13/0	22	2H.F., D., L.F., P.
Eagle	Junior 5 ..	£14/14/0	26	2HF., D., 2L.F.

(*Continued on next page*)

For explanation of abbreviations, etc., see notes on page 634.

PORTABLE RECEIVERS—BATTERY OPERATED—*Continued*

BETWEEN £5 AND £20 (*Continued*)

Maker	Type	Price	Weight in lbs.	Combination
Empire	Pixie	£14/14/0	22	2H.F., D., 2L.F.
Ormond	Cabinet	£15/0/0	30	2H.F., D., 2L.F.
Ormond	Suitcase	£15/0/0	28	2H.F., D., 2L.F.
Falk Stadelmann	Windsor	£15/15/0	31	2H.F., D., L.F., P.
Ormond	Cabinet	£15/15/0	30	2H.F., D., 2L.F.
C.I britone	C.l.bio	£16/16/0	25	2H.F., D., 2L.F.
Classic Radio	Ariel 5 Cabinet	£16/16/0	26	2H.F., D., 2L.F.
Classic Radio	Ariel 5 Suitcase	£16/16/0	25	2H.F., D., 2L.F.
Eagle	Warwick 5	£16/16/0	34	2H.F., D., 2L.F.
Edison Bell	Picnic	£16/16/0	26	2H.F., D., 2L.F.
Itonia	Autocrat 5	£16/16/0	30	2H.F., D., 2L.F.
Lamplugh	Suitcase	£16/16/0	—	2H.F., D., 2L.F.
Ormond	Suitcase 4	£16/16/0	28	H.F., D., 2L.F.
Pandona	Portable 5	£16/16/0	28	2H.F., D., 2L.F.
Rialton	Junior	£16/16/0	20	2H.F., D., Pen.
Rooke	Faraday 5	£16/16/0	27	2H.F., D., L.F., P.
Truphonic	Upright	£16/16/0	26	2H.F., D., 2L.F.
Falk Stadelmann	Oxford	£17/5/0	36	2H.F., D., L.F., P.
Columbia	Portable	£17/17/0	27½	2H.F., D., 2L.F.
Henderson	"T"	£17/17/0	28	2H.F., D., 2L.F.
Rolls-Caydon	Regional	£17/17/0	25	2H.F., D., 2L.F.
Trix	Portable (plus Royalty)	£17/17/0	30	2H.F., D., 2L.F.
Truphonic	Suitcase	£17/17/0	26	2H.F., D., 2L.F.
Burne-Jones	Suitcase 5	£18/18/0	27	2H.F., D., 2L.F.
Marconiphone	Model 55	£18/18/0	26	2H.F., D., 2L.F.
Rolls-Caydon	Monitor	£18/18/0	25	2H.F., D., 2L.F.
Rooke	Screened Grid 4	£18/18/0	34	H.F., D., L.F., P.
Burgoyne	"Pentode"	£19/19/0	26	2H.F., D., 2L.F.
Burndept	New Screened Portable	£19/19/0	30	H.F., D., 2L.F., P.
Columbia	Portable	£19/19/0	27½	2H.F., D., 2L.F.
Halcyon	Screened Grid 4 Suitcase	£19/19/0	28	H.F., D., 2L.F.
Rialton	Screened Grid	£19/19/0	24	H.F., D., Pen.
Whittingham, Smith	Portadyne Super Five	£19/19/0	28	2H.F., D., 2L.F

BETWEEN £20 AND £30

Maker	Type	Price	Weight in lbs.	Combination
Classic Radio	Ariel 4	£21/0/0	30	H.F., D., 2L.F.
Itonia	Autocrat 4	£21/0/0	33	H.F., D., 2L.F.
Falk Stadelmann	Ascot	£21/0/0	32	H.F., D., 2L.F.
Hart Collins	Portable 4	£21/5/0	25	H.F., D., 2L.F.
Dyson	Model H	£22/0/0	20	H.F., D., 2L.F.
Montague	Suitcase	£22/1/0	26	2H.F., D., 2L.F.
McMichael	Super-Range 4	£23/2/0	—	H.F., D., 2L.F.
Truphonic	Upright	£23/2/0	28	2H.F., D., 2L.F.
Whittingham, Smith	Portadyne 4	£23/2/0	35	H.F., D., 2L.F.
Pye	25/C	£23/10/0	26	2H.F., D., 2L.F.
G.E.C.	Attache-case	£24/3/0	35	H.F., D., 2L.F.
Henderson	Type P	£24/5/0	24½	2H.F., D., 2L.F.
Burgoyne	Screened 4 De Luxe	£25/4/0	30	H.F., D., 2L.F.
Rolls-Caydon	Ranger	£25/4/0	32	H.F., D., 2L.F.
G.E.C.	Screened Grid 4	£26/0/0	40	H.F., D., 2L.F.
Henderson	Type S	£26/5/0	31	2H.F., D., 2L.F.
Montague	Cabinet	£26/5/0	34	2H.F., D., Pen.
Stratton	Scientific 3	£26/15/0	34	H.F., D., Pen.
G.E.C.	Portable 7	£30/0/0	—	Super-het.

BETWEEN £30 AND £50

Maker	Type	Price	Weight in lbs.	Combination,
Igranic	Universal	£33/2/6	40	2H.F., D., 2L.F.
Selectors	Cabinet 4	£33/12/0	26	H.F., D., 2L.F.
Selectors	Attache 4	£33/12/0	26	H.F., D., 2L.F.
Rolls-Caydon	Phantom	£34/13/0	35	2H.F., D., Pen.
McMichael	Super Screened 4	£36/15/0	—	2H.F., D., L.F., Pen.
Rolls-Caydon	Phantom Regional	£44/2/0	40	2H.F., D., Pen.

Readers who are interested in any particular set listed here are invited to let us know, with a view to future publication of a test report.

NOTES ON THIS SPECIAL "W.M." GUIDE

The 250-odd sets listed above 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.*

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* 622.

Radio Quotations

The Classical Talker

"A sophistical rhetorician, inebriated with the exuberance of his own verbosity."—Disraeli, Speech.

◆ ◆ ◆

The Broadcast Sermon

"When the sermon is good we need not much concern ourselves about the form of the pulpit."—Ruskin, *Stones of Venice.*

◆ ◆ ◆

The Receiver

"The foul sluggard's comfort: 'It will last my time.'"—Carlyle *Count Cagliostro.*

The Crystal Set

"A harmless necessary cat."—Shakespeare, *Merchant of Venice.*

◆ ◆ ◆

The Oscillator's Neighbour

"I think there's never man in Christendom
Can lesser hide his hate or love than he."

—Shakespeare, *Richard III.*

Far-off Stations

"Something attempted, something done,
Has earned a night's repose."

—Longfellow, *The Village Blacksmith.*

◆ ◆ ◆

The Bells of St. Martin-in-the-Fields

"Those evening bells! those evening bells!
How many a tale their music tells!
Of youth, and home, and that sweet time
When last I heard their soothing chime."

—T. Moore, *Those Evening Bells.*

Wireless Magazine GRAMO-RADIO SECTION

THE FIRST SUPPLEMENT OF ITS KIND PUBLISHED BY ANY RADIO PERIODICAL—A FEATURE FOR RADIO AND GRAMOPHONE ENTHUSIASTS

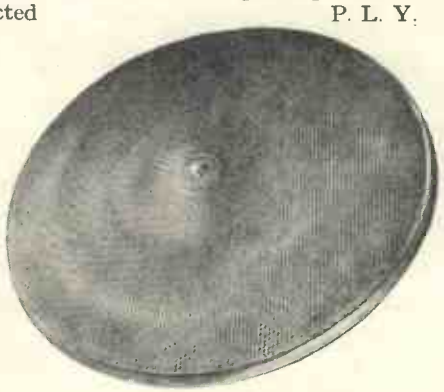
The Non-skid Record Pad

A LITTLE refinement for use on gramophone turntables is the Finch non-skid rubber pad made by the Murdock Trading Co. It is simply a loose cover of inducted rubber and drops over the spindle on to the turntable so as completely to cover it.

Reduces Scratch Noise

Its utilities are small, but various. In the first place it slightly reduces scratch noise; secondly, when dust collects upon it, it is easily taken off and shaken and put on again; thirdly, it prevents the record from moving when exceptionally heavy recording comes under the needle; and fourthly, should the turntable be out of level a little, the low place can be built up with strips of pasted on paper before the pad is put on.

P. L. Y.



A non-skid mat placed on a gramophone turntable.

Round Versus Square

In the Cross-section of Horns

I AM often asked why some horns are round and some rectangular in their cross-sectioned contour; why all horns, in cabinets or otherwise, are not either round or square, whichever might be the better.

Several Reasons

The reasons are several. In the first place, when absolutely pure and faithful reproduction is required, in my opinion the round cross-section is the better, and in practically all open-horn machines this is the shape adhered to.

When the constructional material is paper (as in the beautiful Wonderphone horn), a second factor comes into operation, namely, cost, and it is easier, and therefore cheaper, to make this horn round than it would be to make it square.

In cabinet machines horns are rectangular for three reasons. In the first place, it is much cheaper to make a square horn than a round one. Secondly, a larger amplification can be given in limited cabinet space.

Thirdly, cross reflection of the shorter sound waves in the horn angles gives an almost microphonic amplification of the higher periods badly needed to neutralise the heavy loss in these tones which occurs in the curves and reflex angles of the horn.

H. T. B.

Piano Concertos

IN selecting records of high-class music to play to ordinary people who possibly may not be specially educated in music one is never so safe as when taking a piano concerto. Everybody likes the tone of a piano; even on a thoroughly bad reproducer it is not so unpleasant as strings and brass.

Perfectly Recorded Example

In Rachmaninoff's second concerto (8s. 6d. a disc, H.M.V.), with the composer at the piano in combination with the Philadelphia Orchestra, we now have a perfectly recorded example of the playing of the finest orchestra in the world coupled with that of a pianist who at least is second to none when playing his own compositions.

How many people in this country have heard a Chickering piano? They are too dear for us to buy; when I was in America before the war they cost £500 each!

The instrument is furnished with four stings to a note, a machine head for tuning, a stretched-steel soundboard and several other clever points in construction absent from European instruments. I think everyone who has heard a Chickering piano will easily identify Rachmaninoff's instrument as being of that make.

Full of Invention

The music is sweet and *full of invention*.

Those who cannot afford the whole work should buy the last two discs and perhaps also the first.

H. T. B.

Gramophone Electric Motors

In this article H T BARNETT, M.I.E.E., gives gramophone enthusiasts some useful notes on his experiences with electric motors for driving turntables.

A modern all-electric gramo-radio set cannot be considered complete unless an electric turntable motor is provided, and this article will put readers on the right track.

I HAVE had a lot of trouble with these things. While it is not necessary to mention any names, I can certainly assert that every motor for driving a gramophone electrically which I have tried myself or that I have heard of anyone else trying before the day when I received the Garrard Universal has had some very bad points about it.

Typical Troubles

In some the governors were given to "hunting," in others commutator discharges interfered with radio reception, some hummed, some *rattled*, some caused an inductive hum.

Many were too weak to carry a Parlophone band record past the loud places without a drop in pitch, and there was nearly always an annoying difference in pitch between the end of one side of a 12-in. record and the beginning of the other.

A skilled electrician was often needed to fit the motor, and he had to determine what lamp to get to use as a series resistance with the motor and then go out and buy it, and fit it inside the motor cabinet, where its heat was always a nuisance and sometimes a danger.

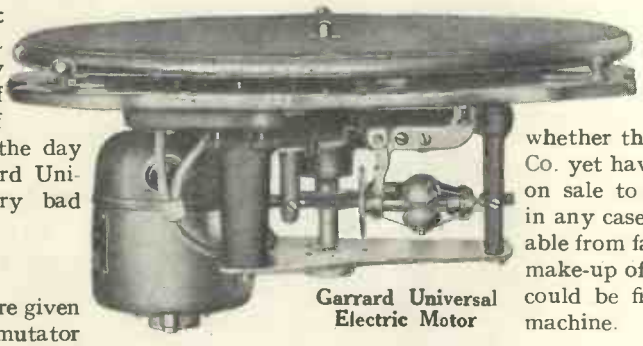
Broken Belts

Belts, when used, stretched and generally broke at the most awkward moment.

Now, I am happy to say, *all* my drive troubles are in abeyance, and, after carefully examining the new Garrard Universal electric motor fitted in the largest size Perophone which has just been delivered to me, it seems likely they may remain so for years.

Easier than a mechanical motor to fit into place (no difficult winding handle hole to make), it is *quite* noiseless in itself and causes no interference even in closely associated radio circuits. There is no lamp needed for a series resistance, the governors do not hunt, no matter how the load may be varied, the *textile* belt is amply large, and is very tough and flexible.

On receiving one's machine fitted with this motor, or on changing it from one residence to another under different current-supply conditions, all that one has to do is to insert a couple of screw plugs into their appropriate clearly labelled sockets on the outside of the resistance block where it sticks through the back of the case.



Garrard Universal Electric Motor

I Cry "Eureka"

Like my friend the painter when he tried my suggestion of petrol for working up the bottoms of his pots, I felt disposed to cry out "EUBLOOMINGREKA," although, as a matter of fact, "blooming" was not the exact interpolation, but a word to that effect!

I do not know whether the Garrard Engineering Co. yet have the motor generally on sale to the public direct, but, in any case, it should be obtainable from factors who use it in the make-up of machines or by them could be fitted into any existing machine.

Value of Electrical Reproduction

SIR,—The other evening I listened to a large number of cheap gramophone records.

As an interesting experiment, I first played them all with a pick-up in conjunction with a moving-coil loud-speaker and then replayed each record by reverting to the original soundbox.

Impossible to Tell Difference

I was surprised to find that, when using the pick-up, the quality was generally so fine that it would not have been possible for me to tell in a large number of cases whether the record was of the cheap or better-class variety.

Personally, I am not able always to afford the highest-priced records and therefore have to content myself with less expensive ones.

I am, however, very often more than satisfied with the results obtained by electrical reproduction and in some cases I would not accept even in exchange the dearer disc.

Nowadays a popular tune is invariably obtainable in four or five different renderings and therefore one has sufficient choice to be able to pick out the best record at the lowest price.

For this reason, I am very pleased to see that there is now a complete list of all records issued by the various gramophone companies every month in your Gramo-Radio Section.

How Criticisms Help

The criticisms given by C. Whitaker-Wilson also greatly simplify one's choice.

No doubt, a large number of readers confine themselves to buying a definite number of records monthly and one can easily pick out those required from the tabulated lists.

C H A

Picking Records to Suit Your Taste

By H.T. BARNETT, M.I.E.E.

IT may be helpful to those wishing to purchase a certain type of recording to know in which list they will be most likely to find them. In this article I am using the words "type of recording" from an electrician's and an engineer's standpoint and I shall be considering the various types as they affect the listener.

It must not be supposed that because the recording is done under a certain group of patents, say those of the A.B.C. Co., for example, that the recording of all firms for whom the A.B.C. Co. do the electrician's work will be similar.

It may be very different for different manufacturers; it may be different for different performers, and individual records of the same performer may differ considerably.

The records I hear give me the impression that the recording engineers work carefully to general instructions from the director of recording of each company and also (still, no doubt, under his instructions) at times vary the electrical conditions for certain performers and even at rare times for individual records.

Mechanical Variations

And then, of course, the recording styli used by various companies may differ and it is quite unlikely that all companies will use exactly the same composition for taking the original record upon. They are also not likely to subject the wax and its subsequent position and negative metal replicas to the same preparation or treatment.

Let us consider the performing units and the various catalogues, so far as possible generalising (in the aggregate that will be the most useful way to go to work), but always remembering that there are rare exceptions in every class in order that no record whose title may be fancied shall go unheard by a possible purchaser.

THE GRAND ORCHESTRA. To me and as a large group the Victor recordings on the H.M.V. and Zonophone lists stand first. In addition to the grand recording the Philadelphia orchestra is a perfect recording unit, and I think their Brahms' "First Symphony" is the finest musical work obtainable for the gramophone to-day.

The New York Orchestra is nearly as good in Haydn's "Clock Symphony," and this music is as pretty as Brahms' is grand. An example on the Zonophone list—"William Tell" on two 2s. 6d. 10-in. discs.

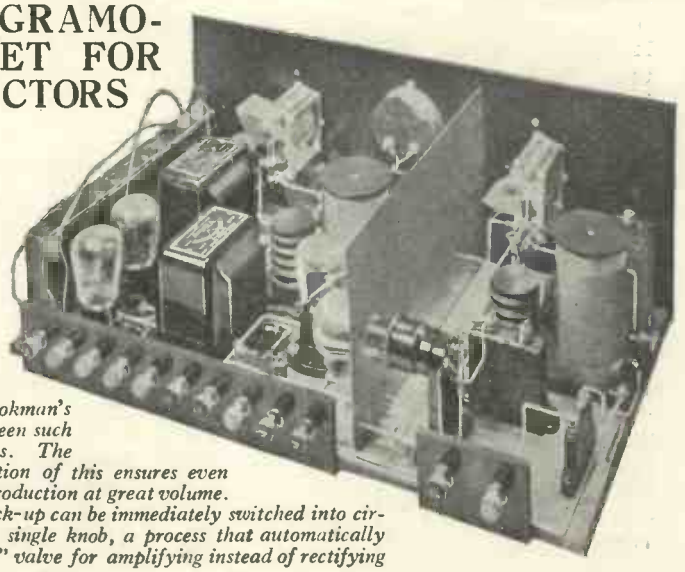
In all the records of these groups the recording engineer has succeeded in giving great volume, correct scale balance, true instrumental characteristic, good drum tone and an entire absence of harshness. There is no objectionable hall resonance (Oh! the Albert Hall!) in any of them.

Best Orchestral Value

The next great group are the Berlin Opera House and the Symphony Orchestra records on the Parlophone list, at 4s. 6d. a disc, the best orchestral value to-day. The recording is as full, as well-balanced, and as true to instrumental characteristic, as any, but the general impression produced is rather more brilliant than with Victors; probably the electrician uses very little, if any, cut-off for the highest frequencies.

The Decca company have just made a record that reaches by a little the highest level in orchestral recording I have yet heard, "The Bartered Bride," 4s. 6d. At the time of writing it stands alone for its quality, possessing every virtue coupled with a larger volume than that of any other orchestral record I have.

A FINE GRAMO-RADIO SET FOR CONSTRUCTORS



Just the set for the enthusiast who wants good record and radio reproduction at will is the Brookman's Push-pull Three, which was fully described in the previous issue of WIRELESS MAGAZINE. *This set is based on W. James' Brookman's Three, which has been such an enormous success. The "push-pull" adaption of this ensures even better quality of reproduction at great volume.*

A gramophone pick-up can be immediately switched into circuit at the turn of a single knob, a process that automatically biases the "detector" valve for amplifying instead of rectifying

Picking Records to Suit Your Taste—*Continued*

Columbia Orchestrals in the aggregate are too hard and thin for me, but they are improving and seem likely soon to take a stable character, closely resembling the H.M.V. English recordings.

One disc of theirs I have is absolutely faultless; I play it to everybody (it has been run well over one hundred times and is better than new), "Trumpet Voluntary" and "Solemn Melody," 6s. 6d., performances by the Hallé Orchestra, with organ, in the Free Trade Hall, Manchester.

A Difficult Problem

ENSEMBLE. The grand orchestra performing together with soloists and chorus is a very difficult problem both for the director of recording and his engineer. The only products in this class I care to show the highly critical are some of the Parlophones (4s. 6d. a disc) of which, I think, the "Faust" group the best, and all the Parlophone-Odeons (6s. 6d. a disc).

THE GRAND ORGAN. In two out of three of these in a miscellaneous collection, the recording seems unsatisfactory; generally it fails on the score of thinness of tone, the effect of a grand organ being lost with a suggestion in its place of the tone of a harmonium.

Very successful and convincing records are the H.M.V. 12-in. Bach "Fantasia," "Old Hundredth Transcription" and "Finale in B-flat." Equally good 10-in. ones are "Sonata on 94th Psalm," "Easter Hymns" (Alleluia) and "Marche Scipio."

Brunswick have a solitary example, the most convincing organ record I have, "Toccata and Fugue in D Minor."

Best Columbia's

The best of the Columbia's are the Lyons Cathedral group, although they are a little hard, the acoustic quality of the Cathedral makes them priceless.

Really good 2s. organ records will be found on the Edison-Bell Winner list; I mention "Merchant of Venice Marches."

There are only two or three on the Parlophone list, they are all 12-in. records at 4s. 6d.

THE CINEMA ORGAN. For 12-in. examples there is an excellent Christie Organ record on Electron, "Memories of Schubert" (4s. 6d.), and a few of the fuller-toned Wurlitzer Organ records (H.M.V.) are very good. For 10-in. records I think as a group the Christie Organ examples on the Winner list (2s. each) the best.

PIANOFORTE. Why is it people are so often dissatisfied, and rightly so, with the piano as reproduced on the gramophone?

Because everyone knows the *exact* tone of the instrument; its beautiful quality, transcending bells, has been indurated into us from earliest childhood, and the slightest fault, either in recording or in reproduction, is instantly apparent.

Fortunately I have a faithful reproducing unit so that, given good recordings, I get pure piano tone.

The two best recordings I have are both Polydor-Brunswicks at 6s. 6d. each, "Fugue in A" and "Valse Brilliante"; the tone is enormous and very true, and the *touch* of the performer is clearly apparent.

Ordering from the List

Closely approaching these are the majority of the H.M.V. and the Parlophone discs. They are all so good, with the exception of the Paderewski's (I think his piano unsuitable) and two of Carol Syreter's (an electrical fault in these) that you may almost without fear order from the list.

Recent Edison-Bells are vigorous and true. I mention "Fantasie Impromptu," a 12-in. Electron at 4s. 6d.; it is one of the Czecho-Slovakian group recorded at Budapest.

Decca have done some light music 10-in. records that are up to the average, but I want to see what will happen when they make 12-in. piano records of good music with the same setting of the instruments on the panel that they used for the orchestral recording of "The Bartered Bride."

PIANO CONCERTOS. Two in which the producers have succeeded are the "Liszt Concerto" (Parlophone) and the "Schumann Concerto" (Columbia) and neither of them costs more than 4s. 6d. a disc, including album. A first-class cheap work is the "Greig Concerto" (Broadcast Twelve), three discs at 2s. each.

H.M.V. for Chamber Music

CHAMBER MUSIC. For full volume tone in this class, H.M.V. and Parlophone excel, but there is little of it on the latter list. I put my three Casals Trio works (H.M.V., 8s. 6d. a disc) before all others. The Schubert is the best; the Mendelssohn had a little blast in the piano tone on two of the discs when new, but the fault has now burnished out. The tone of the Beethoven trio is not so full and round as that of the Schubert.

VOCAL. No groups of vocal records are so *uniformly* successful as my large set of Parlophone-Odeons and my small set of Edison-Bells. Whatever the singer has to give, they truly pass on, vowels, consonants and even breathing sounds. The volume can be big at times and yet the pianissimos are perfectly clean.

Edison-Bells are to be particularly commended for their orchestral accompaniments with the timpani rarely omitted.

Columbia are very good at *sotto-voce* recording, invariably good; the Layton and Johnstone records are an example.

MILITARY BANDS. For a high-class band, almost orchestral in character and with good timpani, the Victor recordings of Creatore's Band on the H.M.V. list are invariably pure full volume recording.

The Parlophone "Massed Band" records at 2s. 6d. are the grandest full volume recording.

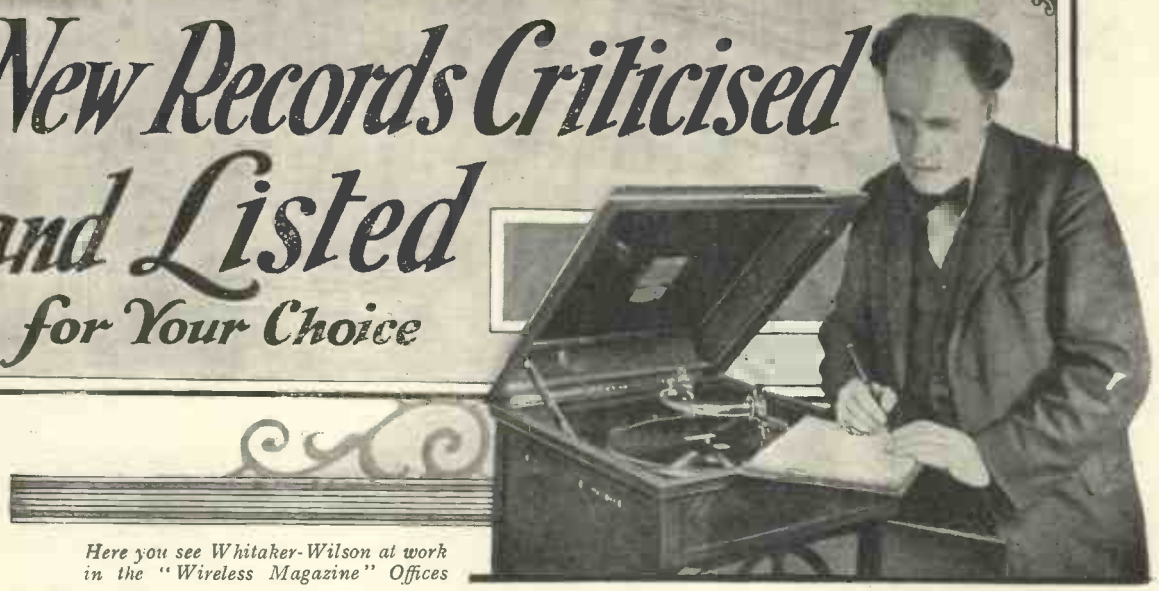
Prettiest Medium Tones

The 2s. Broadcast Twelve records of the Lifeguards Band (with timpani) are quite the prettiest medium-tone volume records.

DANCE RECORDS. English recording seems to be at its best with Jack Hylton (H.M.V) and American with Sam Lanin (Parlophone). For other recordings Parlophone seem to have the fullest roundest tone.

I must specially praise the Parlophone South-American Tango recordings and the piano recording in the Raie da Costa group.

New Records Criticised and Listed for Your Choice



Here you see Whitaker-Wilson at work in the "Wireless Magazine" Offices

Below will be found a list of the latest releases of the chief record publishing companies (Broadcast, Decca, Dominion, H.M.V., Parlophone and Piccadilly). 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 Whitaker-Wilson, the well-known musician and writer.

VOCAL RECORDS

Addio Fiorito Asil. Alessandro Valente, ten., and members of La Scala Orch. 3/-. **H.M.V. B3141**

From *Madame Butterfly*. What a superb melody it is! It receives sympathetic treatment here, but the recording is not perfect, unfortunately.

Aida, Act 2 (Verdi) Sung in German. Emmy Bettendorf, sop., Karin Branzell, cont., with Grand Symphony orch. (d.s.) 4/6. Parlo E10916

Aloha, Pierce and Roslyn, musical entertainers. 1/6. Pic 379

Amor ti Vieta, Guido Volpi, ten, with orch. **Dom. B25**

Volpi is excellent in this. His sustained tone and admirable technique come out extraordinarily well.

Angels Ever Bright and Fair (*Handel*), Kate Winter, sop , with orch. 4/6. Parlo E10919

Annie Laurie, Murray Stewart, Scot., ten, with orch. 3/- Parlo R459

Bonnie Banks of Loch Lomond, Murray Stewart, Scot., ten.. with orch. 3/-. Parlo R459

Burlington Bertie, Ella Shields, com. 1/3. Brdcst 472

Button Up Your Overcoat (from *Follow Through*), Muriel and Bob, with piano. 2/- Dec F1529

Cast Thy Burden, Tom Burke, ten., with orch. **Dom B23**

This did not impress me; but get the record because of *There is No Death*, which is on the other side.

Celia's Charm (*Arne*), Dale Smith, bar , with piano. 3/-. Dec M74

Burlington Bertie, Ella Shields, com., with orch. 1/3. **Brdcst 472**

You will not miss a word of this; Ella Shields' diction is excellent, but she does not *sing*; she recites rhythmically to the orchestral accompaniment.

Che Gelida Manina (*Puccini*) Oreste de Bernardi, ten., with orch. **Dom B24**

You can always depend upon a record by Bernardi. He sings this magnificently; I have every admiration for him.

What I'd Like to Be (Child's Study), Mona Grey, variety entertainer, with piano. 3/-. Parlo R456

Chorus, Gentlemen (*Lohr*), Harold Foster, bass-bar, with piano. 2/-. Dec F154.

Christmas Day at the Bugginses, (d.s.) Mabel Constanduros, assisted by Michael Hogan. 1/3. **Brdcst 471**

Mabel Constanduros sounds very good Cockney, despite her Greek-looking name. This is quite amusing, though a trifle vulgar. One is glad one has not to spend Christmas at the Bugginses.

Clair de Lune, Ninon Vallin, sop., with piano. 4/6. **Parlo RO20094**

An appealing voice singing an appealing melody; it is beautiful.

Digging Up the Road, Tommy Handley, com., with orch. 1/6. Pic 385

Don Juan (*Mozart*) Max Hirzel, ten., with Grand Symphony Orch. 4/6. (d.s.) Parlo E10918

Don't Be So Unkind, Charlie Domino, light vocalist, with orch. 2/-. Dec F1560

Drum Major (*Newton*), Harold Foster, bass-bar., with piano 2/-. Dec F1544

Farmyard Medley, Gotham Comedy Four. 2/-. Dec F1553

Father O'Flynn, Martin Howard, bass, with orch. 1/6. **Pic 381**

An excellent rendering of it; the Irish brogue is done very well. The voice is full and round, and every word is distinctly enunciated.

For All the Saints (*Vaughan Williams*), full choir of St. Mary-le-Bow, with organ 2/-. **Brdcst 5111**

Vaughan Williams did a service to the Church of England when he wrote this tune. It is splendidly sung here.

Gae Bring to Me a Pint o' Wine, McKenzie Lang, ten., with piano. 2/-. Dec F1555

Gypsy Charmer, Lucien La Riviere, with piano and piano accord. 1/6. Pic 384

Hallo Medley, Gotham Comedy Four. 2/-. Dec F1553

Here Comes the Show Boat, Pierce and Roslyn, musical entertainers. 1/6. Pic 379

I've Got a Feeling I'm Falling, Lawrence Easson, with piano. 2/-. Dec F1552

Huggable, Kissable You, Buddy Prince, bar., and Seven Jewels. 1/6. Pic 382

Habanera (*Carmen*) Constance Willis, cont., with orch. 2/-. **Brdcst 5114**

The low notes of the bass strings come out admirably. This shows an improvement in recording. Miss Willis does full justice to the song.

It Came Upon the Midnight Clear, choir of City Temple, London, with organ. 2/-. **Brdcst 5112**

I recorded some Christmas carols in 1925 for H.M.V. I have since come to the conclusion that it is no good playing them on an organ. They must be sung. This is excellent. Have it for Christmas.

La Boheme (*Puccini*), Lotte Lehmann, sop., with Berlin State Opera House Orch. 6/6. **Parlo R20095**

Puccini is here sung as he would have had himself sung! What more can I say; it is a triumph of recording.

L'Anima Stanca (*Cilea*), Guido Volpi, ten., orch. acc. **Dom B25**

This is a fine specimen of Guido Volpi. His control is admirable. It is a little sentimental perhaps, for a record; one misses the stage surroundings.

La Tosca (*Puccini*), Lotte Lehmann, sop , with Berlin State Opera House Orch. 6/6. **Parlo R20095**

One of the best vocal records I have ever heard. Her voice is magnificent and the orchestral

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.

New Records Criticised and Listed—*Continued*

accompaniment. If you don't like this you are indeed fastidious!

L'Automne, Ninon Vallin sop., with piano. 4/6. **Parlo RO20094**

Beautifully recorded. Ninon Vallin's voice is worth hearing, and the song is one of Faure's best.

Let Me Dream in Your Arms Again, Buddy Prince and Seven Jewels. 1/6. Pic 382

Lolita, Jan Zalski, ten., with orch. 1/6. Pic 380

Louise (*Innocents of Pairs*), Lou Abelardo, light vocalist, with piano. 2/- Dec F1536

Love's Old Sweet Song (*Molloy*) Thea Philips, sop., and Guy Marshall, ten., with orch. 2/-. **Brdcst 5115**

I approve of this. Some enterprising individual has seen that the melody will stand some imitation in another part. An excellent duet in consequence.

Love Went A-Riding (*Frank Bridge*), Frank Titterton, ten., with piano. 3/-. Dec M77

MacGregor's Gathering, McKenzie Lang, ten., with piano. 2/- Dec F1555

Magnificat (*Garrett*), full choir of St. Mary-le-Bow, with organ. 2/-. **Brdcst 5111**

It is quite a novel idea to record a "service," as the settings to the Canticles are called. Does BROADCAST want any suggestions? *Do Walmisley in D minor*! I was greatly entertained by this record. A pity the solo-boy "blasted" on his high notes; he has a good voice.

Makin' Whoopee, Muriel and Bob, with piano. 2/-. Dec F1529

Mucking About the Garden, George Buck, com., with piano. 2/- **Dec 1545**

I have heard this before—with an orchestra. I purloined the record for my little boy who adored it. Get it for the kiddies; they will love it! This is a good version of it into the bargain.

My Little Fell' and Me, Lawrence Easson, with piano. 2/-. Dec F1552

My Song of the Nile, George Dosher, bass, with piano. 1/6. **Pic 383**

I am not thrilled by the song, but do not let *that* deter you from hearing the record! George Dosher is a *bass*; nothing of a baritone about him. His speaking voice is full of real bass tone.

My Wife is on a Diet, Charley Domino, light vocalist, with orch. 2/-. Dec F1560

Napoleon Said to Josephine (from *Not To-night*), Gladdy Sewell, comedy girl. 3/-. Parlo R457

Nelly Grey, Ella Shields, com., with orch. 1/3. **Brdcst 472**

Ella Shields evidently *can* sing; I thought not when I heard *Burlington Bertie.* Her voice is very masculine in style, but, perhaps, that is as well in a song of this description.

Nobody Knows de Trouble I've Seen, Maria Sandra, with Lawrence Brown at piano. 3/- Parlo R458

No Possible Doubt Whatever, Dominion Light Opera Company, with orch. **Dom A194**

This is "topping." What a diction the man has! You could take him down in shorthand.

O Divine Redeemer, Kate Winter, sop., with orch. 4/6. Parlo E10919

O Paradiso! Alessandro Valente, ten., and members of La Scala orch. 3/-. **H.M.V. B3141**

This is a scene from *L'Africana* by Meyerbeer. It is well sung, but the strings are a little too subdued in places. The recording is a little imperfect as it comes out on an ordinary machine. It would be better on an electric one. The singer ends *sharp,* which is a pity!

Once in Royal David's City, choir of City Temple, with organ. 2/-. **Brdcst 5112**

The boys come out excellently. A soft needle is best for this excellent record.

Only For You, Claude Brooke, with orch. 1/3. Brdcst 465

George Dosher, bass, with piano and violin. 1/6. **Pic 383**

His seems such a manly voice for sentimental songs. I want to hear him sing a bass aria of Handel. His style could be so good.

On Top of the World, Alone (*Innocents of Paris*), Lou Abelardo, light vocalist, with piano. 2/-. Dec F1536

Oulde Orange Flute, (a) Harbour (*Letts*); (b) Sailor Courted (*French*), Florence Marks. (d.s.) 2/-. Dec F1538

Pagan Love Song, Harry Carlton with Hawaiian Melody Makers. 1/3. Brdcst 464

Palantine's Daughter, Dale Smith, bar., with piano. 3/-. Dec M74

Passion According to St. John (*J. S. Bach*), choir of St. William's, Strasbourg, with organ. (d.s.) 4/6. **Parlo E10917**

y first Bach record. It made my blood run cold. There is nothing on earth like him! This is magnificently done; a triumph for PARLOPHONE, indeed!

Phil the Fluter's Ball, Martin Howard, bass, with orch. 1/6. **Pic 381**

Very well sung. It makes an excellent companion to *Father O'Flynn* on the other side.

Phyllis Has Such Charming Graces, Frank Titterton, ten., Leslie Heward at piano. 3/- **Dec M73**

I am listening to the voice of someone I knew when were we both boys! He sings this admirably.

Rose Marie, Dominion Light Opera Company, with orch. (d.s.) Dom A199

Rum-tum-tum, George Buck, com., with piano. 2/-. **Dec 1545**

This is very amusing—all about the sailor's love for rum, etc., etc. It is well sung; George Buck takes care to let you hear his words. It is well recorded and the accompaniment is exceptionally well played. I feel I ought to say that.

Sandy, the Goalkeeper, Sandy Powell, com., assis. by Bay Russell. (d.s.) 1/3. **Brdcst 458**

Sandy is interviewed by a reporter from *The Megaphone* The humour is a little strained, but it *is* funny in places. Football enthusiasts may appreciate the "other side" of it. Sandy's rules for football playing leave something to be desired.

Sea Rapture, Frank Titterton, ten., Leslie Heward at piano. 3/-. **Dec M73**

Frank Titterton's voice is appealing; there is no question of his artistry. I consider this the best of the Decca records of the month.

Second Minuet, Thea Philips, sop., and Arthur Vivian, bar., with piano and violin. 2/-. **Brdcst 5115**

Duets are very pleasant to hear now and again. This one has much to recommend it. It is a graceful, old-world tune, excellently sung.

Smiling Irish Eyes, Harry Carlton, with orch. 1/3. Brdcst 465

Softly Awakes My Heart, Constance Willis, cont., with orch. 2/-. **Brdcst 5114**

Her diction—she sings it in English—is good. I consider it a good rendering of the aria.

Sometimes I Feel Like a Motherless Child, Maria Sandra, with Lawrence Brown at piano. 3/-. Parlo R458

Song of Love, Jan Zalski, ten., with orch. 1/6. Pic 380

Strange Adventure, Dominion Light Opera Company, with orch. **Dom A194**

A very good rendering. I imagine Rupert D'Oyly Carte himself would sit and listen to this—and he is a trifle particular about "G. and S."

Sun of My Soul, Choir of the City Temple, with organ. 1/3. **Brdcst 469**

If the hymn is a favourite of yours and you want to hear it well sung, buy this record.

Talor dal mio Forziere (*Puccini*), Oreste de Bernardi, ten., with orch. **Dom B24**

A first-rate record of Bernardi. I do not mind how many times I listen to his singing.

Tell Me the Old, Old Story, Choir of the City Temple, with organ. 1/3. **Brdcst 469**

I should not have thought this was worth recording, but others may think differently. It is a good record of the hymn.

There Is No Death (*O'Hara*), Frank Titterton, ten., with piano. 3/-. Dec M77

There is No Death. Tom Burke ten., with orch. **Dom B23**

This is a fine song; there is a manly sentiment in the words. Those who have lost their own in the war could hear this, as sung by Tom Burke, without a tear and with a certain sense of thrill. *I tell you they have not died,* he says.

There's A Four-leaf Clover in My Pocket. Lucien La Riviere with piano and piano accord. 1/6. Pic 384

Tondeleyo (from *White Cargo*), Harry Carlton with Hawaiian Melody Makers. 1/3. **Brdcst 446**

The waltz rhythm is here sufficiently well-marked to use the record for dance purposes, even though it is sung. I can see no other use for the record.

Tut-Tut-Tut, Tommy Handley, com., with orch. 1/6. Pic 385

World Weary, Noel Coward, bar., with piano. 3/-. **H.M.V. B3158**

A peculiar, adenoidal voice sings rather attractively. Noel Coward is no composer; he had better be content with playwriting! But this is by no means a poor thing.

You Wanted Someone to Play With, Mona Grey, varivoiced entertainer, with piano. 3/-. Parlo R456

Zigeuner, Noel Coward, bar., with piano. 3/- **H.M.V. B3158**

This is quite attractive to those who like Coward's music. That is the fairest criticism I can give. The recording is excellent.

ORCHESTRAL RECORDS

Air from the Third Suite (Bach), Chenil Military Band, 2/-. Dec F1534

Album Leaf (Wagner), Chenil Military Band, 2/- Dec F1534

Ave Maria (Schubert), Herbert Jaeger and Salon orch., 2/-. Dec F1554

Ballet Egyptien (Sel.), (Luigini) Dominion Orch. (d.s.). **Dom A202**

As a light orchestral number this has a good deal to recommend it. I advise you to ask to hear it.

Blue Danube Waltz (Strauss), H.M. Welsh Guards, 2/-. **Brdcst 5117**

This old favourite is always worth hearing. The Welsh Guards do not insult it by any means.

Children's Overture, Parts 1 and 2, Grand Sym. Orch. (d.s.), 4/6. **Parlo E10912**

Roger Quilter does not usually go very deeply into things. Perhaps it is as well in an overture for the kiddies. He ought to do more of this kind of thing—it suits him and it will suit the children. Let them have it for Christmas!

Criticisms by Whitaker-Wilson

Christmas with Jack, Band of H.M. Welsh Guards, 1/3. **Brdcst 470**

There is something amusing about this—yet pathetic. It is a good idea to have compiled a record suggestive of Christmas on board ship. Of course, being the H.M. Guards, it is excellently played.

Christmas with Tommy, Band of H.M. Welsh Guards, 1/3. **Brdcst 470**

The distinction between Christmas with a sailor and that with a soldier are clearly brought out. It is certainly original.

Dance Selection (1929), Rhythem Maniacs, dance orch., with vocal refrain (d.s.), 2/-. **Dec 1546**

The Rhythm Maniacs are "mad" in a good cause; they make dancing a pleasure. This is an excellent record and can be safely purchased for dance purposes. The music, though, is not very valuable.

Dancing Goblin, Six Nite Lights, 3/-. Parlo E6210

Deep River, Victor Olof Sextet, 3/-. Parlo R453

Distant Greeting, Massed Military Bands, 3/-. Parlo E6314

Federacion, Orquesta Tipica, Francisco Canaro, 3/-. Parlo R450

Follow Through (sel.), Mayfair Orch. (d.s.), 4/6. **H.M.V. C1769**

I am rather attracted to this. I have already reviewed many of the separate numbers from *Follow Through* and they appear here as quite old friends. It is thoroughly well done.

Gipsy Princess, Barnabas von Geczy and Orch., 3/-. Parlo R452

Glow-worm Idyll, Luna Park Orch., 3/-. Parlo E6213

Harry Lauder Lancers, Figures 1 and 2, and 3 and 4, H.M. Welsh Guards (d.s.), 2/-. **Brdcst 5116**

If anyone wants to have Lancers in these days they should certainly get this record. It could be heard all over any ordinary-sized house.

Figure 5, 2/-. **Brdcst 5117**

The excellence is maintained in Figure 5.

Huggable Kissable You, Hawaiian Novelty Trio, 3/- Parlo E6211

Hungarian Dance, Nos. 1 and 3 (*Brahms*), Vienna Philharmonic Orch. (d.s.) 3/-. **H.M.V. B3145**

This is worth having. It is easily the best of the H.M.V. records I have heard recently. I wish they would do more of this kind of thing.

Hungarian Rhapsody, Parts 1 and 2 (Liszt), Berlin State Opera Orch., (d.s.) 3/- **H.M.V. B3135**

I am listening to this played on a magnificent electrically-driven gramophone. I wish the Abbé Liszt could have heard it. What those men missed! Of course, it is a magnificent record. Parts 3 and 4, 3/-. **H.M.V. B3135**

The most taking themes, from the public point of view, appear in this section. This is the height of excellence in recording. We live in an age of invention, and no mistake! I suppose we shall have television soon, and see the people who record! They know how to play Liszt in Berlin. Everyone should get these two records; I do not expect to receive letters of disappointment if they do.

If I Had My Way (*Flying Fool*), Lily Lapidus, Jazz Girl and Novelty Orch., 3/-. Parlo R455

Le Cygne (Saint-Saens), Herbert Jaeger's Salon Orch. 2/-. **Dec 1535**

Whether or not it is because I have just heard about a dozen "dance selections" I cannot say—but this seems very peaceful and pleasant. It is a tune that will never die. If you have not a record of it I can honestly recommend this, for there is some thought behind the rendering.

Life on the Ocean, Metropolitan Police Band, "A" Division, 2/-. Pic 375

It may be a minstrel show of 1929, but it reminds one of childhood's days; minstrels were common then. This is really excellent and seems to play a very long time. Some of the singing is charming. I like "Lady Moor" very much. The Niggers applaud each other vigorously, which cheers up the proceedings considerably.

More Old Songs, Jack Hylton and His Orch. (d.s.) 4/6. **H.M.V. C1783**

For those who like a collection of old songs, this is admirable. Such tunes as *My Irish Molly O, Silver Threads Among the Gold, She Cost Me Seven-and-Sixpence, Waiting at the Church, Let's All Go Down the Strand,* and others, are well rendered.

Our Village Concert, Syd Howard, Vera Pearce, and Leonard Henry and Company. (d.s.) 4/6. **H.M.V. C1782**

This will try your nerves, as the village band plays somewhat *out of tune*! The record fetched some of the "W.M." staff over to me to ask if all was well with the gramophone. I am slowly recovering, I may say; time and rest should see me fit to review

The Month's Best Records

IF I had to entertain you with a short recital of records which have come in this month, I think I should choose the following from those I have reviewed :—

The Bach *Passion* appeals to me more than any, but I happen to be a Bach enthusiast. Anyhow, PARLO E10917 would be my show-piece for this month.

DOMINION B27 would make a good second; one side of it is Louis Godowsky playing the finale of the Mendelssohn *Violin Concerto.*

PARLO E10910 comes third in my view; it is two of the *Slavonic Dances* of Dvorak.

Fourth, I should place Lottie Lehmann's records from *La Tosca* and *La Boheme*.

Fifth, a Spiwakowsky record PARLO E10914.

Sixth would be DOMINION B24, which is an admirable representation of Puccini.

Seventh, an excellent record by Frank Titterton on DECCA M73.

Seven is a complete number, and is enough for the purpose. If I add anything to the above, it must be two Gilbert and Sullivan numbers, recorded on DOMINION A194.

You will find my reviews of these in the general lists.

WHITAKER-WILSON.

Love (*Trespasser*), Lily Lapidus, Jazz Girl, and Novelty Orch., 3/-. Parlo R455

Lonesome Little Doll, Jack Hylton and His Orch. 3/-. **H.M.V. B5727**

This and *Steppin' Out* go well together. An admirable dance record.

Mad Major (Alford), Band of H.M. Welsh Guards, 1/3. **Brdcst 467**

Another excellent number from H.M. Welsh Guards. Lovers of military band records should not miss this.

March Indienne, Massed Military Bands, 3/-. Parlo E6214

Merry Widow, Barnabas von Geczy and Orch., 3/-. Parlo R452

Milonguita, Kipnis Tango Orch, 1/3. Brdcst 476

New Rhythm Style Series, Louis Armstrong's Hot Five, 3/- Parlo. R448

Minstrel Show of 1929, Darktown Melody Makers, with orch. (d.s.) 4/6. **H.M.V. C1789**

some more records next month. "Miss Bloodworthy" and that appalling "Silver Tuba Band" ought to have been stifled at birth! Get it—the record, I mean—it is really "en-joy-able," as the worthy vicar says.

Perpetuum Mobile (Weber), Herbert Jaeger's Orch., 2/-. **Dec 1535**

Not badly done by any means. Weber's *Perpetuum Mobile* is not easy to "bring off," but it is here done well. As it is "on the other side" of *Le Cygne,* which you will find reviewed somewhere in these columns, I should say "get it."

Por Ella, Kipnis Tango Orch., 1/3. Brdcst 476

Ragamuffin, Six Nite Lights, 3/-. Parlo E6210

Raymond Overture (Thomas), Metropolitan Police Band, "A" Division, 2/-. Dec 375

Semiramide, Orch. of the State Opera House, Berlin, con. by Dr. Weissmann (d.s.), 4/6. Parlo E10911

Serenata (Onesti), Herbert Jaeger and Salon Orch., 2/-. Dec F1554

Safe, The (A Thriller) Angela Baddeley and Company. (d.s.) 4/6. **H.M.V. C1738**

This is quite exciting. I shall not tell you any more about it—not fair to H.M.V. if I do!

Slavonic Dance, Nos. 8 and 16, Orch. of State Opera House, Berlin, 4/6. **Parlo E10910**

All the wildness of Dvorak's Bohemian intellect ever conceived comes out in this rendering. I know the score intimately; and I am satisfied that I can seriously say—"*have it!*" No. 16, on the other side, is played with real individuality. I thoroughly enjoyed the record.

Star of Love, Victor Olof Sextet, 3/-. Parlo R453

Stephanie Gavotte, Luna Park Orch., 3/-. Parlo E6213

Talkie Hit Selection, Rhythm Maniacs, dance orch. with vocal refrain (d.s.), 2/-. Dec 1547

Thou Swell, Bix Beiderbeck and Gang, 3/-. Parlo R451

Tiempos Viejos, Orquesta Tipica Francisco Canaro, 3/-. Parlo R450

Tiger Rag (Monaco), Philip Lewis and Orch., with vocal refrain, 2/-. Dec 1540

Viennese Waltz Potpourri, Parts 3 and 4, Dajos Bela Orch., (d.s.), 4/6. Parlo E10913

Waldteufel Memories, Frank Westfield's Orch. (d.s.), 3/-. Parlo E6212

Steppin' Out (*Vauchant*), Jack Hylton and His Orch. 3/-. **H.M.V. B5727**

The use of a xylophone adds to the value of this as a dance record, for which purpose it can be honestly recommended.

Whistler and His Dog (Pryor), Band of H.M. Welsh Guards 1/3. **Brdcst 467**

This is *splendid.*

INSTRUMENTAL RECORDS

Bells Across the Meadow (*Ketelbey*), Herbert Griffiths, organ. 2/-. Brdcst 5113

Caprice Viennois (*Kreisler*), Arschensky, violin with piano. 1/6. **Pic 378**

I have heard Kreisler play this; Arschensky plays it much as Kreisler does—a strong recommendation, surely.

Caprice Viennois, Melsa, violin, with piano. 2/- **Brdcst 5110**

You should hear Melza play this and then Arschensky (Pic. 378). Then you can *choose.* The Caprice as a work never fails to please.

Caprice XX, Tossy Spiwakowsky, violin with piano. 4/6. **Parlo E10914**

Beautifully played. The recording is perhaps not up to that of the Bach Passion, reviewed elsewhere, but even PARLOPHONE cannot expect to reach that standard *always*!

New Records Criticised and Listed—*Continued*

Cavalleria Rusticana, Samehtini Ensemble. (d.s.) 1/6. **Pic 376**

The playing here is good. The recording of this firm needs careful attention, in my opinion. Their productions seem to me to be within an ace of being really first-class. I cannot refrain from saying this because I hear hundreds of records, from the "worst ever" up to amazing heights of excellence. Come on, PICCADILLY! You can give us something unassailable!

Christmas Memories, Herbert Griffiths, organ. 2/-. Brdcst 5113

Doin' the New Low Down, Patricia Rossborough, syn. pianist. 2/-. Decca F1537

Fairy on the Clock, Teddy Brown, xylophone and saxophone with vocal refrain. 1/3. **Brdcst 473**

The xylophone comes out excellently; it is played here with considerable technique. The refrain is well sung. An admirable dance record in every way; the actual playing is very nearly perfect for this type of record.

Finale from Violin Concerto (*Mendelssohn*), Louis Godowsky, violin. **Dom B27**

Same thing here as in *Songs My Mother Taught Me.* Get it, listen to it, study his ideas, and then work it up for yourself. If you can play this with him—go up to the Dominion people; they will record you immediately.

He's a Good Man to Have Around, Patricia Rossborough, syn. pianist. 2-/. Decca F1537

Honey, Teddy Brown, xylophone and saxophone solos, with piano. 1/3. Brdcst 466

Liebesträume, No. 3 (*Liszt*), Herman Wassermann, piano **Dom B26**

Here is a chance for comparison! A good many amateurs play this. Get this record and compare it with other men's renderings—that is the way to play it well yourself. I have played it for years; I do not agree with much that Wasserman does here, but I learnt one or two things I am not likely to forget! That is the point of view I must take regarding these piano records, and I speak chiefly to piano students now.

Molly on the Shore (*Grainger*), Herman Wassermann, piano **Dom B26**

He plays this well; I think Grainger himself would tell you so Get it; I assure you that you will not be disappointed in Wasserman here!

My Lucky Star and *Button Up Your Overcoat,* Raie da Costa, Parlophone girl. Piano. 3/- Parlo R454

Medley of Christmas Melodies, Arthur Meale, organ. (d.s.) 3/-. **H.M.V. B3124**

Arthur Meale evidently believes in getting through the Christmas tunes as fast as he can. They sound ridiculous as he plays them. He is deteriorating into a cheap-style player; he *must* have his tremulants on every moment. Some of the tunes are *unrecognisable.* Buy the record and have prizes at Christmas for those who can guess what the tunes are! I daresay he will answer any questions; it will be such good fun!

Milonguita, Kipnis Tango Orch. 1/3. Brdcst 476

Por Ella, Kipnis Tango Orch. 1/3. Brdcst 476

'Neath the Desert Moon, Arthur Meale, organ. 3/-. **H.M.V. B3112**

This is quite attractive and is worth getting. I look forward to the day when we shall hear the thundering of the 32 ft. reeds—when we can record John Sebastian Bach as he would himself approve. And now, Mr. Meale, gives us something *really* worth hearing! You have a fine instrument and some technique; please give us the benefit of both! Don't let us always have Desert Moons and Yellow Sands; let us hear your diapasons rather than your pet solo reeds. We want "dignity" more than "impudence!"

New Rhythm Style Series, No. 3. *Beebe.* (*Dorsey*). Jimmy Dorsey, saxophone. 3/-. Parlo R449

No. 4. *It's Right Here For You.* Tom Dorsey, trumpet. 3/-. Parlo R449

Pagan Love Song (*Brown*), Alex Taylor, organ, from Davis' Theatre, Croydon. 2/- **Dec 1548**

I cannot make up my mind whether I like this or not; I reviewed it last month. What I do *not* like is this atrocious habit cinema-organists have of using the tremulant. It is not my intention to review this negatively—I know it to be popular for one thing. I simply leave it for those who like the work—*and* cinema organs.

Pastorale: Etude in F minor, Etude in C minor, Alfred Hohn, piano. 4/6. Parlo E10915

Rose Marie, Teddy Brown, xylophone and saxophone solos, with piano. 1/3. Brdcst 466

Serenade to Nicolette (*Bernard Russell*), Arschensky, violin with piano. 1/6. **Pic 378**

There is some very effective double stopping in this. I thoroughly recommend the record, though the actual recording is not perfect.

Songs My Mother Taught Me, Louis Godowsky, violin. **Dom B27**

Of course, this sort of thing suits Louis Godowsky; it gives him a chance to show off the purity of his tone. Now then, you who play the violin—get the arrangement of the work, and play it *with* Godowski on your own violin. (Use a loud needle.) I do that sort of thing with piano records of Paderewski and Pachmann; it's great fun and knocks all the conceit out of me!

Tambourin Chinois, Tossy Spiwakowsky, violin with piano. 4/6. **Parlo E10914**

All violinists—amateur or professional—should have this. It is admirably played. Spiwakowsky's tone is a little brilliant in places; use a soft needle for him!

Through! Teddy Brown, xylophone and saxophone, with vocal refrain. 1/3. **Brdcst 473**

The saxophone melody is supported rhythmically by the xylophone; the gramophone seems to support both, for the recording is excellent.

World is Waiting for the Sunrise (*Seitz*), Alex Taylor, organ, from Davis' Theatre, Croydon. 2/-. **Dec 1548**

The organ here, again, is ridiculous. Mr. Taylor would do well to break his tremulants into very small pieces. He spoils his playing which otherwise seems to me to be good. The recording here is *quite* good.

Yellow Sands, Arthur Meale, organ. 3/-. **H.M.V. B3112**

I am naturally interested in organ records by the H.M.V., as I was the first to suggest them to the firm and carried out some research at St. John's, Regent's Park and the Kingsway Hall in 1925. Things have greatly improved since those days and Mr. Meale is able to take advantage of the improved method of recording.

Zapateado, Melsa, violin, with piano. 2/-. **Brdcst 5110**

The recording is not *quite* perfect. The playing is so good that I think it would be worth doing again. It improves as it goes on.

DANCE RECORDS

Ain't Misbehavin' (slow f), Midnight Merrymakers. 1/3. **Brdcst 462**

Another strongly rhythmical work, suitable for dancing; especially when the room is large. With a loud needle it could be heard at a considerable distance.

Am I Blue? (f), Eddie Harding and Night Club Boys, with vocal refrain. 1/6. Pic 390

Button Up Your Overcoat (f), Nat Lewis and Dance Band. Brdcst 474

Philip Lewis and orch., with vocal refrain. 2/-. Dec F1557

A Kiss to Remember (w), Rudy Vallee and His Connecticut Yankees, with vocal refrain. 3/-. **H.M.V. B5724**

An excellent dance record. Is the tune a well-known one? If not, it soon will be, I imagine.

Button Up Your Overcoat (f) Nat Lewis and Dance Band. 1/3. **Brdcst 474**

This seems to be the prime favourite; it certainly seems to be a favourite for recording purposes. This example of it is not sung so well as others I have heard. Otherwise, there is not much amiss.

Come on, Baby (f), Midnight Merrymakers. 1/3. **Brdcst 463**

A good dance number, but nothing else very outstanding about it.

Copper Blues (f), Mayfair Dance Orch. 3/- **H.M.V. B5717**

Rhythmical to a degree; useful for dancing.

Cute Little Flat (f), Allan Selby and band. 1/6. Pic 388

Don't You Want to See More of Me? (f) Ever-Bright Boys with vocal refrain 1/6. Pic 386

Do Something (f), Manhattan Melodymakers, introducing Teddy Brown and his xylophone. 2/-. **Brdcst 2521**

Teddy *does* do something on that weapon of his! It is excellent for dancing; you cannot possibly miss a bar when Teddy is at work. The vocal refrain is quite good.

Estudiantina (w), Giorgio Amato and orch. 1/3. Brdcst 468

Excuse me, Lady (slow f), Nat Lewis and Dance Band. Brdcst 475

Manhattan Melodymakers with organ in Stoll Picture Theatre, London. 2/- Brdcst 2520

From Sunrise to Sunset (f), Al Benny's Broadway Boys. 2/-. Brdcst 2524

He's A Good Man to Have Around (f), Philip Lewis and orch., with vocal refrain. 2/-. Dec F1541

Honey (f), Philip Lewis and orch., with vocal refrain. 2/-. Dec F1558

Excuse Me, Lady (slow f), Nat Lewis and His Band, with vocal refrain. 1/3. **Brdcst 475**

This is a remarkable tune. The vocal part is very effective. A good record!

I Ain't Certain (six-eight vocal one-step), Bidgood's Broadcasters. 1/3. **Brdcst 460**

This is quite entertaining. The gentleman is suspicious of his lady-love's veracity A perfectly appalling instrument "plays" at one stage in the procedure.

If I Had My Way (f), Jack Leon's Symphonic Dance Band, with vocal refrain. 1/6. Pic 388

If You Were Mine (f), Jack Leon's Dance Band, with vocal refrain. 1/6. Pic 387

I'll Always Be in Love with You (w), Manhattan Melodymakers, with organ in Stoll Picture Theatre, London. 2/-. Brdcst 2520

I Love You, I Hate You (w), Eddie Harding and Night Club Boys, with vocal refrain. 1/6. Pic 389

I'm Feathering A Nest (from *Honkey Tonk*), Rhythm Maniacs. 2/-. Dec F1542

In An Old-world Garden (f), Eddie Harding and Night Club Boys, with vocal refrain. 1/6. Pic 390

Kansas City Kitty (f), Midnight Merrymakers. 1/3. **Brdcst 462**

This is likely to be popular this season. It is a splendid fox-trot. I imagine that it will sell very well.

(*Continued on page 664*)

A New Radio Device for the Deaf

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

A device that will enable the deaf to listen with safety to a wireless set is described in this article, which will interest every listener because of its explanation of the limits of audibility that apply to everybody.

If you know any deaf persons who are at present debarred from the pleasures of radio, bring this article to their notice—they will appreciate it.

ONE often hears the remark made that such and such a person—who is really frightfully deaf, don't you know—is nevertheless able to hear the wireless quite well. Perhaps one is inclined to put this down to imagination, but in a large number of cases there is a definite basis of fact underlying the statement.

Deafness is, of course, a relative term, there being quite a number of people, particularly in later life, who are distinctly less keen of hearing than a normal person.

One in Every Three

In fact, the number of persons whose hearing is not up to standard is quite surprising and, although chronically deaf persons are fortunately not too common, it is calculated that one person in every three over the age of 30 is hard of hearing.

In view of the extent to which one relies on hearing to-day, so many of our simple pleasures being bound up with this sense, it is surprising that the attention which is paid to this branch of science is so small.

No one thinks very much about another person wearing glasses to-day. In fact, many people whose sight is quite good for normal purposes will nevertheless wear glasses for reading or for some other phase of their activities, because they realise that by doing so they tend to preserve their sight against failure in later life.

Yet, by the ordinary person, anyone wearing or using a deaf-aid appliance is regarded to some extent as a freak and an object of pity. Perhaps the time will come, in a more enlightened age, when this will not be so. The cost of apparatus at the present time is a barrier to its general use, but the developments which are being made every day in amplification of sound will undoubtedly have a beneficial effect upon this phase of the subject.

It may perhaps be argued that amplification is not what is required. There are undoubtedly cases where this is so. Deafness may generally be divided into three classes. First, there is congenital deafness, the deafness which exists in people who are born without the sense of hearing. Here a certain part of their anatomy is definitely missing and cannot be replaced.

Secondly, we have deafness due to organic causes, some disease having attacked the structure of the ear and caused deafness. In such cases, the remedy can only be dealt with by the medical profession.

The third class, however, is by far the most numerous, and is due to a gradual failure of the ear to appreciate sound in much the same way as the nerves of sight gradually deteriorate with old age. It is in this direction that science has been directing its energies for some considerable time past, and a series of experiments were put in train by the American Western Electric Co. some time ago in order to determine what was normal hearing

Average for Normal Hearing

They produced sounds of constant frequency, but variable intensity and, first of all, reduced the intensity until the sound could just be detected by a person of normal hearing. They repeated this for a number of frequencies covering the whole spectrum and, of course, utilised a large number of observers in order to determine the average for normal hearing.

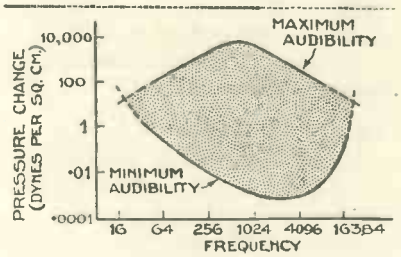


Fig. 1.—Curve for normal hearing

They then repeated the experiments in order to define the maximum audibility. This may seem rather

A New Radio Device for the Deaf—*Continued*

The special loud-speaker for deaf people developed by C. M. R. Balbi, A.M.I.E.E.

curious to many people who have not hitherto appreciated that there is a maximum limit of hearing.

Actually, however, if the sound intensity is increased too much, a sensation of physical pain is experienced. Indeed, if one is very close to a loud sound, it loses all its distinctive character and simply produces a feeling of shock such as would be obtained from an explosion.

Physical Pain

The investigators determined the maximum audibility as the point where physical pain began to be experienced and, as a result of these tests, they were able to draw a curve such as that shown in Fig 1, which illustrates the maximum and minimum audibility at varying frequencies for a normal person.

It will be noticed that the curves cross at about 20 cycles and at about 20,000 cycles, the ear being most sensitive in the region 1,000 to 4,000 cycles per second.

Two Different Cases

Now Figs 2 and 3 illustrate two entirely different cases of partial deafness. In neither case is the deafness really severe, but it will be seen that one person cannot hear the bass notes well, while the other cannot hear the treble. Fig. 4 illustrates a case of a more uniform deafness in which all frequencies are less well reproduced than they should be and in all these cases some form of deaf aid could be used with advantage.

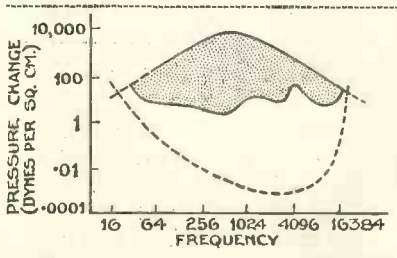


Fig. 4.—Uniformly deaf person—a bad case

If we use a microphone to pick up the sounds and amplify them suitably, and then apply them to a telephone earpiece, we can make up the deficiency in a person's hearing to a large extent. Generally, the amplification obtained from a microphone and battery is sufficient, although apparatus incorporating valves is beginning to make its appearance on the market.

It will be appreciated from what has been said that a person who cannot hear satisfactorily the noises produced by a loud-speaker can understand clearly if the sound is transferred direct to a telephone earpiece and applied to the ear so that actual sound pressure is distinctly greater than it would normally be.

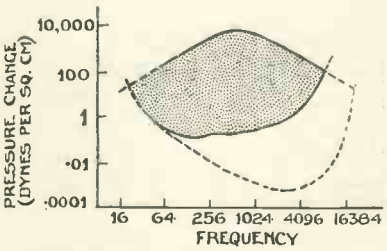


Fig. 3.—Chart of treble-deaf person

A disadvantage of the use of an ordinary telephone in this connection, however, lies in the fact that telephones are meant to handle relatively small volume. Particularly if the deafness in question is fairly severe, so that one has to raise one's voice considerably when speaking to the person, there is a distinct liability for the telephone itself to overload and, consequently, to distort.

A device has recently been put on the market to overcome this by C M R. Balbi, A.M.I.E.E., who has made a study of deafness for many years and has written several books on the subject.

This device consists essentially of a loud-speaker unit which is capable of delivering considerably more sound pressure than a telephone earpiece. The sound pressure is conveyed by a flexible tube to a small earpiece which fits in the ear. The whole is totally enclosed as can be seen from the photograph accompanying this article and, to operate it, it is simply necessary to plug it in or otherwise connect it to a wireless set.

The person can then adjust the volume to any intensity desired, up to full loud-speaker strength, and the noise produced will be still clear and undistorted, a state of affairs which is quite impossible with the small telephone earpiece.

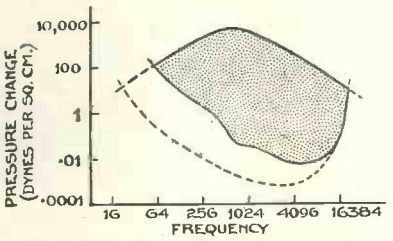


Fig. 2.—Chart of bass-deaf person

Varying the Response

Incidentally, those who are experimentally-minded can try the effect of varying the response of their amplifier. They may arrange the amplifier to have a rising bass characteristic so that the lower tones are amplified in greater proportion, or alternatively, they may accentuate the upper frequencies.

Such an arrangement would be particularly satisfactory for a person whose deafness was of the form shown in either Fig. 2 or 3, where the lack of appreciation is not uniform, and a little experiment should enable the most pleasing combination to be obtained without difficulty.

A publisher states that only one jazz tune in every hundred submitted is worth printing.

Then why are the other 99 broadcast?

◆ ◆ ◆

Auntie: "*Tommy tuned in like a man.*"

Mother: "*I didn't think he'd make all that fuss.*"

HAVE YOU HEARD THEM?

CARTOONS OF SOME BROADCASTERS BY LISSENDEN and ROBERTS

(*Above*).—*Stuart Ross and Joe Sargent.* (*Left and below*)—*Dale Smith and Beatrice Eveline, who take part in the Children's Hour*

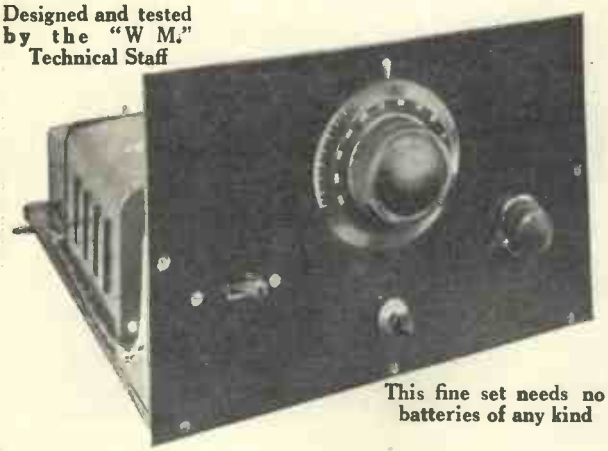
(*Above*).—*Scott Sanders, comedian*

(*Left*).—*Gwen Vaughan and Alec McGill.*

(*Below, left to right*).—*Leslie Sarony; Desmond MacCarthy, B.B.C. Literary Critic; and Emilio Colombo, the violinist.*

Designed and tested by the "W M." Technical Staff

The A·C·TWO



This fine set needs no batteries of any kind

NOT the least advantage of a set run entirely from alternating-current mains is the fact that special valves can be used which have far better characteristics than the normal types employed for battery operation

Indeed, so great is the amplification of the indirectly-heated type of valve now available that a two-valve mains set is almost as powerful as a three-valve battery set, using a similar circuit.

Average Characteristics

For example, take the case of an ordinary detector and power valve, of which the average characteristics are magnifications of 18 and 4 respectively for anode impedances of 20,000 and 2,500 ohms.

Then take the indirectly-heated type of detector and power, having "heaters" that need one ampere at 4 volts. The characteristics we find are magnifications of the order of 35 and 10 for anode impedances of 14,000 and 3,000 ohms.

It will be obvious that the mains valves are very much more efficient, with higher magnification factors and lower impedances than battery valves.

Further Advantages

Apart from increased valve efficiency, the all-mains A.C. set has further obvious advantages. There are no batteries to replace and the maintenance cost is infinitesimal. Perhaps this last statement needs explanation, for beginners will ask how valves taking 1 ampere each can be economical to run

The answer is that power is bought and registered on an electric-light meter in terms of kilowatt hours, one Board of Trade unit being a kilowatt-hour. This means the use of 1,000 watts in one hour; it comes, of course, to the same thing if 500 watts are used in two hours, and so on.

Now wattage is a function of voltage and current, and is obtained by multiplying these two factors together. Thus, a 50 watt lamp used on a 200-volt supply consumes $\frac{50}{200}$ or 25 ampere.

Similarly, power consumed by a valve taking 1 ampere at 4 volts is 4 watts.

In the case of a two-valve set, such as is described and illustrated in these pages, it will be obvious that the total wattage required to operate the "heaters" is 8 watts. But there is also the high-tension current to be considered.

At a very generous estimate, we can assume this to be 20 milliamperes (a milliampere is $\frac{1}{1,000}$ ampere) at 200 volts, that is, 4 watts. (Actually the consumption is much lower)

A PARTICULARLY SIMPLE AND EFFICIENT SET THAT TAKES ALL ITS CURRENT FROM A.C MAINS

INCORPORATES A DUAL-RANGE TUNER

USES SPECIAL MAINS POWER BOX AND FILTER COMPACT TO SIMPLIFY CONSTRUCTION

ONCE ASSEMBLED NEEDS NO MAINTENANCE EXCEPT FOR PROVISION OF NEW VALVES

METAL RECTIFIER USED FOR SUPPLYING HIGH TENSION

Total of Ten Watts

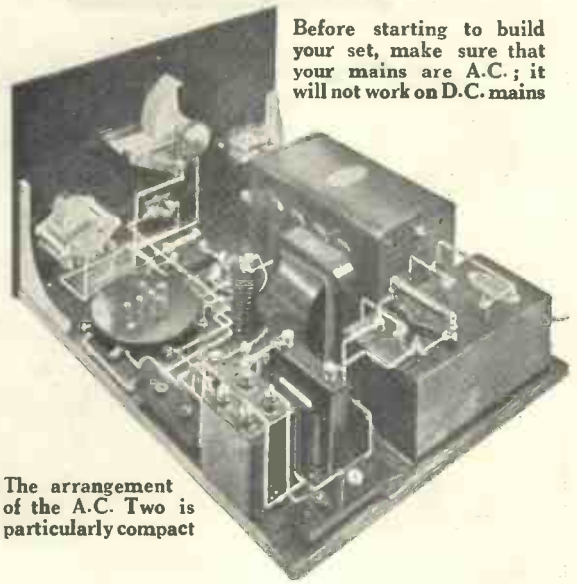
Allowing for any inefficiency in the apparatus, we can say that the total power needed to run the set is 10 watts, that is, the set can be run continuously for 100 hours before one unit of power is used. If electricity costs 6d. a unit, then the cost of operation is 3/50d. an hour!

Another advantage of the all-mains set is that, once assembled, it needs a minimum of attention. There are no drops in battery voltage to be made good by altering the tappings, and there are, of course, no low-tension accumulators to be charged

Long-life Valves

With the use of a metal rectifier for supplying the high tension, the only vulnerable parts are the two receiving valves, and these should last even longer than the battery-operated types.

Having once realised the advantages of mains-operated sets, there are usually only two reasons which make



Before starting to build your set, make sure that your mains are A.C.; it will not work on D.C. mains

The arrangement of the A.C. Two is particularly compact

an amateur hesitate to construct one. The first reason is a doubt as to the cost, and the second is a hesitation to risk an accident by touching the mains. On both of these points we can offer reassurance.

As regards cost, a glance at the list of components on page 650 will show clearly what are the prices of the components required Many amateurs will already have some of the necessary apparatus on hand, and the cost of extra parts needed can readily be calculated.

Safety Fuse in Main Lead

On the score of possible shocks from the mains, no fear need be entertained. The whole assembly can be completed and shut safely in the cabinet before any connection is made to the electric-light supply. Should anything have been connected up wrongly, a fuse in the main lead will blow.

To be always on the safe side, the set should never be touched when the main lead is connected up; if this simple precaution is observed, everything will be quite harmless.

And now, after so many generalisations, let us get down to particulars of the A.C. Two, illustrated in these pages.

The circuit combination (see next page) consists of a leaky-grid detector, followed by a transformer-coupled low-frequency stage. A dual-range tuner is provided and this is tuned by a .0005-microfarad variable condenser

In the anode circuit of the detector valve is a high-frequency choke to get reaction, the amount of which is controlled by a small .0002-microfarad variable condenser This and the main tuning condenser are the only external controls, apart, of course, from the main on-off switch

Composite Mains Unit

The metal rectifier for giving high tension is supplied from a mains transformer, both pieces of apparatus being obtained as one unit in a special metal case; and at a lower cost than if the parts were obtained separately. When ordering this unit, it is essential to specify the mains voltage and periodicity.

After the metal rectifier comes a bank of filter condensers and a choke; these, again, are obtained in one complete unit, with the various components connected externally. Moreover, the cost of the complete unit is also lower than that of the parts would be if bought separately.

Indeed, the use of these two mains units, known respectively as a power and filter compact, very greatly simplifies the construction, and obviates the possibility of making mistakes in the wiring of what is actually the most "dangerous" part of the receiver.

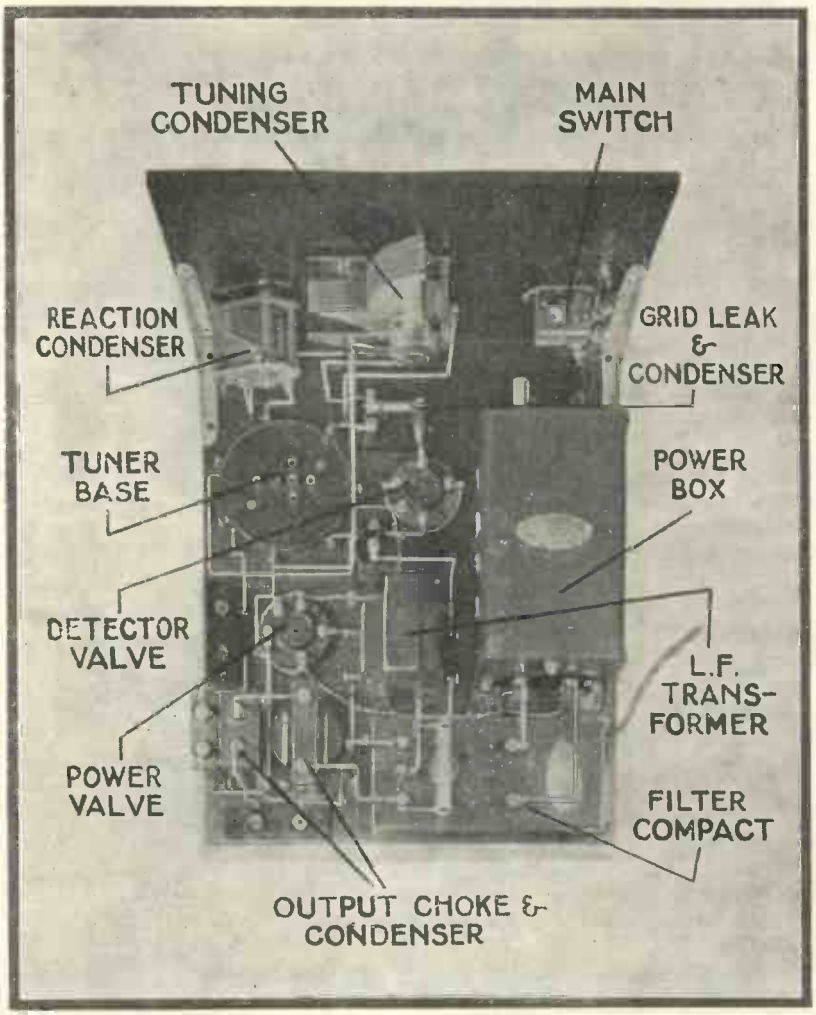
Larger models of these units were used with great success by J. Sieger and D. Sisson Relph in their Electric Four (see the WIRELESS MAGAZINE for October, 1929) They are well made and give every satisfaction.

In the negative high-tension lead is placed a 1,000-ohm resistance. The voltage drop across this, due to the anode current flowing, gives automatic grid bias for the last valve.

Full particulars for the construction of the A.C. Two are given in these pages. The layout and wiring diagram is, of course, on a reduced scale. For those who desire one, however, full-size blueprints have been prepared and are available for half-price (that is, 6d., post free), if the coupon on page iii of the cover is used by January 31.

Full-size Template

These blueprints can be used as templates for marking out the centres for drilling holes in the panel and also for placing the components on the baseboard.



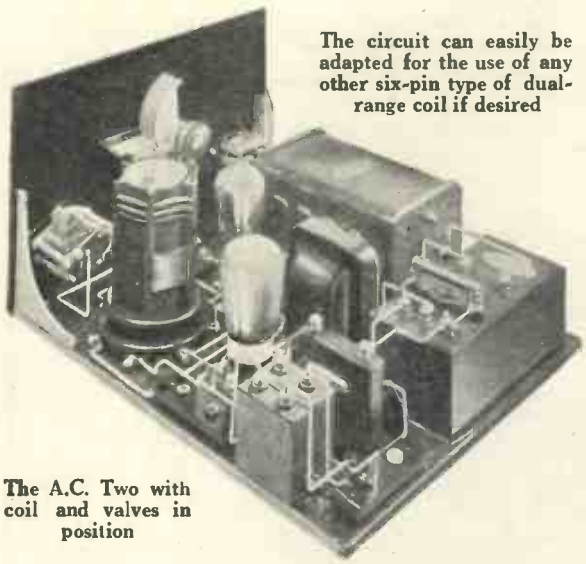
This plan view of the A.C. Two clearly shows how all the parts are arranged

Address your inquiry to Blueprint Dept., WIRELESS MAGAZINE, 58-61 Fetter Lane, E.C.4, and ask for blueprint No. WM175.

Mounting Panel Components

The first part of the construction to be undertaken is the drilling of the front panel. The number of holes required is small, for the only components to be mounted are the main tuning condenser, reaction condenser wave-change switch, and

The A.C. Two—*Continued*



The circuit can easily be adapted for the use of any other six-pin type of dual-range coil if desired

The A.C. Two with coil and valves in position

main switch; for the last a small slot must be cut

Next, the panel should be firmly fixed to the baseboard by means of the brackets, after which the remainder of the components can be assembled on the baseboard

If the blueprint is laid carefully over the baseboard marks can be made with a bradawl, or gimlet, at the centres of the holes in the fixing lugs for the various parts.

Those who use other components than those in the original WIRELESS MAGAZINE set should remember that the sizes may not be exactly the same, and allowance must be made for this when laying out the baseboard.

Insulated Grid-leak Clip

The arrangement of the set is comparatively simple. It should be particularly noted that one of the clips on the grid condenser is of the insulated type.

If it is intended to use a power valve other than that specified, it may be necessary to change the value of the resistance in the negative high-tension lead, which, as already explained, gives automatic grid bias required is found by dividing the former by the latter For example, assume the anode current to be 10 milliamperes (.01 ampere) and the proper bias to be 10 volts, then the resistance is $\frac{10}{.01}$ or 1,000 ohms.

When all the parts have been firmly fixed into position, wiring up can be started For this purpose well insulated wire should be used, and the blueprint (or reduced reproduction on page 652) should be carefully followed.

First connect up lead No. 1 and then cross this number through clearly on the wiring diagram. Proceed with wire No. 2; then carry on in the proper numerical order until all the connections are completed.

In this way it is almost impossible to make a mistake, and the careful constructor is assured that the set will work directly it is switched on for the first time.

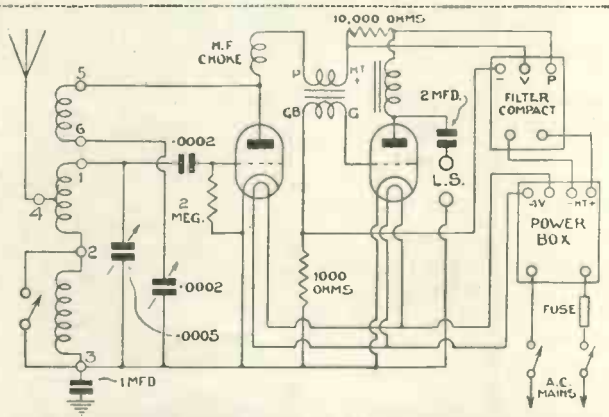
Inserting Coil and Valves

When the wiring has been completed, the dual-range coil should be inserted in the six-pin base, and the valves also placed in their respective holders.

Whilst on the subject of valves, it may be as well to explain for the benefit of newcomers to radio what exactly is meant by an indirectly-heated type of valve—a term that was mentioned at the beginning of this article.

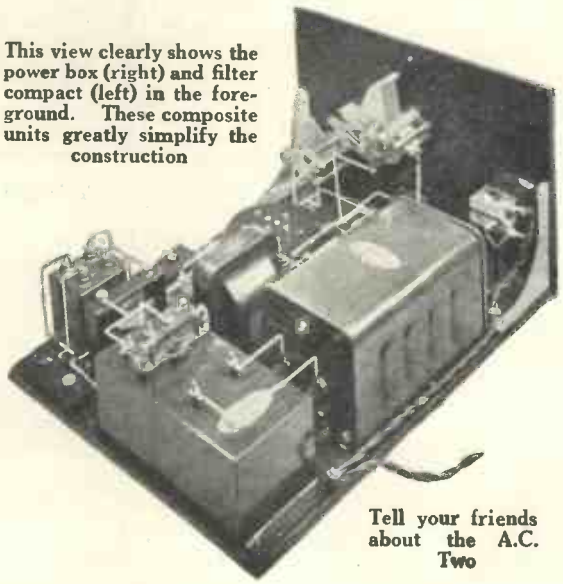
In the normal type of battery-operated valve, the filament itself emits electrons and is, of course, heated directly by

(*Continued on page 650*)



Circuit of the A.C. Two, which takes all its power supply from A.C. mains. A dry metal rectifier is used for getting high tension

This view clearly shows the power box (right) and filter compact (left) in the foreground. These composite units greatly simplify the construction



Tell your friends about the A.C. Two

THE BA2 21/-

AN AMPLION PRODUCT

NEW VOLUME AND CLARITY

The Amplion BA2 Unit has volume-handling capacity coupled with a degree of sensitivity far beyond normal.

With adapter plate to fit different types of chassis and adjustable values of impedance for use with power valve or pentode.

The BA2 means new power and mellow purity of reproduction. Ask your dealer for a demonstration.

THE AMPLION

BA2

BALANCED ARMATURE SPEAKER UNIT

GRAHAM AMPLION LIMITED
25/26, Savile Row, Regent Street, W.1

The A.C. Two—*Continued from page 648*

COMPONENTS REQUIRED FOR THE A.C. TWO

CHOKE, HIGH-FREQUENCY
1—Ready Radio, 6/6 (or Bulgin, Burndept).

CHOKE, LOW-FREQUENCY
1—Formo, 10/6 (or Bulgin, Igranic).

COILS
1—Keystone dual-range tuner, with 6-pin base and wave-change switch, 12/6.

CONDENSERS, FIXED
1—Dubilier .0003-microfarad with insulated grid-leak clip, 2/6.
1—T.C.C. 1-microfarad, 2/10 (or Dubilier, Hydra).
1—T.C.C. 2-microfarad, 3/10 (or Dubilier, Hydra).

CONDENSERS, VARIABLE
1—Jackson .0005-microfarad, slow-motion type, 14/- (or Ormond, Polar).
1—Cyldon .0002-microfarad, Bébé type, 6/- (or Formo, Bulgin).

EBONITE
1—Trelleborg panel, 12 in. by 8 in., 4/6 (or Parfait, Becol).
2—Ebonite strips, 3 in. by 1 in.

HOLDERS, VALVE
2—W.B. 5-pin holders, 2/6 (or Lotus, Benjamin)

MAINS UNITS
1—Regentone Power Box No. 1, £2 10s.
1—Regentone Filter Compact No. 1, £1 10s.

PLUGS AND SOCKETS
4—Clix for panel mounting (marked: Aerial, Earth, L.S.+, L.S.−), 1/-.

RESISTANCE, FIXED
1—Graham-Farish 10,000-ohm resistance with holder, 2/9 (or Ediswan).
1—Climax 1,000-ohm resistance, 2/-.

SUNDRIES
Glazite insulated wire for connecting up.
Length of rubber-covered flex.
1—Pair Lissen panel brackets, 8d. (or Bulgin, Raymond).

SWITCH
1—Bulgin two-pole mains switch, 3/6.

TRANSFORMER, LOW-FREQUENCY
1—Lissen Super, 19/- (or Telsen, Ferranti).

ACCESSORIES

CABINET
1—Clarion, with 14½-in. baseboard, 30/-. (or Camco).

LOUD-SPEAKER
1—Philips Double Cone, £5 5s. (or Ormond, Marconiphone).

VALVES
1—Marconi MH4, 15/- (or Osram MH4, Mazda AC/HL).
1—Mazda AC/P), 15/-.

low-tension current from an accumulator. The difference with the indirectly-heated type is that t electron-emitting surface is heated by radiation. There is a "filament" or "heater," consuming 1 ampere at 4 volts, which rises in temperature and heats *by radiation* an electron-emitting substance coated around it, but insulated from it by a porcelain tube.

Avoiding Mains Hum

The chief advantage of this method of construction is to avoid mains hum when the heater is run direct from a low-voltage A.C. supply—which in the case of the A.C. Two is obtained from two terminals on the power box (which includes a power transformer with a 4-volt secondary).

There is another type of mains valve, known as the "directly-heated" or ".8" type, which takes .8 ampere at .8 volt. It should be noted that these valves cannot be used for this particular receiver.

Valve Positions

When the coil and valves have been placed in position (the MH4 is the detector and the AC/P the power valve), the set should be placed in its cabinet.

This should be provided with two rows of holes about ½ in. in diameter along the top and bottom edges of the back to allow of air circulation, so that the apparatus does not get too hot. Do not be alarmed if a little heat is felt; it is quite normal and to be expected.

Holes must also be provided in the back and one side of the cabinet for insulated leads from the aerial-earth and loud-speaker sockets, mounted on the two small ebonite strips. So that these leads can be distinguished from outside they should be provided with the small ivorine indicating tags known as Cortabs.

Now turn the mains switch on the panel off (knob to the right), and *then* insert the mains plug into a lighting socket.

The method of operating the set is then very simple. Push the knob of the main switch on the panel to the left to switch the set on. Nothing will be heard for about 30 seconds, whilst the heaters of the valves get warmed up and raise the temperature of the electron-emitting surface.

After about 30 seconds a "live" sound will be heard from the loud-speaker; it is difficult to describe the slight burr which is audible, but there will be no mistaking it when it starts. Until the valves do get warmed up the loud-speaker will sound quite dead.

Now put the dial of the main tuning condenser to zero and advance the knob of the reaction condeners in a clockwise direction until a rustling or hissing sound is heard; this indicates that the set is on the verge of oscillation and in its most sensitive state for reception.

Wave-change Switch

Turn the main tuning control until a station is picked up and then readjust the reaction condenser until the best reception is obtained. The wave-change switch is in for the long waves, and out for the medium wavelengths.

By the way, care should be taken not to touch the terminals on the filter-compact unit, even when the set is switched off, unless a pair of insulated pliers is used.

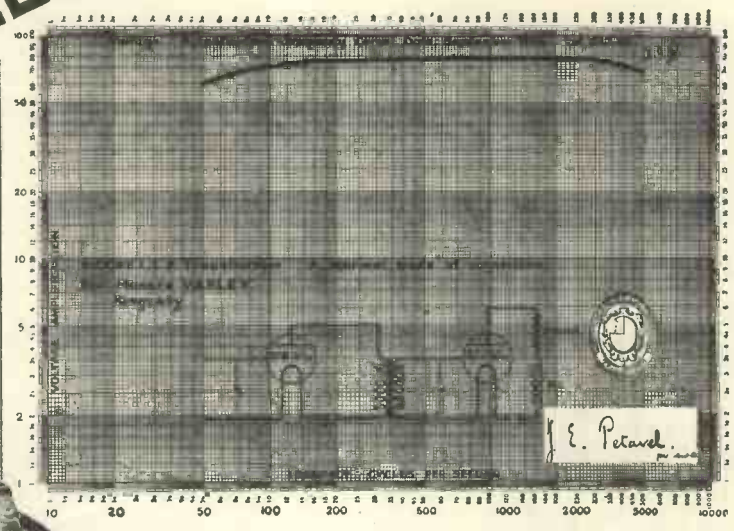
Charged Condensers

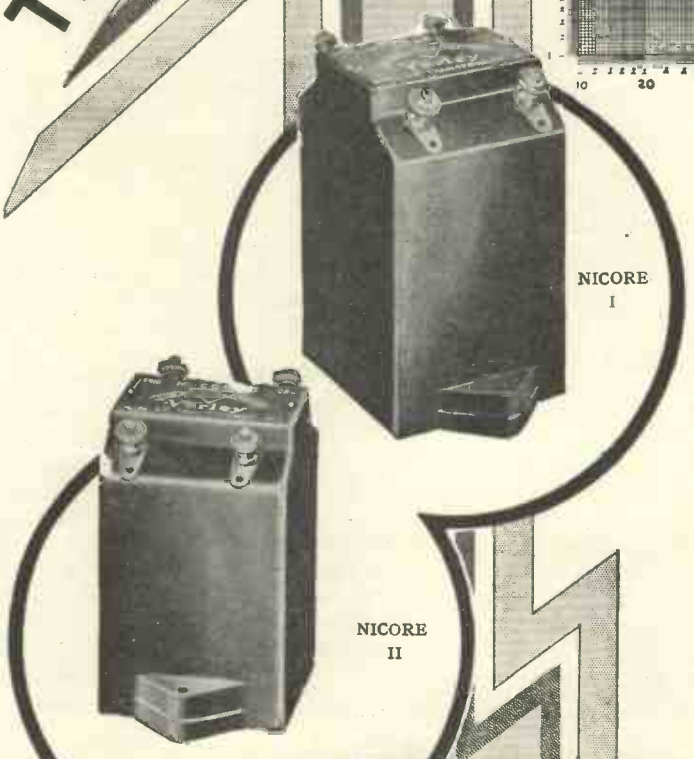
This compact contains a number of fixed condensers which become charged to quite a high voltage, and this charge is held for a considerable time.

Immediately after switching off, the voltage is enough to give one an unpleasant shock; there is little danger in this, however, for as soon as the condensers are touched they are discharged and there is no reserve of voltage to continue the

(*Continued on page* 652)

THE CURVE TELLS THE STORY !





An amplification curve of almost 80—and a frequency response curve practically uniform over the whole audible frequency range—that's the story told by the National Physical Laboratory curve—the story of a really good L.F. Intervalve Transformer—the VARLEY Nicore I.

And this story is practically as true in the case of Nicore II—almost the same constant amplification over the whole range of musical frequencies—results infinitely better than many higher priced transformers of other makes.

The use of a nickel iron alloy core coupled with long and varied experience in the winding of Transformer Coils enables VARLEY to produce Transformers of exceptional performance.

Remember that more than 30 years' research is behind a VARLEY product. That's why quality is assured when you specify VARLEY.

Nicore I (List No. D.P.1) Ratio 4 ; 1 - £1

Nicore II (List No. D.P.2) Ratio 4 : 1 - 15s.

Write for Section D of the Varley Catalogue.

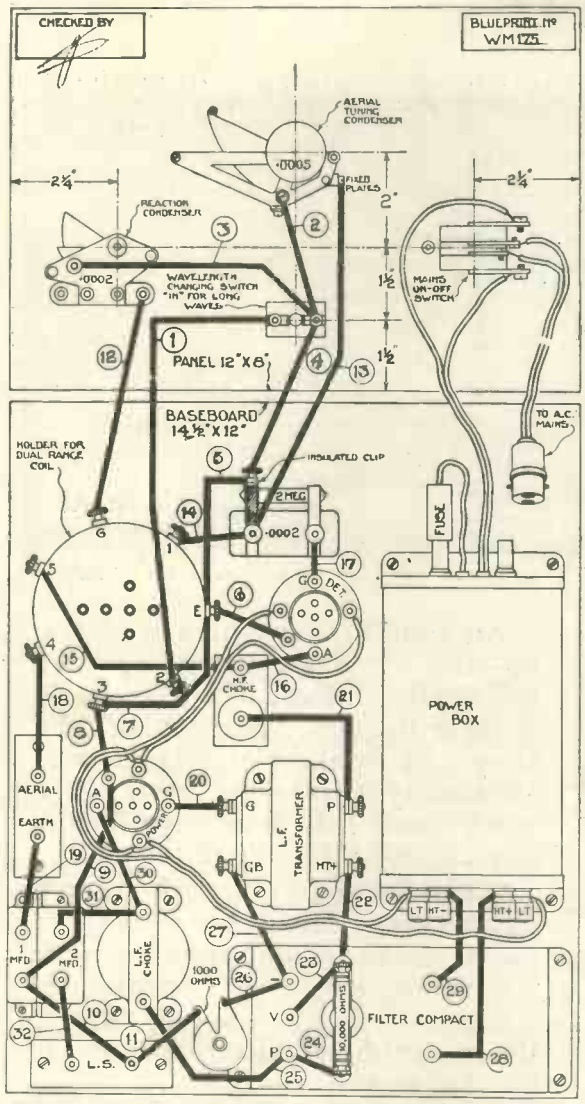
For RADIO

OLIVER PELL MANUFACTURE

Varley

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

The A.C. Two—*Continued from page 650*



This layout and wiring diagram of the A.C. Two 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 January 31. Ask for No. WM175. Wire up in numerical order

shock as is the case if the body is accidentally connected across the mains.

A little trick that may be useful in cases of bad interference between two stations is this : Advance the reaction control until the set is well on the threshold of oscillation. Then tune the main condenser very critically.

Tuning in Unison

In fact, it is usually necessary when using this dodge to adjust both condensers critically in unison, otherwise the set is liable to oscillate.

It should be clearly understood that this practice is bad technically, but it is sometimes useful as a temporary expedient.

If interference is experienced from Brookman's Park regularly, for instance, the first thing to try is a reduction in the length of the aerial. Good results should be obtained with a vertical wire about 30 ft. long.

With a mains set of this type a good earth is even more essential than a good aerial. In this connection we can recommend the use of a Climax earth tube—two of these connected together are better than one—but even one copper earth tube is often better than the water- or gas-pipe earth, so often used by listeners.

The chief difference between this set and the Stay-put Two, described by J. H. Reyner, B.Sc., A.M.I.E.E., is that the present design uses a dry metal rectifier for the high-tension supply, whilst the other uses a valve rectifier.

The Three-in-one Meter

THE "three-in-one" volt-ampere meter is fairly common nowadays and perhaps some readers who use it are puzzled as to how such a small case contains apparently three instruments.

Only One Meter

The answer is simple. There is only one meter, that is, the milliammeter, and the rest of the instrument consists of resistances arranged in such a way as to make the pointer read volts or amperes over any required range.

For instance, if a resistance of 1,000 ohms is connected in series with the milliammeter, the current in milliamperes passing through the resistance will be numerically equal to the potential difference applied between the free ends of the meter and the resistance. Thus the meter is now, in effect, a voltmeter.

Again if the milliammeter is shunted with a resistance, whose value is $\frac{1}{999}$ the resistance of the meter, the instrument becomes an ammeter.

Reading in Amperes

The fraction above is an awkward one, but it ensures that exactly 1/1,000 of the current passes through the milliammeter; consequently the current to be measured is so many milliampere times 1,000, which is the same number of amperes.

The variations in range are obtained by altering the values of the resistances.

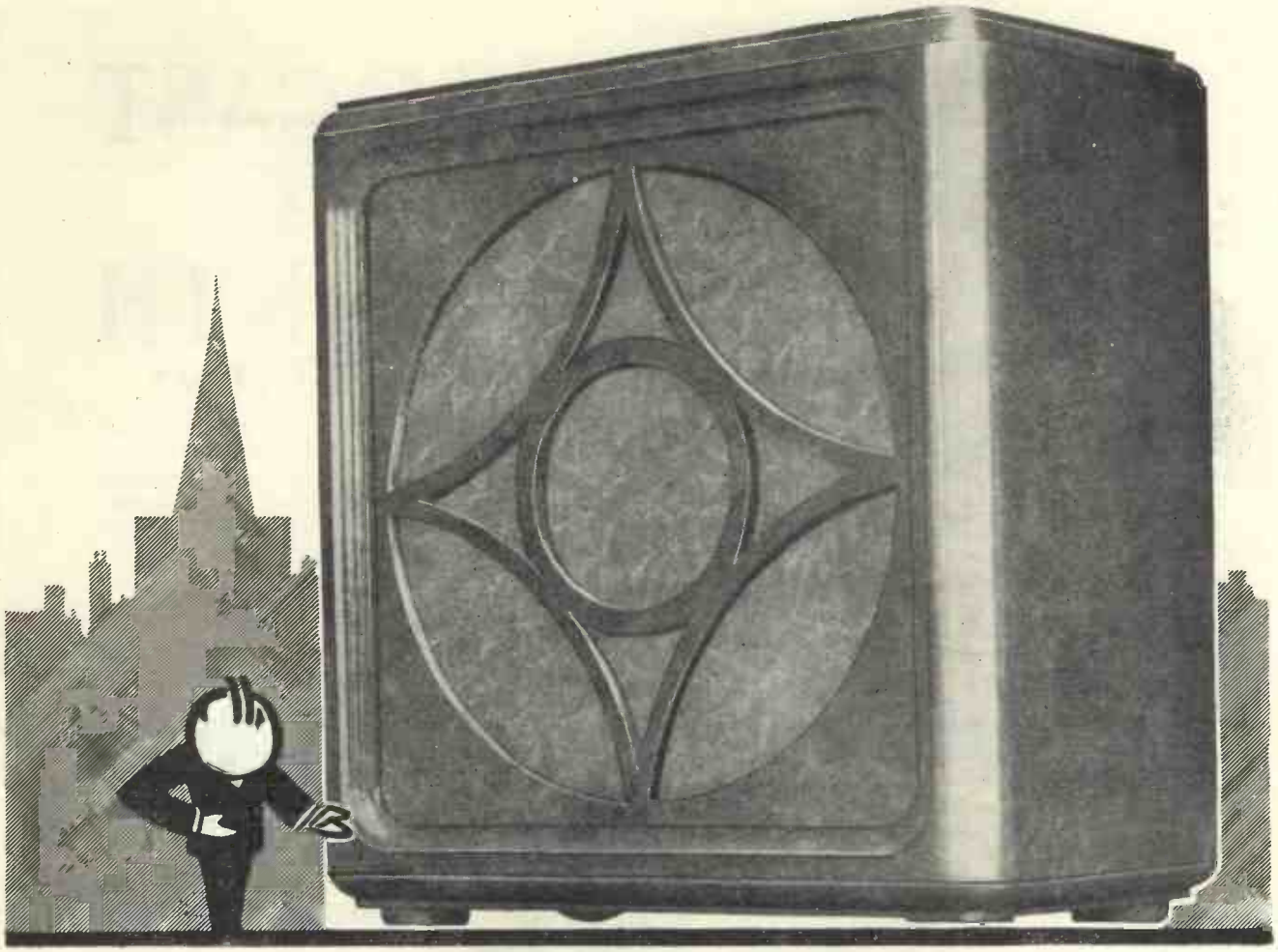
W. D.

For Woodworkers

WHEN one has made up a complete set there is the opportunity to do almost an unlimited amount of wood-working and in this connection the new edition of "Hobbies," issued by Hobbies, Ltd., of London and Dereham, is of particular interest. The book gives details of cabinet and many other pieces of furniture likely to interest the handy man.

Hobbies, of course, make sets of parts for radio cabinets and the amount of skill it requires for simple designs is cut down to the very minimum. If you have any thought of doing your own woodwork in connection with a radio set, or, indeed, with any other similar household job, then you will find "Hobbies" of great assistance to you.

This 1930 edition can be obtained, price 9d., at any newsagent or bookstall. Alternatively, it can be obtained, price 1s., post free, from Hobbies, Ltd., of Dereham, Norfolk.



Usher in the New Year with "GOLIATH"

. . . ten — eleven — *twelve!* . . . 1930 is here!

The thrill of the passing of the old year — the ushering in of the new . . . is intensified by Goliath.

The chimes, the songs and the music, the very spirit of the new year seems to creep into Goliath and burst forth in joyous frolic.

The Blue Spot Goliath is the 1930 speaker in every sense. It is true to life, natural and clear, it is in fact the finest speaker of the Blue Spot range, and the speaker which experts declare to be years ahead of any other speaker, both in performance and appearance.

You can hear it at your dealer's. Its price is **£6. 6. 0.**

F. A. HUGHES & CO., LIMITED, 204-6, Gt. Portland St., London, W.1

Telephone: Museum 8630 (4 lines).

Distributors for Northern England, Scotland & North Wales: H. C. Rawson (Sheffield & London), Ltd., 100, London Road, Sheffield (Tel. Sheffield 26006), 22, St. Mary's Parsonage, Manchester (Tel.: Manchester City 3329).

BROADCAST MUSIC OF THE MONTH

Reviewed by STUDIUS

The Houston Sisters

WITH a year's programmes behind us, it is difficult to point to any month conspicuous for entirely satisfactory results. December, for the main part, has stood out prominently for its several orchestral concerts, made up chiefly of works slightly on the heavy side.

Leonard Gowings, tenor

For lovers of foreign performers, possibly the concert relayed from Queen's Hall on December 3 of the Berlin Philharmonic Orchestra held interest. More popular was that announced for December 5, the second of the series held at the People's Palace, Mile End.

Two Contrasting Works

With Solomon as solo pianist in Schumann's Pianoforte Concerto in A minor, and the well-liked Hungarian Rhapsody No. 2 of Liszt, two widely contrasting works were found, and the remainder was redeemed from dullness by the inclusion of Bizet's suite *L'Arlesienne*, arranged by Sir Landon himself.

The concert which followed on December 6 at Queen's Hall had again a German flavour for, besides being mainly devoted to works of Wagner, it was conducted by Herr Franz von Hoesslin, conductor of the *Festspielhaus* in Bayreuth, the home of Wagnerian music. It may be worth noting that the great Wagner festival itself will be relayed from here next year.

Difficult Interpretation

Well-known excerpts made up the programme of December 6, and Miss Stiles Allen was appropriately chosen for interpretation of the difficult *Liebstod* from *Tristan and Isolde*.

On a smaller scale, but none the less effective, was the orchestral concert from the Birmingham studio on December 5 relayed through 5GB. Under Joseph Lewis, the station orchestra performed a programme devoted to the lesser known works of Coleridge-Taylor, with the name of Maurice Cole as solo pianist.

Frederick Lake, singer and entertainer

The London Symphony Orchestra was also engaged for December 14, when *The Messiah* was given by the Bristol Choral Society, the solo artists including many well-known names, such as Alice Moxon, Trefor Jones, and Howard Fry, with the Bristol Symphony Orchestra under S. W. Underwood.

Marian Angus, soprano

A special word is due also to the smaller orchestras, sometimes only dignified by the name of bands. Worthy of particular mention is that of Jan Ralfini, known as the Regal Orchestra and heard from Belfast. Their music is always well chosen and sufficiently varied from jazz to classic.

Fred Kitchen and his orchestra from the new Brixton Astoria, Moschetto and his orchestra, Alphonse du Clos, and Leonardo Kemp—all their relayed concerts are often miniatures of good performance and taste.

Familiar Vocalists

The vocalists have been mainly familiar wireless names. Eric Green, who sang in one of the recent Bach cantatas, has been heard in many vocal combinations; he has a baritone voice of rarely sensitive timbre and it lends itself well to the essentially English type of song which he usually chooses.

Leonard Gowings, one of our best known English tenors, has been heard frequently over the ether, and always to advantage. Not the least important of his broadcasts was that of December 7, when the twenty-fourth annual concert given by William Turner's Ladies' Choir was relayed from the Albert Hall, Nottingham.

The artists included Mavis Bennett, Ronald Gourley in music and humour, and Maurice Cole, the pianist. Co-operation was

(*Continued on page 656*)

James Mason, baritone

An Old Musician ~

appreciates music that he himself has played to thousands.

No greater testimony for Telsen Transformers could be found than the artistic sense of a Musician who writes to us of the wonderful balance of tone these Transformers give throughout the entire musical scale—which has now made it possible for him to hear as he once played to thousands.
Try one in your set—and have music in all its reality!

RADIO'S CHOICE AND A MUSICIAN'S, TOO

'RADIOGRAND'
12/6
Ratios 5-1 *or* 3-1

TELSEN
TRANSFORMERS

TELSEN ELECTRIC CO., LTD., MILLER STREET, BIRMINGHAM.

Broadcast Music of the Month—*Contd.*

Doris Gambell, soprano

given also by the Nottingham Philharmonic Society. Mr. Gowings also appeared to fine advantage in the performance of the last opera, *Louise*.

Eric Greene

In the provinces many local singers have made their mark. From the northern stations the names of Marian Angus, a fine soprano; James Mason, a baritone; and Mathew Nesbit, a bass singer heard from Aberdeen, figure prominently.

At Manchester, Doris Gambell, known for her work both in the Children's Hour and in opera, has been heard, and also, from 2LO, Frederick Lake recently broadcast.

James Ching, pianist

At the People's Palace

From Daventry, many names are household words, owing not only to their wireless exploits, but also to their many excellent records. Dale Smith has made many fine Decca records; also Patricia Rossborough and Frank Titterton, the latter heard to fine advantage in the recent symphony concert at the People's Palace, Mile End.

Amongst other names one recalls those of Kate Winter, Dorothy Bennett, Herbert Thorpe (a fine operatic singer), and Dennis Noble (late of the B.N.O.C.), and who sang in Bristol Radio Week on the first day, when Sir Thomas Beecham conducted the National Orchestra of Wales from Park Hall, Cardiff.

Favourite Soloists

Apart from Solomon at the People's Palace concert, the soloists have been mainly drawn from well-known wireless favourites. Maurice Cole is always bound to attract listeners, for he has made wireless pianoforte playing his special cult. James Ching, another favourite pianist, who is known in several of the Foundations of Music series, with Edward Isaacs, the blind pianist, have both been heard again this month.

Harriet Cohen is a classical pianist who rarely makes a choice of pleasant music. Others are Isabel Gray and Claude Pollard.

Of the violinists, William Primrose, Arthur Catterall, now leader of the B.B.C. Symphony Orchestra; Leonard Hirsch, with his own quartet; S. Kneale Kelley; and Rosica Rothschild, the Hungarian violinist, who gave a special recital recently of her native music, have all been heard.

Harry Dyson, flute

Matthew Nisbet, bass

One of the earliest broadcasting 'cellists is Edith Lake, while a recital of special interest was that announced for December 4 by Lauri Kennedy, now principal 'cellist in the new B.B.C. Symphony Orchestra. Hailing from Australia, he has now established himself over here.

The flute is not usually reckoned a solo instrument, but Edith Penville has succeeded in making it one of interest; also Henry Dyson, who is a member of the Belfast Station Orchestra, and frequently heard as soloist.

If the organ can be considered strictly speaking as a solo instrument, then we have had many interesting exponents, amongst them Pattman, now at the Brixton Astoria; Edward O'Henry, at Tussauds' Cinema; Alex Taylor, at the Davis Cinema, Croydon; and Reginald Foort.

Few Entertainers

The month has dealt sparingly with entertainers, despite of the occasional relays from the big variety theatres. In the studio the names of Tommy Handley, Kenneth and George Weston (once known as "the Perfectly Polite Pair"), Clapham and Dwyer, and Sandy Rowan leap to the front. On the feminine side we have had Colleen Clifford, Mabel Constanduros, and the clever Houston Sisters.

It is this part of the programme which, I think, might be better developed. Jazz bands, pianistic syncopations, and negro spirituals cannot be called entertaining in the fullest sense of the word; a few more of the old revues for which Mr. Jeffries was responsible, or even some of the old comedies, would be a vast improvement.

An interesting experiment was announced from Belfast for December 12, when a version of an old pantomime, was promised. *The Golden Stream* was first given at Belfast in 1882.

Rosica Rothschild violinist

MICA CONDENSERS

Type B 775.

·01 - 4/- .1 - 8/6 .5 - 37/6
intermediate Capacities at proportionate prices.

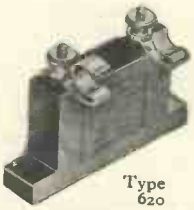
Types 610 and 620

.00005 to .0009 - - 2/6
.001 to .006 - - 3/-
.007 to .009 - - 3/6

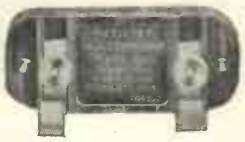
PAPER DIELECTRIC CONDENSERS

.01 to .1 - - each 2/-
.125 and .2 - - each 2/3
.25 and .3 - - each 2/5
.4 and .5 - - each 2/6
1.0 - each 2/6 2.0 - each 3/6

Prices of higher values on application.



Type 620



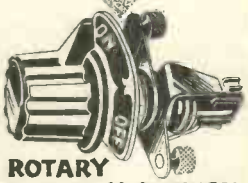
Type 610

If unobtainable from your dealer, write direct to us giving his name and address

DUBILIER
FIXED CONDENSERS

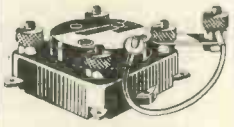
Dubilier Condenser Co. (1925), Ltd., Ducon Works, Victoria Road, N. Acton, London, W.3

BC239/F



ROTARY BATTERY SWITCH

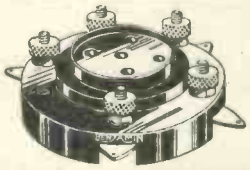
An attractive alternative to the usual Push and Pull type of Switch. All insulated, with indicating "On" and "Off" dial, pointer knob, double contact and suitable for use with panels up to ¼" thickness. Each **1/9**



PENTODE

The famous Benjamin Clearer-Tone Valveholder, Flexible connection for attaching to the terminal on the cap of the pentode valve. Price each **2/3**

Pentode attachment only for use with existing Clearer-Tone Valve holders or Vibroliders, 3d. each.



5-PIN VALVEHOLDER

Designed for use with the new 5-pin A.C. valve with centre leg. The well-known Benjamin anti-microphonic feature is incorporated, and also patented contact, which ensures perfect contact when using either solid pin or split pin valves. Price, each **1/9**

MORE NEW BENJAMIN PRODUCTS

Write for Leaflets on all Radio Products

AND THESE 3 FAVOURITES

The original CLEARER-TONE VALVEHOLDER in face of considerable low price competition has more than held its own and will be continued at price of **2/-**

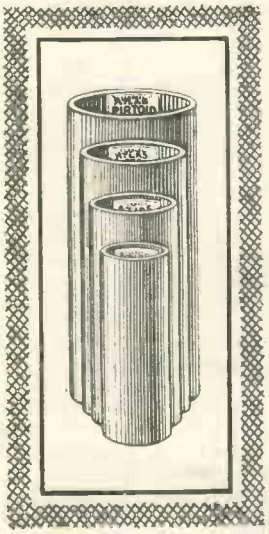
The BENJAMIN VIBROLDER was last season's most successful accessory, the self-aligning feature ensuring positive contact with all types of 4-pin valves. Price each **1/6**

The popular Push and Pull double-contact Battery Switch. It's "off" when it's "in." Price with terminals, each **1/3**

Without terminals each **1/-**

THE BENJAMIN ELECTRIC LTD.
BRANTWOOD WORKS, LONDON N.17.

MINIMUM LOSS



Hard and tough, almost unbreakable, "Atlas" Pirtoid Tubing is a unique and far superior material for High Frequency Transformers, Aerial Coils, etc. Drills and taps like hard wood or bone. "Atlas" Pirtoid Tubing can be obtained in any usual diameter, thickness of wall and length.

CLARKE'S
"ATLAS" PIRTOID TUBING

Write for full particulars to the Sole Makers:

H. CLARKE & CO. (M/CR) Ltd.,
Atlas Works,
Old Trafford, Manchester.

Set Reports from Our Readers

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 another page 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.

LODESTONE THREE

A REACTIONLESS set with W. James' special Litz-wound coils, the Lodestone Three (WIRELESS MAGAZINE, *March*, 1929) *is giving good results in Kilmarnock, as the following letter shows:*

I have built the Lodestone Three for a friend, and must congratulate you on the splendid design. On the local station (5SC, 21 miles), the volume control has to be turned half off to bring the volume down to a reasonable level. The purity is also remarkable.

◆ ◆ ◆

COMMUNITY THREE

"I CANNOT say too much for the receiver" is a Corsham reader's opinion of the Community Three (WIRELESS MAGAZINE, *November*, 1929). *Read his letter:*

I have just built your Community Three receiver to-day. It took me about two hours to wire it up, and I was able to accomplish this with ease owing to the numbering of your layout.

This set is the most wonderful I have ever heard. The quality is absolutely perfect, and the volume is enormous. I have to use the volume control very frequently. I cannot say too much for this receiver.

I have fitted an output filter and am using 180 volts high tension. Also, I am using an H.T.2 for second valve and an H.T.3 for third valve instead of only using one tapping of H.T. for both. This improves it very much.

I have already received twenty-one stations on it, and I again say that it is a very wonderful set.

Daventry 5XX	Radio-Paris
Daventry 5GB	Edinburgh
Brookman's Park	Glasgow
Cardiff	Wilno (Poland)
Swansea	Witzleben (Berlin)
Toulouse	

and eight others on low waves and two on high waves which I could not identify.

◆ ◆ ◆

BROOKMAN'S THREE

UNDOUBTEDLY the success of the season, W. James' Brookman's Three (WIRELESS MAGAZINE, *October*, 1929) *is giving satisfaction to listeners all over the country. Here is a typical letter from Cardiff:*

I have built the Brookman's Three described in the October WIRELESS MAGAZINE. I consider it to be an excellent set, and has given better results than had been claimed by the designer.

One evening I was able to obtain twenty-one stations on the lower wave-band alone while the local station was transmitting. I was amazed at the strength and the ease with which these stations came in, and also with the purity of tone.

I also tested the set at a local wireless shop where the conditions are considered bad for reception, yet the set demonstrated itself magnificently, bringing in station after station at loud-speaker strength, even while Cardiff was broadcasting. The manager of the shop declared it to be the best he had heard on that aerial.

I took the set to London to test it there. At Acton I found the results were rather better than I had expected. I had no difficulty in cutting out the powerful station within a few degrees on the dial. This, in my opinion, is remarkable, considering the new 2LO is transmitting at 30 kilowatts.

The selectivity, tonal quality, and volume of the set is all that one could desire. Wishing WIRELESS MAGAZINE all success.

ANOTHER reader, at Corsham, also gets excellent results on a home-constructed loud-speaker. He raises the question of the best aerial length:

It gives me very great pleasure to write you in appreciation of the Brookman's Three, designed by W. James.

I completed building this set on Saturday evening last, and am absolutely amazed and delighted with the results I have obtained from same, and can confidently say that it is everything you claim it to be.

The selectivity is exceptional, and the volume and quality leave nothing to be desired. Speaking of quality, in my case the results are in every way equal to a moving coil, the bass reproduction being nothing short of wonderful, and there is a delightful equality over the whole musical scale.

My fellow-enthusiasts marvel at such results on my speaker, which is one I have built entirely myself. I have a baffle-board $\frac{5}{8}$ in. thick fitted into an oak picture frame, so that the overall length is 30 in. and the width 28 in.

The cone is 10 in. across and is floated by kid in a wooden chassis, which I made myself, the whole being screwed on the back of the baffle-board, which is hung on a wooden partition which runs along one side of the room in the form of a picture.

The driving unit is simply an adjustable-type Brown earpiece from a pair of phones, and to the centre of the magnets I have soldered a brass reed; in fact, the volume this little arrangement will take without chatter is really wonderful.

Well, to get back to the set, I find that stations literally roll in, the dials simply seem to teem with them, and I absolutely revel in being able to get station after station without interference.

I shall esteem it a very great favour if you will kindly get into touch with Mr. James and ask him what length aerial is best for use with the Brookman's Three receiver, as mine is rather long, I consider, being just over 98 ft. long.

[This reader has been answered by post, but for the benefit of others who want the best results from different types of aerial, W. James has written some special notes on the subject, which appear on page 618.—ED.]

THE Brookman's Three is the first set a Bristol reader has built from a blueprint. He says that the volume is more than is necessary for average use:

I have recently made up the Brookman's Three which you published in the October magazine.

This is the first set that I have built from a blueprint. I built the set up without any trouble, making only one mistake, which was in placing the transformer round the wrong way.

There is no doubt that it is a very fine set indeed; the tone is very pleasing. I am working a double-linen speaker with the set, and I think I should go a long way to hear anything better.

The volume is more than is necessary for average use.

You give twenty stations as a minimum. On the high waves I get six at good strength and very clear. On the low waves I get so many that I have not bothered to count them. Almost every touch of the dials will bring in a fresh station, and no matter how close they are together it is quite easy to separate them.

In fact, the selectivity is remarkable, also the volume and clearness with which the stations from the bottom of the dials to the top come in.

I honestly think that whoever builds this set will be more than pleased with the results. I can only say that I am.

(*Continued on page* 660)

On Unknown Wavelengths!

"WIRELESS is not an infant industry."

"Most certainly it is."

"But how do you know an infant industry?"

"Like most infants, it is recognised by the amount of noise it makes. And if you don't believe me, come to listen to my neighbour's set at midnight."

◆ ◆ ◆

Husband and wife were visiting friends and were waiting in the drawing room. In front of them on the wall was a pictured loud-speaker.

She: "I wonder why they hung that picture."

He: "Perhaps the artist is broadcasting to-night."

◆ ◆ ◆

"So," said Brown, "your wireless brother suffers from sleeplessness, does he?"

"No," said Bryant, a sick-looking man, "he doesn't. He seems to enjoy it; I'm the one who suffers."

◆ ◆ ◆

A daily informs us that the "annual congress of the British Institute of Radiologs was held in December."

Broadcasting fires!

◆ ◆ ◆

Overhead lines are at present used almost exclusively for relaying musical transmissions. High notes!

◆ ◆ ◆

Asked by the Judge's Clerk at a County Court if he had paid his "hearing fee," a litigant replied that he had not.

The Clerk: "His Honour cannot try your case until you have paid your hearing fee."

The Man: "I forgot. I have a listening-in licence."

◆ ◆ ◆

A new gadget has a spoke wheel.

No more silent radio.

◆ ◆ ◆

"Spare parts as new. Bargain. Ex-Government Stores."

Is it a Conservative estimate?

◆ ◆ ◆

John: "What's become of young Jones and his money?"

Tim: "The young fool's been playing knobs and valves with it."

John: "How?"

Tim: "He put it all into a wireless firm."

Why does the symbol of a variable condenser have an arrow passing through it similar to the heart symbol of love? Because both are variable.

◆ ◆ ◆

"Portables demonstrated any time, anywhere, at 18 guineas cash, or 30s. per month."

The cash demonstration is rather expensive.

◆ ◆ ◆

"Wonderful 1930 model for £10. Includes cabinet."

Broadcasting parliamentary debates.

◆ ◆ ◆

"Mains Drive Sets."

Radio horsemanship.

◆ ◆ ◆

"Easy Payments. Only local firm supplying Wireless components for deferred payments. Also eliminators."

Debt eliminating.

◆ ◆ ◆

"Everything in Electrical and Wireless done."

Even the valves.

"Five-valve Portable Wireless (owner going abroad) for sale."

Cause and effect!

◆ ◆ ◆

"There can be no doubt that more and more English people are taking to the air."

The aerial age.

◆ ◆ ◆

"With Americans nothing is finished, everything is in the course of achievement. On this they found their hopes."

Even their broadcasting stations are in series.

◆ ◆ ◆

Williams was fond of antiques and had just purchased a fine old receiving set. He was endeavouring to impress his visitors with its antiquity. "Ah, it is a beauty. It belonged to General — er — General — er — what's his name?"

"Oh, yes," said a friend coming to his aid, "General Dealer, wasn't it?"

Set Reports from Our Readers

(*Continued from page 658*).

BINOWAVE FOUR

ENTHUSIASM for the Binowave Four (WIRELESS MAGAZINE *January, 1929*) *is also expressed by a reader at Kempton* (*Beds.*), *who is using a moving-coil loud-speaker:*

I have built the Binowave Four and the mains unit as described in the issues of the WIRELESS MAGAZINE for Jan. and Feb. respectively.

The set is providing power for a Magnavox loud-speaker. When on 5XX and 5GB the reproduction is excellent, but the volume is too large for the room and I wish to fit a volume control inside the cabinet; there is room for it.

I require full volume when on foreign stations.

I know nothing at all about wireless and this is the first set which I have built; yet with your blueprint and instructions I have been able to build this splendid set and to get excellent results.

The aerial which I am using is only 30 feet high up the side of the house and with the aerial condenser in series the set is very selective.

The valves which I am using are Ediswan SG610, Mullard PM5B, Cossor 610HF and Marconi P625.

At present, for earthing purposes I am using seven 1-in. gas pipes driven into the ground and coupled up in parallel, and it is really surprising how it improves the tone of the loud-speaker when water is poured down the pipes.

I propose using a copper earth plate and hope to still improve the selectivity of the set. Without watering the earth, foreign stations were not very clear.

Have tried the loud-speaker inside the cabinet, but the slight mains hum of the loud-speaker is greatly magnified and have decided to put the loud-speaker in a separate cabinet at the opposite end of the room, when the tendency to cause the valves to vibrate is greatly reduced.

ANOTHER reader at Dublin also praises the Binowave Four and makes an enquiry for a more up-to-date version of it:

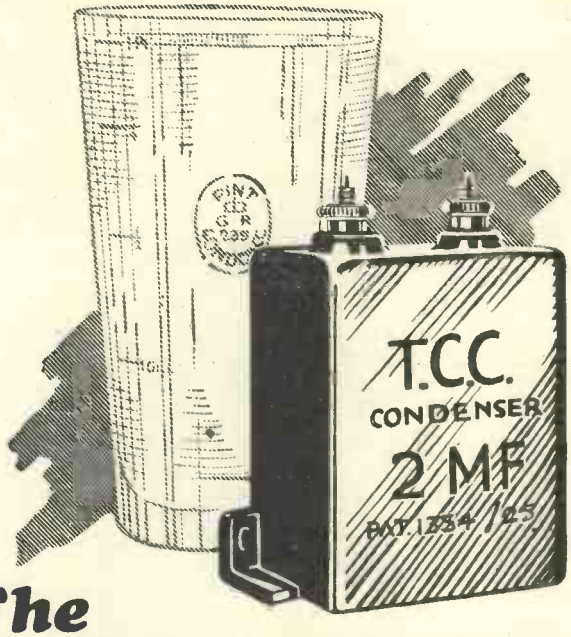
I have built the Binowave Four and a friend of mine wishes me to build a set similar and looking over next month's edition of your magazine I notice you give a description of a Binowave S.G.3.

I am wondering if you will be publishing a modernised edition of the Binowave Four.

May I say as a reader of your magazine from No. 1, Vol. 1, I have never built a set which is so easy to operate by each and every member of the family as the Binowave Four.

[We are glad to say that W. James is this month describing the construction of an up-to-date four-valver using the 1930 Binowave coils which have proved so efficient.—ED.]

STANDARDS



The IMPERIAL PINT and T.C.C.

THE Imperial Pint is the Standard pint—the pattern for all pints. Many pint pots are etched with the Imperial Pint mark—such a pot, filled, contains true measure. There is also a standard among condensers—and that is T.C.C. Every condenser marked "T.C.C." is an assurance that it is up to standard. T.C.C. Condensers, because of their accuracy, dependability and good service are to-day the recognised standard of all condensers—that's the opinion of experimenter, scientist and amateur alike. Remember this when next you want a condenser.

The illustration above is of the 2 mfd. Paper Condenser (Licensed under Design Reg. No. 723,271) Price 3s. 10d.—Other capacities from .005 to 10 mfds. Prices 1s. 8d. to 18s. 6d.

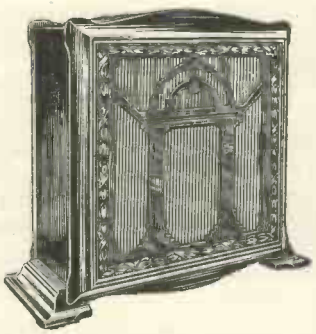
T.C.C. CONDENSERS

Advt. Telegraph Condenser Co., Ltd., Wales Farm Rd., N. Acton, London, W.3. 2375

ULTRA AIR CHROME SPEAKER

Folks!

Quoting Popular Wireless "The Ultra Air Chrome is a complete breakaway from the conventional"



Cabinet Models from £3 19 6
Illustrated: Model U14 at £5 5 0
Chassis Types from £2 2 0
Stocked by all Radio and Music Dealers, Patent No. 295, 625.

There is something about a factory-made double linen diaphragm speaker which is the envy of all. It is beautifully finished, its diaphragms are wonderfully taut, they clearly demonstrate how the job might be done—if only the vast manufacturing resources of two continents could be brought to the amateur workshop bench. Do not envy the efficiency of the Ultra Air Chrome. It is not easily attained outside a modern factory equipped with every jot of research data and every manufacturing facility provided by the combined sciences of acoustics and electricity.

If you would hear with your own ears, then visit your radio or music dealer. He will convince you in the twinkling of an eye.

Employs the famous double linen diaphragm

Ultra Electric Ltd., 661 Harrow Road, London. N.W.10. *Baldry Ad. U 108*

LEAVES from A LISTENER'S LOG

By JAY COOTE

NOTWITHSTANDING the acceptance of the Plan de Prague, a certain number of less-favoured broadcasting stations indulge in spasmodic wanderings in the ether with a view to seeking a place in the sun.

When such casual excursions are made by the smaller fry, little interest is taken in the matter and but perhaps for a solitary report published in a wireless journal, the fact would pass unnoticed.

A More Comfortable Position

Such, however, was not the case when Turin, tired of nightly collisions with Kaiserslautern and Rennes, suddenly disappeared from our horizon to bob up serenely a few days later perched in a more comfortable position in the waveband.

To-day you will find that station on 291 metres, clear of Kosice, and you will experience no difficulty in identifying its transmissions by its reiterated call of *Eh-yah Radio Torino*, closely followed by the twitterings and trills of its pet nightingale, a mechanical bird which dutifully fulfils the functions of an interval signal. I need not add that it is a gramophone record.

The *Eh-yah*, which the lady announcer emits with so much gusto as a preface to her call, is a very necessary abbreviation, for you would hardly expect her to "spill" such a bibfull as "*Ente Italiana audio Radiofoniche, Stazione di Torino*" between each two items!

The nightingale, however, is not the only bird on the air; it has not yet attained the popularity of the cuckoo, which has now built nests at Ljubljana, Wilno, and Strasbourg, and has even opened a branch at Leningrad. It bids fair to become as common as the metronome, and its increasing adoption by studios may defeat its own ends.

Training A Canary

Lille, in an endeavour to show originality, tried to train a live canary to act as a melodious signal when the studio artistes take a breather—or whatever they assimilate between turns—but the feathered protégé did not come up to expectations.

He was too unreliable, for either he refused to tweet when requested to do so, or burst into trills as soon as the bandmaster had given the formal two taps on his desk to start off his orchestra. So Lille has given the bird—well, the bird.

◆ ◆ ◆

The new Belgian station is now on the air, at regular intervals; you may hear it on Sundays and Thursdays, from 8.15 p.m. G.M.T. onwards, on 339 metres. It is a hefty addition to the Belgian broadcasting system and has put Radio Belgique in the shade, for it possesses a power of some 8 kilowatts in the aerial.

Apparently, at the moment, it has not yet decided on a definite call for, on occasion, you will hear the announcer—invariably a man—advertise the broadcast as from *Radio Leuven*, on others as from *Radio Velthem* (the name of the village near Louvain at which it is situated), and you may also pick up a reference to the *Katholieke Omroep*, or another call embodying the mystifying word, *Sarov*. An explanation, I think is necessary.

French Translations

Fundamentally, the broadcasts are destined to the Flemish-speaking districts of Belgium and that Teutonic language is mainly used, although the translation of an item or an announcement is frequently given in French.

You may hear "*Allo, Hier Velthem, de Katholieke Vlaamsche Omroep op drie honderd negen en dertig meter,*" followed by its counterpart in French, "*Ici le nouveau poste radiophonique Catholique Flamand, longeur d'onde 339 metres.*"

On these occasions, as stated, the studio is in the hands of the Flemish Catholic Broadcasting Association, but on those evenings on which the station is taken over by the Flemish Socialist Workers' Union, the call is accordingly modified and often curtailed to "*Radio Sarov,*" the latter being a coined word formed by the initial letters of the *Socialistische Arbeiders Radio Omroep voor Vlanderen.*

If I have indulged in lengthy details, it is for the sole reason that since the advent of the new station I have been asked by many correspondents to elucidate the mysterious *Sarov*, which in some cases was thought to be a Soviet transmitter somewhere in the steppes of Siberia!

◆ ◆ ◆

Revised Interval Signal

Since my last notes appeared I find that Munich has again made an alteration in its interval signal; it has completely abandoned the metronome and replaced it by a carillon of six bells (E F G A B C); it is seldom that the hooter is used except to open a main transmission.

Bells would appear to be coming into fashion, for Huizen (Holland) also uses them when the studio is run by the K.R.O. (*Katholieke Radio Omroep*), which is not to be confused with the Belgian organisation. At these periods you will hear a short carillon ringing out G D E B D B. It is less irritating than Radio Toulouse's single reiterated stroke and the melody is easily memorised.

◆ ◆ ◆

Rumours were current recently to the effect that Oslo had changed its wavelength and that it was to be found on 345 metres, lower in the waveband. On two nights, however, I was able to assure myself that such was not the case, but that Frederikstad, one of its relays which shared a wave with Bucharest (394 metres), for the time being had been compelled to work on 345 metres, a position which will be later vacated in favour of the new Strasbourg high-power station, to which it was originally allotted.

A Roman "Titan"

Although tests have been made by the Oslo "Giant" on 1,072 metres, at time of writing it has not yet taken up its duties. Perhaps when you read these lines it may be in operation, as well as the Rome "Titan," which, until Warsaw steps in, will be the most powerful transmitter in Europe.

DO NOT OVERLOOK THE SPECIAL ARTICLE ON CONDITIONS IN CYPRUS WHICH APPEARS ON PAGE 608.

New Records Criticised and Reviewed—*Cont. from page 642*

Lovable and Sweet (f), (from *Street Girl*), Ambrose and orch. 3/-. **Dec M80**

The "W.M." Staff think that this is nearer the mark than *My Dream Memory* (see below). Records in this place come under concentrative notice, I assure you.

Makin' Whoopee (f), Al Benny's Broadway Boys. 2/-. Brdcst 2524

Love, Your Spell is Everywhere (f), Victor Arden-Phil Ohman and Their Orch. 3/-. **H.M.V. B5724**

Another admirable dance-record. It is so orchestrated that neither tune nor rhythm can be mistaken.

My Dream Memory (f), (from *Street Girl*), Ambrose and orch. 3/-. **Dec M80**

There has been a discussion about this. A member of the "W.M." Staff came into my gramophone "cubby-hole" and asked me what I thought I was doing. I told him I was listening to *My Dream Memory*. It was new to me but not, evidently, to him. We came to the conclusion that the speed mark of 80 is wrong—much too fast, and that, played as a fox-trot, the melody is lost. What a pity! The tune is worth better treatment.

My Heart is Bluer Than Your Eyes (w), Bidgood's Broadcasters. 1/3. Brdcst 460

My Lucky Star (f), (from *Follow Through*), Ambrose and orch. 3/-. Dec M78

My Song of the Nile (w), (from *Parasites*), Manhattan Melody-makers, with organ in Stoll Picture Theatre, London. 2/-. Brdcst 2522

My Wife Is on a Diet (f)' Sandy Powell with Nat Lewis and Dance Band. 1/3. **Brdcst 475**

This is a sad story, Sandy's wife is on a diet, since when he has lost a "pound" a day. He is very pathetic about it.

Nobody But You (f), (from *Hollywood Revue of* 1929), Al Benny's Broadway Boys. 2/-. Brdcst 2523

One Alone (f), Savoy Orpheans with vocal refrain. 1/9. **Dom B29**

I like this tune. A good record for the summer when you dance on the lawn away from the gramophone.

Orange Blossom Time (f), (from *Hollywood Revue*), Philip Lewis and orch., with vocal refrain. 2/-. Dec 1540

Eddie Harding and Night Club Boys, with vocal refrain. 1/6. Pic 389

Pagan Love Song (f), Ambrose and orch. 3/-. **Dec M79**

I think this sounds a bit more pagan than on any of the other *three* records I have heard. If you like the tune—you are sure to know it—get this version and see how you like it. I am still not satisfied with the amount of paganism—but I expect I am wrong. Anyhow, it is well played.

Philip Lewis and orch., with vocal refrain. 2/-. Dec F1558

Piccadilly (six-eight), Deauville Dance orch. Dom A196

Raisin' the Roof (f), Rhythm Maniacs. 2/-. Dec F1542

Red Hair and Freckles (f) Philip Lewis and orch., with vocal refrain. 2/-. Dec F1539

Rosa (six-eight), Deauville Dance orch. Dom A196

Lloyd Shakespeare's Piccadilly band. 1/6. **Pic 391**

This is a very good tune. I did not review *Tell Me, Mother* (on the other side) because I did not think enough of it—but you had better have the record for *this* side. It is worth 1s. 6d.!

Riff Song (f), Savoy Orpheans, with vocal refrain. 1/9. **Dom B29**

Very well recorded and admirable playing. But please give it another label! It is not one of a *Classic Series*, whatever else it is!

Sing A Little Love Song (f), (from *Broadway*), Manhattan Melodymakers, introducing Teddy Brown and his xylophone. 2/- **Brdcst 2522**

My friend Teddy is at it again. I am glad I do not play a xylophone! I admire his technique notwithstanding. It is a good record.

Singin' In the Rain (f), Nat Lewis and His Band. with vocal refrain. 1/3. **Brdcst 4746**

There is something about the modulations on this which has a flattening effect to my ideas. I am not sure I like it; but the number is excellent for dances.

Singin' In the Rain (f), (from *Hollywood Revue of* 1929), Nat Lewis and Dance Band. Brdcst 474

Al Benny's Broadway Boys. 2/-. **Brdcst 2523**

I think I have reviewed this before. It is an excellent fox-trot.

Skaters (w), Giorgio Amato and orch. 1/3. **Brdcst 468**

I consider this a very good tune and, moreover, it is well recorded and well played.

Steppin' Along (f), Savoy Orpheans, with vocal refrain. 1/9. **Dom B28**

This is one of two records (four numbers) I have received from DOMINION for review. Both this and the other record are fox-trots by the Savoy Orpheans. Why place them then amongst the *Classic Series*? Surely this is a mistake; I hope so, at all events.

Too Wonderful for Words (f), Savoy Orpheans, with vocal refrain. 1/9 Dom B28

This is an excellent tune and it is admirably sung. A very taking number!

Smiling Irish Eyes (f), Jack Leon's Symphonic Dance Band, with vocal refrain. 1/6. Pic 387

Sweetness (f), Rhythm Maniacs with vocal refrain. 2/-. Dec F1543

Tell Me Mother! (six-eight one-step), Lloyd Shakespeare's Piccadilly Band. 1/6. Pic 391

Terribly Fond of You (f), May fair Dance orch. 3/-. **H.M.V. B5717**

I do not think I shall ever be "terribly fond" of this, but it is a good dance record.

That's How I Feel About You (f), Rhythm Maniacs, with vocal refrain. 2/-. Dec F1543

Thou Swell (f) (from *A Yankee at the Court of King Arthur*), Ambrose and orch. 3/-. Dec M79

Through! (f) Midnight Merry-makers. 1/3. **Brdcst 463**

Commendable for dance purposes.

To Be in Love (f), Philip Lewis and orch. 2/-. Dec F1541

Too Wonderful for Words (f), Manhattan Melodymakers. 2/-. **Brdcst 2519**

This is an excellent tune—outstanding in a good many ways. Invaluable for dancing.

What Can You Do Without Money? (f), Bidgood's Broadcasters 1/3. **Brdcst 461**

You know the answer to that question; it is answered here. I was amused at some of the "comic" orchestration.

When My Dreams Come True (f), Philip Lewis and orch., with vocal refrain. 2/-. Dec F1539

Why Can't You? (f), Manhattan Melodymakers. 2/-. Brdcst 2521

Yet You Forget! (f), Bidgood's Broadcasters. 1/3. Brdcst 461

Yours Sincerely (f), Manhattan Melodymakers, with organ in Stoll Picture Theatre, London. 2/-. Brdcst 2519

You Wanted Someone to Play With (w), Jack Leon's Symphonic Dance Band, with vocal refrain. 1/6. Pic 386

You Wouldn't Fool Me (f), (from *Follow Through*), Ambrose and orch. 3/-. Dec M78

Philip Lewis and orch., with vocal refrain. 2/-. Dec F155[illegible]

Getting A Laugh Out of Radio!

"THERE are 121 languages spoken by the 461,000,000 inhabitants of Europe."

B.B.C. English brings the total to 122.

◆ ◆ ◆

A critic observes that "a wireless play is necessarily different from a stage play or a film because it cannot be *seen*."

Lack of scenery.

◆ ◆ ◆

"Wireless is too funny for words for it depends entirely on poles and ears." Aerial and aural.

◆ ◆ ◆

Question at County Court: "What did your husband say when he discovered the broken receiving set?"

Wife: "May I write it down?"

◆ ◆ ◆

Willesden Magistrate: "Ask your landlord for a statement of account to justify the increase of rent on account of the wireless."

Tenant: "I have it, sir. It's like television, I'm none the wiser."

◆ ◆ ◆

A listener complained recently that nothing is more aggravating than the halting speech of some of our public men through the microphone.

But it is only human to er——

◆ ◆ ◆

A London radio fan claims to have had the same wireless set for ten years. If he has kept up the instalments it ought to be his by now.

Wireless Magazine. January, 1930

The Radio Play and the Talkies

HOW THE TECHNIQUE DIFFERS

An impression of G. A. Atkinson, who has been heard giving film criticisms over the "mike."

PERHAPS because it lacks the mathematical exactitude of a mechanical process, the technique of an art is usually left to those who practise it. Most of us know something of how a cinema works, or how a radio valve functions.

But until we see a film, or hear a broadcast in which the story or the acting "creaks" in its efforts to impress, it may not dawn on us that technique is more than a "highbrow's" chimera.

The youngest technique at present is that of the talking film. To some it may seem that the "talkies" are merely the result of superimposing radio on the silent picture. In the case of the first talking films, this idea might be said to be partly true.

Graduating from A Novelty

But in order to graduate from a novelty to a form of art, and to justify its existence when the newness has worn off, the talking picture is nowadays developing a special technique of its own—and one which is becoming more and more foreign to broadcasting.

It is sometimes said that the radio play is first cousin to the film. But by "film" is meant the silent picture. A swift succession of impressions, seen or heard, a rapid transition from one location to another, characterisation through a single medium which in the case of the film is visual expression and in the case of radio, sound—all these things are common characteristics both of the silent screen and the microphone.

The talkies, on the other hand, have much more in common with the theatre. In time, relationship may become so close that, with the development of stereoscopy and improved elocution, the former will be almost indistinguishable from the latter.

"Almost," but not quite, since the diffusion of that mysterious quality known as the "human element" seems to be limited to the stage, and perhaps, to radio.

It may be argued that, since the talking picture has photography at its service, there is nothing to prevent its using that variety of setting which is found in broadcasting and in the silent film. And it is true, moreover, that the out-of-doors recording of voices has been more or less satisfactorily achieved.

But just as some authorities maintain that the only way to get the best out of Shakespeare is to play him before a patternless curtain, in order that nothing visible detracts from the beauty of the spoken word, so it is possible to argue that exquisite photography in a sound-film may detract from the dialogue.

If this is the case (and it seems likely, unless there arises some author who can write "lines" more compelling than the natural pictorial backgrounds seen in certain films) the producer, in his wisdom, will confine his attention to interiors—and not too magnificent ones at that.

Still Greater Difference

This means that sooner or later a still greater difference between the talking film and the radio play may appear. The act-division system will operate in the former, not as a convention, but as a necessity.

In the radio play the division of a story into acts is often not only unnecessary, but dangerous to its continuity. It can be as irritating as when, in the old days at the cinema, patrons were informed in the midst of some exciting or moving episode, that "Part Five Will Follow Immediately." Even though a smart operator could sometimes carry out the promise of the last word in that

(*Continued on page* 668)

On Listening to Distant Stations

In spite of Plan de Prague the chaos remains
And the ether grows steadily worse,
For ham-handed Henrys cause ear-splitting pains
And the din is enlivened with morse.

Says Glasgow : "Good evening, listeners all,
Here's a talk by Professor MacFuzz—
He'll tell you of lichens that grow on a wall
And explain how the—" BUZZ—buzz-buzz—BUZZ!

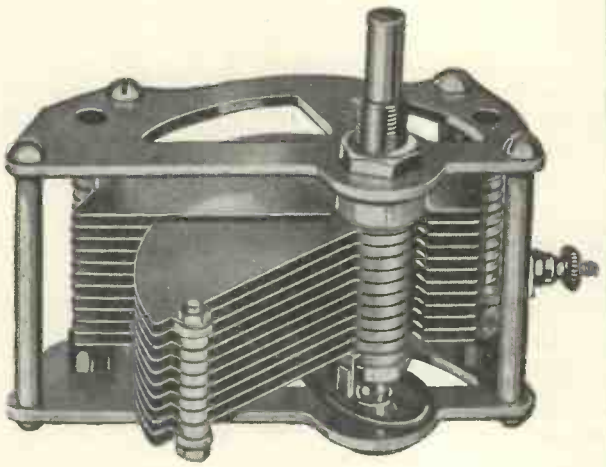
Despairing, I turn to the Emerald Isle
And hastily find 2BE,
"And now," says the speaker, "just two minutes while
The orchestra—" LAH—dee-dee—DEE!

A visit to Paris just over the pond—
Chaotic conditions prevail;
A resonant voice says, "Vous venez d'entendre—"
The rest is an ear-splitting wail.

Oh truly, there's much to be said for Aunt Jane
And her method of crystal detection—
She listens to programmes again and again
And hears the whole thing to perfection!

C. P. P.

Lotus Logarithmic Condensers
pass the test



Technical writers, the press and the leading manufacturers of circuits are constantly recommending Lotus Logarithmic Condensers. Why not use these proved Condensers in *your* set?

The ball bearings and the chemically cleaned special brass vanes and end plates ensure a smooth firm movement and perfect conductivity and the ample spacing prevents any chance of short circuiting of the vanes.

Every Lotus Component from a Variable Condenser to a simple switch is the product of experience and experiment—a masterpiece of mechanical perfection. Make a point of building your next set with Lotus Components.

.0005	Condenser - -	5/9
.00035	Condenser - -	5/7
.0003	Condenser -	5/6
.00025	Condenser - -	5/3
.00015	Condenser - -	5/-

From all Radio Dealers.

LOTUS

VARIABLE CONDENSERS

Made in one of the most modern radio factories in Great Britain.

You can get these Condensers fitted to the Lotus Dual and Single Drum Dials. Ask your Dealer.

Garnett, Whiteley & Co., Ltd., Liverpool

READ THIS!

Messrs. Watmel's,
High Street,
Edgware.

14, Beechwood Crescent,
Burley,
Leeds,
30th Sept. 1929.

Dear Sirs,

I have already purchased one of your balanced armature loudspeaker units and I must say it is a really fine piece of work and is giving splendid results on a 6" floating cone. I am now curious to see what sort of cone you recommend, so please forward me your literature on the subject.

I must say that the thing that persuaded me to buy your unit is the way it is constructed. You are evidently not afraid of letting anyone see how it is made, and not boxing it up like most cone units on the market.

Yours truly,
(Signed) A. Davidson.

Price 18/6

¶ **This bears out our claim that the Watmel is "the best of the British Units."**

Try one—or better still, buy the Watmel Cone Speaker Kit (including cabinet) at 55/-, and make up your own Speaker, using this Unit.

Full particulars and instructions on application.

WatMel

Wireless Co., Ltd.

Imperial Works, High St., Edgware, Middlesex.

Telephone: Edgware 0323 P. & I

The Radio Play and the Talkies — (Continued from page 666)

message, the delay was always dangerous to appreciation.

But with the talking film, breaks of some kind may prove essential rather than harmful to enjoyment. A limitation of scene throws too much strain on one's listening powers. Even a broadcast play is not all listening. The mind *sees* as many scenes as the author and producer conjure up, and this mental process balances the work of the ears. This compensatory balance is not present to the same extent in the talking film.

Desirable Rest

There being little variation of scene, the viewing of a talking picture becomes a matter of hearing most of the time, and, as in the case of the theatre, a rest at the end of forty or so strenuous minutes becomes very desirable.

It may even be that the technique of the talkies will, in the end, provide for more act-divisions than that of the stage play—and at shorter intervals of time. For in addition to demanding conscious listening attention it further requires, at least at present, that its patrons focus that attention on one spot.

The voices of the film-players do not come from their lips. The ears and eyes of the person watching are constantly being "pulled into line" as it were by means of efforts which are none the less real in that they are made unconsciously. In the broadcasting of a play, this does not happen, since the eye has no work to do, and all the "seeing" is performed by the "mind's eye," which can work in harmony with the ear.

It may appear from what I have said that talking pictures constitute a rather formidable way of enjoying oneself. What I have aimed at, however, has merely been to indicate that they possess a technique which, like that of many other arts, is a bigger thing than is often realised.

What makes a film or a play or a broadcast enjoyable? In nine cases out of ten it is the hidden but intelligent use of a good technique. An interesting story will give pleasure, but the writer knows that there is a technique of story-writing to be mastered before that pleasure can become an accomplished fact. And after the story comes the production with its same need of technique. The acting, setting, even the advertising require it, too, in no uncertain degree.

Listeners' Technique

And finally, though it lies outside the scope of this present article, there is a technique required of those who attend theatres or listen to broadcasts with the desire of getting the best out of them. And this, of all techniques, is perhaps the least understood by students of the various dramatic forms.

ALFRED DUNNING.

The B.B.C. Hits Back!

THE General Council of the B.B.C. was in session. Everyone who was anyone in the world of British broadcasting was present at that momentous meeting.

Controllers, announcers, engineers, assistant engineers, programme arrangers and their assistants, and many other people that the ordinary listener does not know much about had flocked from Daventry, Cardiff, Glasgow, and all stations to the Great Metropolis so as to take part in this, the most stupendous meeting that the realms of broadcasting had ever known.

Crammed to Suffocation

The huge room was crammed to suffocation, and asbestos mats had been placed on the radiators to provide extra seating accommodation.

An announcer was speaking, his perfectly-modulated voice as calm as though he was reading the Daventry Shipping Forecast (while London takes some piano music).

But, despite his perfect diction, there was a flash in his eyes that told of deep emotion, his words were coming from his heart, and a momentary glance round the crowded room would have shown you that the meeting was with him to an Uncle.

When at long last the resolution was put to a show of hands there was not one dissenting arm upraised. The measure had been carried, and such a storm of cheering broke out that the sound penetrated even to the studios, causing many a listener to wonder.

Not a whisper of the course adopted reached the public, however, and three days later the announcer faced the microphone, a sheaf of news items in his hand. The hour was nine o'clock, and the bombshell was timed to follow immediately upon the news bulletin. All stations were taking the London programme; unsuspecting listeners listened to the news.

The moment had arrived. The announcer raised the last sheet of paper, his words brought consternation to a million homes.

"Owing to the many complaints that have been received concerning the broadcast programmes, the B.B.C. decided at a special meeting to suspend all broadcasting for three weeks. It is hoped that the old motto will again prove true, 'Absence makes the heart grow fonder.' *Good-night*, everybody."

A. S. F.

A Question of Aerials

IN erecting a wireless aerial it is necessary, sometimes, to run the wire across some part of a neighbour's premises, or even to attach it to his house. In these circumstances most people are inclined to content themselves with merely asking permission of the occupier, but where the latter is only a tenant this is not really sufficient.

Correct Procedure

The correct procedure is to obtain a wayleave, or a wayleave with permission to attach, as the case may be, from the *landlord* of your neighbour's premises. This is an effective security against any objections which might be raised by a future tenant.

W. O

Our Tests of New Apparatus

Conducted by J. H. REYNER, B.Sc., A.M.I.E.E., at the Furzehill Laboratories

WATES METER

TEST meters are useful instruments, not only for the electrical engineers, but for the ordinary amateur who requires to know whether his batteries are in good condition and whether his valves are working efficiently.

Generally, there are three tests which

Useful Wates Panel Meter

the amateur requires to make : one on his low-tension battery, another on the high-tension battery, and a third on the high-tension consumption, either of the whole set, or of the final valve.

A meter which will combine these three performances is certainly useful, and, therefore, the new Wates panel-mounting meter, which sells for the modest price of 13s. 9d., and combines the three above-mentioned functions, should be popular.

The various ranges are obtained by placing connectors in a number of coloured sockets. These are mounted on a small rectangular panel which is intended to be fixed on to the main panel beneath the meter.

When wired up correctly in accordance with the maker's instructions, the voltage of the low-tension battery can be read up to 6 volts, the high-tension battery up to 150 volts and the anode-current consumption up to 30 milliamperes.

We tested these ranges in conjunction with a standard instrument of known accuracy; the results were favourable for a meter of this class, in no case did the error exceed 5 per cent. The meter will, therefore, provide a satisfactory test of potential and anode currents.

The maximum resistance of this meter is 5,000 ohms, giving approximately 33 ohms per volt. When used as a milliammeter it will be advisable to connect a by-pass condenser across the terminals, while it should not be left connected permanently across the low tension or high tension. With these precautions, we can recommend this instrument to readers. It is obtainable from the Standard Battery Co., of 184-188 Shaftesbury Avenue, W.C.2.

◆ ◆ ◆

BURTON LOW-FREQUENCY TRANSFORMER

THERE is always a demand for inexpensive low-frequency transformers capable of giving a good performance under normal conditions. One does not expect such an instrument to have exceptionally high-primary inductances and, indeed, this is hardly necessary with the majority of loud-speakers, since they do not reproduce the lowest frequencies.

The Burton intervalve transformer, manufactured by C. F. & H. Burton, Ltd., of Walsall, is a useful and efficient article of its kind which will operate effectively under average conditions.

The windings are placed on two coaxial formers, the primary on one side and the secondary on the other; the connections are taken to four terminals, two on each side of the moulded bakelite case which completely encloses the windings and core.

On test, we took a number of readings of the primary inductance with various values of D.C. polarising current. With 2 milliamperes flowing, the inductance was 17.7 henries, whilst with 4 milliamperes it was 15.2. Even at 10 milliamperes, the inductance did not fall below 10 henries.

These figures were all taken with a small A.C. current flowing through the windings to duplicate the conditions obtaining in actual practice.

Burton low-frequency transformer

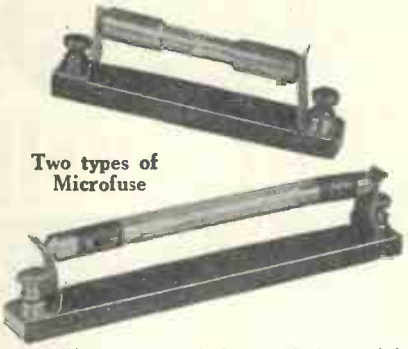
This instrument should give quite satisfactory results when following a grid-leak detector valve of medium impedance, whilst it will make an excellent second-stage transformer.

◆ ◆ ◆

MICROFUSES

MOST readers have had the misfortune to burn out a set of valves, or an expensive meter, yet such a calamity might be avoided by the use of fuses.

We have just tested a device known as the Microfuse, manufactured by Microfuses, Ltd., of 3 Finsbury Square, E.C.2. This component is made in the form of a cartridge, somewhat similar to a grid leak and fits into a special holder. The samples which we actually tested were rated to carry currents between 15 and



Two types of Microfuse

60 milliamperes and, due to their special method of construction, they will fuse at intervals of between 1/1,000 and 2/1,000 of a second.

Such a delicate fuse cannot be made by the process of drawing a fine wire, since the diameter of the wire would have to be reduced beyond practical limits. In order to obtain a very fine metal surface without tendency for this surface to break, from mechanical strain, Microfuses, Ltd., have conceived the idea of depositing a very fine layer of gold film on a glass surface.

By this method, it is actually possible to make fuses which will blow at 5 milliamperes; naturally by increasing the thickness of the film the fusing point may be raised to any desired extent.

Of the three samples which we tested one was rated to carry 15 to 20 milliamperes and had a D.C. resistance of 120 ohms; this actually blew instantaneously at 18 milliamperes. The second one was rated to have a current carrying capacity of 20 milliamperes with a D.C. resistance of 280 ohms, but actually blew at a lower value of current—actually 10 milliamperes. The third sample, rated to carry 60 milliamperes, with a D.C. resistance of 37 ohms, blew at 55 milliamperes.

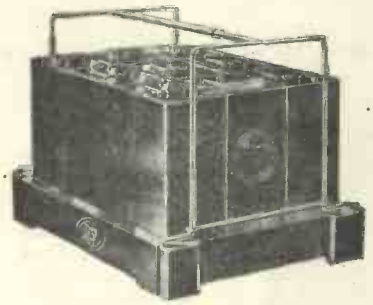
There is no doubt that for the protection of delicate apparatus these fuses are almost indispensable.

(*Continued on page* 672)

Our Tests of New Apparatus

(Continued from page 670)

C.A.V. HIGH-TENSION ACCUMULATOR



C.A.V. new type high-tension accumulator

THE letters C.A.V. have always been connected with high-class accumulators. The makers, C. A. Vandervell and Co., Ltd., of Acton, W.3, have had long experience in the art of accumulator making from the largest down to the smallest cell.

From the appearance of the new high-tension type M unit which we have received for test, it appears that the makers have reproduced to some extent a replica of their large-capacity batteries, for the plates are completely enclosed in a black moulded container, whilst the connections from cell to cell are both neat and strong.

The cells are supplied in groups of five, giving an output of 10 volts; each cell measures 1⅝ in. by 2½ in. by 3¾ in. high, including terminals. The particular unit which we tested consisted of three groups of five, giving an output of 30 volts and supplied in a moulded carrier with collapsible handle, forming a very convenient method of carrying the unit.

The cells are rated at a capacity of 5,000 milliampere-hours, and are therefore eminently suitable for supplying high values of anode current. Although eliminators have reached a high standard of efficiency, few of them can compare in freedom of ripple with the output from a high-tension accumulator; it is not surprising, therefore, that many people use these batteries and charge them from their mains supply in the intervals between broadcasting.

During our test the cells were discharged at a continuous rate of 100 milliamperes; this was continued until the voltage of each cell had fallen to 1.8. The total capacity extracted from the battery under such conditions was 4,500 milliampere-hours—a creditable figure, following the first charge and considering the high rate of discharge.

A set of these batteries should prove a sound investment to any reader who requires an exceptionally smooth high-tension supply.

Learning to Fly by Radio!

DURING the past few weeks considerable activity has taken place at the Heston Air Park School, Middlesex, in order that the new wireless installation might be completed in readiness for the official opening at the end of November.

One of the radio-equipped planes at the Heston Air School

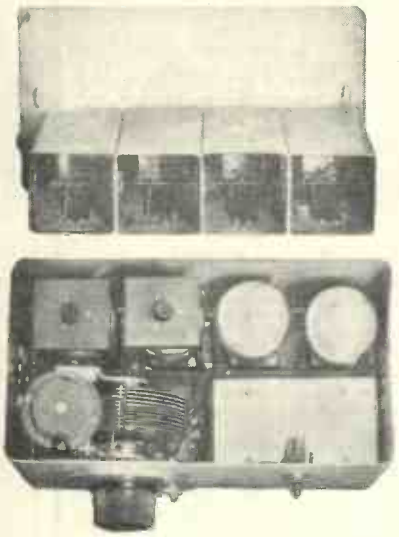
The inaugural ceremony included practical demonstrations of the latest methods of transmitting orders by radio from the ground to aircraft in flight, one important application of which is the tuition of pilots by means of orders given by an instructor on *terra firma* to a pupil in the air.

All the aircraft taking part in the official opening were fitted with radio equipment manufactured by Alfred Graham & Co., Ltd., of Slough. The equipment selected for the light aeroplanes consists of a receiving set only, no transmitter being fitted.

The set, which is of light weight and compact dimensions, and which can therefore be accommodated on the dashboard, comprises two stages of screened-grid high-frequency amplification, detector, and a single low-frequency stage, the valves employed being two Mullard PM14 screened-grid valves, one Mullard PM3a, and one Mullard PM4.

A recent incident serves to confirm the strength of modern valves. In the early part of September a Gipsy Moth plane was fitted with Graham flying-school wireless equipment and was in service for several weeks, the total flying time amounting to some thirty hours.

Towards the end of the month, owing to bad handling by an inexperienced pupil, the machine crashed into a fence on landing and was completely wrecked.



Note the compact layout of this aeroplane set

Upon examination, however, it was found that the wireless equipment was quite undamaged and that none of the Mullard valves needed replacement. Without any repair or renewal the set was put into service again a few weeks later, and is still working perfectly satisfactorily, using the original set of Mullard valves.

Notes and Jottings

WE learn that Pickett's, of Bexleyheath, are supplying the complete wooden framework for the Improved Linen Loud-speaker (described on page 520 of the December WIRELESS MAGAZINE) for 10s. (carriage by rail, 2s.) and as a set of pieces ready to assemble for 5s. (postage, 1s.).

◆ ◆ ◆

Constructors of the Concentrator and the Brookman's Push-pull Three (both described that month) should note that the change-over switch required for each is a Lotus No. 9 jack switch at 4s.

◆ ◆ ◆

On October 1, 1929, the number of licensed radio sets in Sweden was 416,865, or in the proportion of 68.3 per every 1,000 inhabitants. This brings Sweden to the second place amongst the nations in the world, the first place being held by Denmark.

◆ ◆ ◆

In our test of the Wates loud-speaker on page 473 of the December issue we gave the price as £4 10s. It should be £4 6s.

RADIO WEEK!

A Great Chance for All "Wireless Magazine" Readers to Show Their Friends How Good Wireless Really Is with Modern Apparatus!

An event of outstanding importance in the radio world is Radio Week, which takes place from Sunday, January 12, to Saturday, January 18.

All the manufacturers, wholesalers, retailers, wireless societies and associations, the whole of the wireless Press and the B.B.C. have combined to make known to everybody the advantages that modern radio offers.

Preliminary discussions have been taking place during the past few months and every effort has been made to make Radio Week popular and attractive to old hands and prospective listeners alike.

YOU can co-operate in this great "radio drive" by letting your friends listen—especially those who do not yet realise how good radio can be with modern apparatus.

It is too early yet for us to be able to give details of the special programmes that will be broadcast, but there will be great things "in the air."

Listeners will be glad to know, for instance, that the B.B.C. has agreed provisionally that during Radio Week 2LO will severely cut down the number of "talks."

Amongst the items that listeners can expect to hear are a special "request" programme, a 'cello recital by Suggia, vaudeville, an after-dinner speech by Mr. Stanley Baldwin, a running commentary on the England v. Wales Rugger match at Cardiff, and a pantomime.

In short, there will be special features to appeal to all tastes.

Look out for full details in the issue of "Amateur Wireless" published on January 9.

JANUARY 12 to JANUARY 18

Wireless Magazine, January, 1930

The Stenode Radiostat

ARE WE ON THE EVE OF A REVOLUTION IN RADIO RECEPTION?

CONGESTION of the ether is probably the most pressing problem at present confronting all the broadcasting organisations of the world.

It is fairly common knowledge that, with existing apparatus, broadcasting transmitters must be separated by a frequency of not less than 9 kilocycles. In the frequency band allotted to European broadcasters there is, therefore, only room for a hundred or so separate transmissions.

Chaotic Conditions

Every listener with a moderately powerful set knows how chaotic is the present condition of the European ether. Many of the stations interfere with each other, producting a series of heterodyne whistles that no amount of international supervision seems capable of avoiding.

When a much-desired foreign station is accompanied by a heterodyne whistle, produced by the proximity of another station, it is impossible to free the required station from the interference, because the selective properties of the normal set are not fine enough. If the selectivity of a set is increased by normal means beyond a certain well-defined limit, the quality of reproduction suffers.

It is generally understood that although we speak of a station transmitting at a given frequency, we actually imply that the speech and musical frequencies accompanying the pure carrier frequency occupy a complete band of frequencies extending to as much as four or five thousand cycles on either side of the carrier. That is why stations have to be separated by not less than 9 kilocycles.

From the foregoing, it seems that the only way to provide more space in the ether for additional broadcasting stations is to restrict the frequency band required for each individual transmission.

But according to Dr. James Robinson, who, as recently announced in the press, has just perfected a new piece of apparatus called the Stenode Radiostat, the problem can be tackled at the receiving end. He claims that, with his invention, it is quite easy to separate two transmissions whose difference in frequency is only 100 *cycles*.

This is a very remarkable claim.

With the Stenode Radiostat it is claimed that a station subject to the all-too-common heterodyne whistle can be entirely separated from it. There is no need to worry about the transmitters being too close together, because whatever chaos is so produced can be cleared up at the receiving end.

The scheme could, it is claimed, be put into practice by allocating one single station's frequency channel —namely, 9 kilocycles—to a large number of stations crowded within this channel; although the result to a listener with a normal set would be one heterodyne whistle, the listener with a Stenode Radiostat attachment would be able to separate the many stations forming an integral part of the whistle.

Representatives of WIRELESS MAGAZINE were present at a recent demonstration given by Dr. James Robinson and his associates at the Hyde Park Hotel, London. A normal portable receiver was tuned to the Brookman's Park transmission and a powerful local oscillator was tuned to a frequency very close to that of Brookman's Park. As a result, the reception of this broadcasting station was accompanied by a terrific whistle.

Leaving the oscillator switched on, the portable was switched off and a super-heterodyne connected to a Stenode Radiostat instrument was tuned to Brookman's Park. *Not the slightest trace of the heterodyne whistle could be detected.* Most of those present were entirely convinced.

Preserving An Open Mind

At present we intend to preserve an open mind, with, if anything, a bias in favour of the invention. We think the people responsible for the demonstration could quite easily have arranged things in a more convincing way. For example, it was emphasised that the super-heterodyne was only used because of the difficulty of receiving Brookman's Park in the hotel. It was made clear that the well-known selective properties of the super-heterodyne circuit were not necessary and that it was the abnormal selectivity of the Stenode Radiostat instrument that was responsible for the amazing results obtained.

If this is so, we cannot understand why the demonstrators did not use a portable set similar to the one used to demonstrate the interference of the local oscillator with Brookman's Park.

Since the first thing one would suspect in such a finely tuned arrangement would be impaired quality, we think it would have been more convincing if the demonstrators had arranged a really good quality amplifying equipment. As it was, the normal quality was so indifferent that the effect on it of the Stenode Radiostat instrument could hardly be gauged.

We do not wish WIRELESS MAGAZINE readers to infer from what we have said that we do not believe in Dr. Robinson's claims. But since they have such a world-wide importance we permit ourselves to reserve judgment until a more conclusive demonstration has been arranged.

In the African Bush!

MAJOR C. COURT-TREATT, who motored from the Cape to Cairo two years ago, has just returned to this country after a second visit to the Sudan.

He has many interesting stories to tell of his experience amongst the natives. Perhaps the most interesting story of all is the effect created on the natives by the broadcast programmes picked up on the Kolster-Brandes wireless sets which formed part of the equipment of the expedition.

This, of course, was the natives' first experience of wireless, and, having got over their obvious and natural fear of this "devil machine," they became intensely interested, especially in the dance music which was broadcast, and the wireless sets never ceased to be anything but a source of complete wonderment and amusement to them.

The Regional Crystal Set

EXCELLENT RESULTS : : SIMPLE TO BUILD

The Completed Set

GREAT interest has again been revived in crystal receivers since the advent of the new regional high-power station at Brookman's Park, which is expected by B.B.C. engineers to have a crystal range of at least seventy miles.

Alternative Programmes

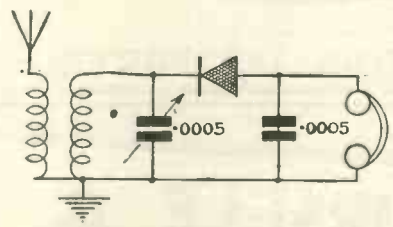
The opening of the second transmitter at Brookman's Park within the next few weeks means that listeners with crystal sets will, at last, have a proper alternative programme.

It is in the realisation that a receiver more selective than the average will be required to pick up these alternative transmissions without interference, that the WIRELESS MAGAZINE Technical Staff have produced the Regional Crystal Set, illustrated in these pages.

Normally, crystal sets employ only a plain tuned aerial circuit. When only one station can be received, as has normally been the case up to the present, selectivity is not a feature of great importance, but it will undoubtedly be the chief requirement under the new conditions.

In this set extra selectivity is obtained by the use of a semi-aperiodic coil in the aerial circuit, coupled to the usual tuned coil. This arrangement gives considerably increased selectivity without in any way complicating the operation of the set.

Moreover, such coils are used that three will cover both upper and medium broadcast wavebands. Thus for the reception of Daventry 5XX the semi-aperiodic coil is a No. 60 of the standard two-contact plug-in type, while the tuned coil is a No. 250.

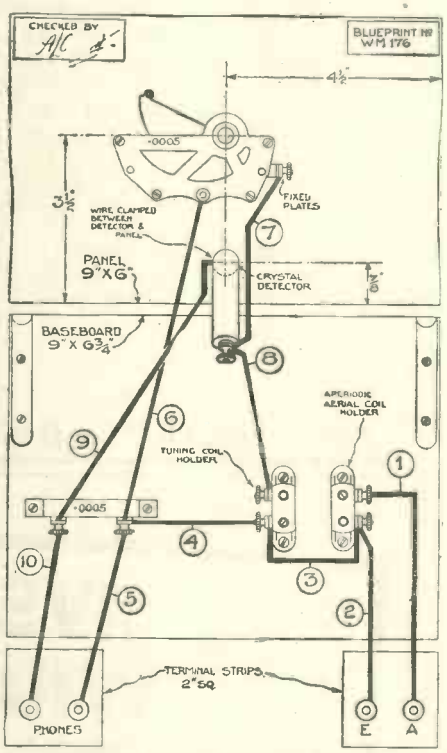


Circuit of the Regional Crystal Set

For reception of the medium waves, that is, of both the Brookman's Park transmitters, the coils required are a No. 25 and No. 60 respectively.

The arrangement of these coils will be quite clear from the photographs and diagrams reproduced in these pages. On the baseboard of the set are two single-coil mounts, that nearest the left-hand side (looking from the front) being for the aperiodic coil, and the other for the tuned coil.

On the panel is mounted a .0005-microfarad variable condenser, with a semi-permanent enclosed type of crystal detector immediately below it.



This layout and wiring diagram can be obtained as a full-size blueprint for half-price (that is, 3d., post free) if the coupon on page iii of the cover is used by January 31. Ask for No. WM176

To operate the set, it is only

(*Continued on page 678*)

COMPONENTS REQUIRED FOR THE REGIONAL CRYSTAL SET

COILS
3—Igranic two-contact plug-in coils; Nos. 25, 60, and 250, 10/3 (or Atlas, Edison Bell).

CONDENSER, FIXED
1—Lissen .0005-microfarad, 1/- (or Trix, T.C.C.).

CONDENSER, VARIABLE
1—Lotus .0005-microfarad, 5/9 (or Jackson, Burton).

CRYSTAL DETECTOR
1—Jewel Pen detector, 2/-.

DIAL
1—Raymond 4-in. dial for ¼ in. spindle, 1/6.

EBONITE
1—Raymond 9 in. by 6 in. panel, 2/6 (or Becol, Lissen).
2—Terminal strips, 2 in. square.

HOLDERS, COIL
2—Lissen single holders, 2/- (or Bulgin, Magnum).

SUNDRIES
Length of Glazite insulated wire for connecting.
1—Pair Bulgin panel brackets, 1/3 (or Camco, Keystone).

TERMINALS
4—Eelex (marked : Aerial, Earth, Phones (2), 1/6) (or Clix, Belling-Lee).

ACCESSORIES

CABINET
1—Camco, upright type, with 7 in. baseboard (or Caxton, Ready Radio).

HEADPHONES
1—Pair Lissen, type LN173, 8/6 (or Brown Featherweight, Ericsson).

The Regional Crystal Set (*Continued from page* 676)

necessary to pull out the plunger of the crystal detector and then let it lightly spring back into position again; then turn the knob of the variable condenser until signals are heard.

Once a sensitive spot has been found on the detector, it should not be touched again until reception becomes bad, when it should be readjusted as previously explained.

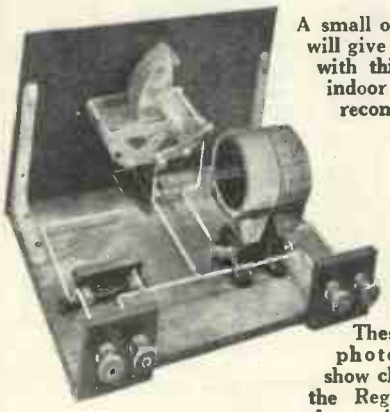
This set has given excellent results on test in the WIRELESS MAGAZINE laboratory in Fetter Lane, which is not placed in at all a good position for reception of any kind.

Not only was Brookman's Park received at good strength, but Daventry 5GB was also audible. This is conclusive proof that the performance of the Regional Crystal Set is well above the average.

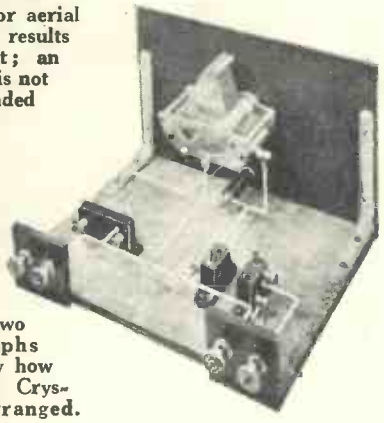
Full-size Blueprint for 3d.

All the details for construction are reproduced in these pages, but for those who desire one, a full-size blueprint has been prepared. This is available for half-price (that is, 3d., post free), if the coupon on the inside back cover is used by January 31.

The numbers on the blueprint (and the reduced reproduction of it on page 676), indicate the sequence of wiring up the components.



A small outdoor aerial will give good results with this set; an indoor one is not recommended



These two photographs show clearly how the Regicnal Crystal set is arranged.

Do Your Own Broadcasting!

THE poor old B.B.C. does its best at Christmas time, but Christmas parties often start early, wax furious and finish late! Therefore it is *just* possible that at some time during the festivities there may be something on which you don't want, or nothing on when you want it. And on these occasions—be your own broadcaster!

Really Quite Easy

It's really quite easy. If your set has provision for adding a gramophone pick-up, then no alteration to the set will be needed; and if there is no provision for a pick-up, then only a few temporary additional wires will be needed.

The idea is to connect an improvised "microphone" to the set so that the speech is amplified and comes out through the speaker just as does an ordinary broadcast. There are almost endless possibilities for fun to be had from such an arrangement; just the thing to link up Christmas and radio.

You've all "groused" at the programmes. Well, with this home-broadcaster try your own programme competitions. Split the party into sections, and arrange for a simple programme competition between each section. Of course, with amateur microphones it won't be possible to give musical items, but only jokes and snatches of speech; but you can use the gramophone and a pick-up for musical "fill-ins."

Or a good idea is to have a guessing competition. Place a screen around the receiver and microphone and get listeners to guess who are the speakers.

Then, again, why not have the receiver and microphone in a separate room, and get members of the party

(*Continued on page* 680)

Do Your Own Broadcasting!

(*Continued from page 678*)

to give "mystery" programmes—to recite a poem or spin a "yarn." Then guess the "mystery" men, and put their programmes in order of merit.

On the technical side there is no need to rig up anything very elaborate. If you can get a proper carbon-type microphone as used for Post Office telephone work, so much the better. Microphones of this kind for amateur work are, I notice, advertised in this journal. A telephone earpiece or even a loud-speaker can, however, be pressed into service.

If you use a carbon "mike" then it may be necessary to connect it across the primary of a microphone transformer, with a 1½- or even a 4½-volt dry battery in series. The secondary of the transformer should then be connected to the set. If a telephone ear-piece or loud-speaker is used, then it can be connected direct to the set, no transformer being needed.

The point of connection to the receiver should be the same as that used when a pick-up is employed, namely, between grid and filament of the detector valve or the first low-frequency stage.

Perhaps not many people are aware of the fact that a loud-speaker makes a tolerably efficient "mike," and that if one speaks close to the horn or cone the output is usually sufficient to operate an amplifier, in just the same way that the vibration of a gramophone pick-up produces voltage changes.

K. U.

Loewe Loud-speaker

In response to a number of enquiries we are reproducing above another photograph of the Loewe loud-speaker which was reviewed on page 476 of the December WIRELESS MAGAZINE.

◆ ◆ ◆

The caption under the photograph of the Amplion Standard mains-operated model on page 554 of the December WIRELESS MAGAZINE described the set as a three-valver priced at £50. This model has five valves.

◆ ◆ ◆

The following items should be added to the list of components for the Brookman's Four, described in this issue:—1—Ediswan 1-megohm grid leak, 1/6 (or Lissen, Dubilier) 12—Belling terminals, 6/- (or Burton, Eelex.)

The Celerity Three

(*Continued from page 614*)

care must be taken to see that it does not come into contact with any metal part, or a short-circuit may occur and serious damage be done.

Now for tuning-in some stations. Set the drum dial at zero and then pull out the knob of the on-off switch. Turn the knob of the reaction condenser (on the left of the panel) until a slight rustling or hissing sound is heard from the loud-speaker; this indicates that the set is on the verge of oscillation and in its most sensitive state for reception.

Carefully turn the knob of the drum dial until a station is tuned in. If nothing is heard, advance the reaction control slightly and try again. As the reading of the drum dial increases, so will the reaction condenser have to be turned in a clockwise direction to keep the set on the verge of oscillation.

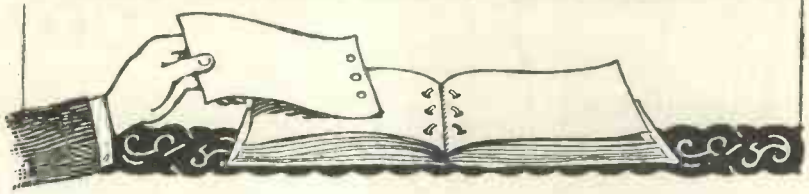
As soon as a station is tuned in at reasonably good strength readjust the reaction condenser, which acts as a volume and range control, for the best results.

During the preliminary stages it is also advisable to try slight variations in the voltage applied to H.T.+1 and also the grid bias. Alter the tapping on the aerial coil and the setting of the semi-fixed condenser in the aerial lead until the best all-round results are obtained for the particular conditions.

It may be repeated that the WIRELESS MAGAZINE Technical Staff are particularly pleased with the results the Celerity Three put up on test and are convinced that all who build it will have the simplest, cheapest, and most satisfactory one-control "three" yet produced.

When you have built it send us your opinion, so that we can pass it on for the benefit of other readers.

"Wireless Magazine" REFERENCE SHEETS



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 amateur will be able to compile for himself a valuable reference book.

WIRELESS MAGAZINE Reference Sheet — *No. 161*

Detector Input

IT is well-known that a grid detector will not handle an unlimited input without overloading. It is essentially a detector suitable for weak signals and where a powerful signal is available an anode-bend detector is preferable from the point of view of overloading.

Unless this latter class of detector, however, is used as a power detector so that the modulation takes place over a straight portion of the characteristic, as described in Reference Sheet No. 126, the rectification is by no means distortionless and in actual practice a grid rectifier gives better approach to linear rectification.

In these circumstances, it is of interest to see what input can safely be handled by various types of valve operating as grid rectifiers. If a large input has to be handled it may be desirable to use a valve having a lower A.C. resistance for, although the sensitivity will be reduced by such a procedure, it may still be comparable with that obtained from anode-bend.

If, therefore, the grid swing which can be applied to the valve is of a satisfactory order, such an arrangement may be a better proposition from an all-round point of view than an anode-bend rectifier.

In order to verify whether this was the case or not, a series of tests was made at the Furzehill Laboratories on three valves, an H.F., L.F., and power valve respectively. A resistance was included in the anode circuit of these valves and the L.F. voltage developed across this resistance per volt of H.F. input, modulated to an extent of 20 per cent., was measured. The results are shown in Reference Sheet No. 162, two sets of curves being presented.

The first of these was taken with 100 volts H.T., which corresponds to about 25 volts actually on the anode of the valve, while the second curve was taken with 200 volts H.T., giving about 50 volts actually applied to the anode. These values correspond, more or less, with ordinary practice and it will be seen that an H.F. valve can only handle a limited input.

Better results are obtained if an L.F. valve is used, although the sensitivity, that is to say, the L.F. output for a given input, is less. Similarly a power valve again will handle a larger input without distortion although the sensitivity is again distinctly less.

The important points however, are:

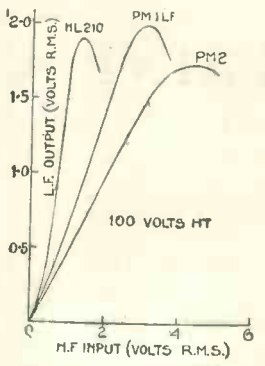
1. The rectification is approximately linear, the output being almost directly proportional to the input up to the overloading point.

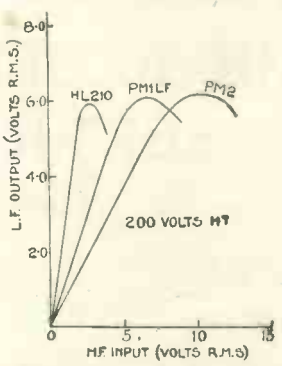
2. The maximum output is the same in each case. Therefore, the use of a lower impedance valve does *not* increase the maximum power output obtainable.

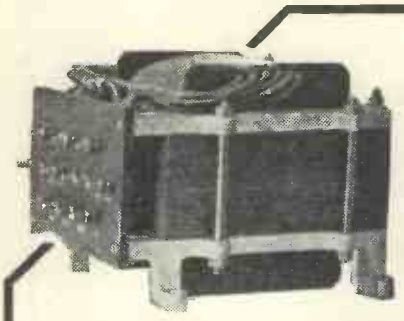
WIRELESS MAGAZINE Reference Sheet — *No. 162*

Detector Input

THE following curves were taken by the method explained in Sheet No. 161, and indicate the low-frequency voltage developed across a resistance in the anode circuit of a valve in terms of the H.F. input. A modulation of 20 per cent. is assumed. The curves are commented upon in Sheet No. 161.







"PARMEKO" manufacture a Mains Transformer and Choke for every Eliminator or Mains operated Transformer published in the Technical press.

If you have special requirements PARMEKO will build to your own specification. Let us quote you by return of post.

Write for full particulars and Illustrated Catalogue

26, DOVER STREET, LEICESTER.

PARTRIDGE & MEE, LTD.

74 NEW OXFORD ST. LONDON, W.C.1 Museum 5070

SWITCH OFF!

AND SO TO BED

With the restful knowledge that all is well with your set. Happy satisfaction when using a **LYONS' B.A.T 750 WATT SWITCH**

"Best after Test"

for all purposes.

Send for FREE 4-pp. circular; request at the same time our famous 36-pp. "CLAROSTAT" Book (all about D.C. and A.C. Mains Units, with scale drawings).

PRICE 2/6

CLAUDE LYONS LTD.
76 OLDHALL STREET, LIVERPOOL

"RADIO-LEGS"

REG° TRADE MARK

AN IDEAL XMAS PRESENT

"Radio-Legs" is adjustable in width and depth, and so converts any set or table gramophone—no matter what size—to a pedestal model. Clips on in a minute. Firm as a rock. Beautiful finish—oak or mahogany.

Your dealer can supply you immediately.

FOLDS UP LIKE THIS

P. PAT.

15/6

BELLING-LEE

Advertisement of Belling & Lee, Ltd., Queensway Works, Ponders End, Middlesex.

Gripso PATENT **"Standard" Single** PUSH-PULL **Indicating Switch**

1/6 EACH
Black Finish

Two adaptable dial readings with each switch: ON-OFF and LONG-SHORT WAVE: Readings: GRAMO-RADIO also obtainable: Well Finished and Soundly Constructed.

"Super" Single Switch

As used in the "W.M." CELERITY THREE

1/9 EACH

FLUSH FITTING TYPE Body as above NICKEL PLATED or BRONZE FINISH

OBTAINABLE FROM ALL DEALERS

THE GRIPSO COY. 32 Victoria St., LONDON, S.W.1.

Make your Radio an **ASSET!**

in the Home this Xmas

See **PICKETTS RADIO FURNITURE** Page 677

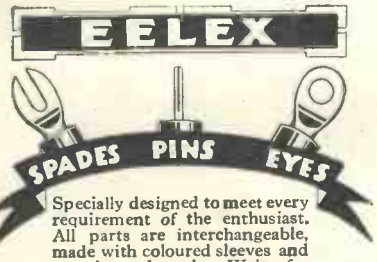
MICROFUSES

Microfuses operate at from 20 to several hundred milliamps. *Gold fuses—not wire.* Type **CDB** carries 50 m/a indefinitely and blows at 100 m/a. 100 m/a type is used in the "W.M." 1930 *FIVE.*

2/- complete
1/6 Refills

MICROFUSES, Ltd., 3 Finsbury Square, E.C.2

EELEX



Specially designed to meet every requirement of the enthusiast. All parts are interchangeable, made with coloured sleeves and cost but 2d. each. Write for list P.71.

J. J. EASTICK & SONS
"EELEX HOUSE," 118 Bunhill Row, E.C.1
Telephone: Clerkenwell 9282/3/4

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

INDEX TO ADVERTISERS

WIRELESS MAGAZINE Reference Sheet — *No. 163*

High-frequency Conductors

FOR the construction of coils at ordinary broadcast frequencies, copper is universally employed. In the region of the ultra high frequencies, however, corresponding to wavelengths of 20 and 30 metres, special arrangements are often utilised with the object of reducing the high-frequency loss for, at these higher frequencies, conductor loss is of preponderating importance. A recent article by W. H. F. Griffiths (*Wireless World*, Vol. 25, No. 19) exposes a number of fallacies in this connection.

In the first place, silver is known to be a better conductor than copper and, therefore, in certain cases, silver-plated wire is used for short-wave coils. Actually the conductivity of silver is only 6 per cent. better than that of copper and at high radio frequencies, on all wires of average size, the gain is of the order of 3 per cent. only, so that the use of silver is not of any moment.

Wires are sometimes nickel-plated but this is a great mistake for, at wavelengths of about 30 metres, the resistance of a copper wire may be increased to six or eight times its original value by nickel-plating it.

Tinning, on the other hand, is not so pernicious although it causes an increase in resistance, but with a fairly heavy deposit this is only of the order of 30 per cent. As a matter of fact, the resistance of tinned-copper wire at high radio frequencies, with the thickness of skin usually deposited in commercial processes, is very little above that of bare copper.

A point which may have troubled some readers is the use of phosphor-bronze for aerial wire. The specific resistance of phosphor-bronze is five times that of copper, but this discrepancy is considerably reduced at radio frequencies and lies between two and three to one only, depending upon the frequency under consideration.

This is a loss which many are prepared to put up with owing to the much greater strength of phosphor-bronze and also bearing in mind the fact that the conductor loss is one of the smallest portions of the total aerial resistance.

At radio frequencies, even for ordinary broadcast use and particularly at high frequencies, the use of iron or steel wire is coming to the fore. The resistance of these wires by themselves is much too high for their satisfactory use, but if the wire is copper-plated even to such a small thickness as 1/1,000th inch the resulting conductor is of a very satisfactory character.

At high frequencies, the current flows almost entirely in the skin of the wire.

WIRELESS MAGAZINE Reference Sheet — *No. 164*

H.F. Transformers, Design of

THE desirability of matching the anode circuit of an H.F. valve to the valve itself has already been referred to in Sheets No. 91 and 92. This necessity for matching applies whether the valve in use is of the neutralised or the screened variety. In the former instance, due to the low resistance of the valve, it is essential to use a transformer in order to obtain any reasonable selectivity.

In the case of screened valves, it is possible to obtain quite good results with a tuned-anode system because the resistance of the valve is distinctly higher.

It is becoming appreciated, however, that this is not the most satisfactory method of procedure and the use of tapped tuned-anodes or transformers is coming into vogue. Of the two, the latter method is preferable because it isolates the H.T. from the grid circuit of the following valve.

The maximum amplification when the circuit is tuned is obtained with a perfectly definite ratio of transformation. With a triode valve this is always a step-up ratio whereas with a screened valve the ratio may be a step-down. In any case, the ratio depends upon the constants of the secondary circuit and if this is of a high-resistance, the ratio is less than if it is of low resistance.

The actual transformation ratio is given by the expression:

$$n = \sqrt{\frac{L}{CRr}}$$

where L = inductance of secondary in micro-henries
C = capacity across secondary in micro-farads
R = H.F. resistance of secondary (ohms).
r = valve resistance (ohms).

By substituting requisite values in this expression, the correct ratio can be found for any given condition. In the case of a broadcast circuit, of course, it is necessary to assume a value of capacity approximately in the middle of the scale for the amplification is actually changing the whole time as we vary the value of the tuning capacity C.

It is customary, therefore, to adjust the transformation ratio to a value suitable for the middle of the scale and to leave the two ends of the scale to look after themselves.

For the modern screened-grid valve, a transformation ratio of the order of 1:1 is customary for the maximum amplification. It is often desirable, however, to sacrifice a certain amount of amplification in order to obtain increased selectivity.

WIRELESS MAGAZINE Reference Sheet — *No. 165*

Power Output, Meaning of

THE exact meaning of the power output obtained from the last stage of an amplifier or wireless set is not always clearly understood. If, for example, the last stage is replaced by two similar valves working in parallel, one can often not detect anything like twice the power output from the loud-speaker.

Nevertheless, power output has a definite physical meaning and it is well to have this clearly defined in one's mind.

In order to produce sound vibration from a loud-speaker, it is necessary to move a diaphragm backwards and forwards. The diaphragm may be small, the sound being suitably magnified and concentrated by means of a horn, or the diaphragm may be large, as with cone and moving-coil loud-speakers. In either case, in order to produce a certain volume of sound, a definite power input is required according to the make of loud-speaker.

Now the loud-speaker has a certain impedance and if we apply a certain voltage across it, we shall get a definite current flowing through the winding. The product of the voltage and the proportion of current in phase with the voltage gives the power taken by the particular speaker.

Let us assume that we have a loud-speaker suitably matched to the valve so that we obtain the maximum undistorted power output as explained in Reference Sheet No. 156. We shall obtain a certain definite power output from the circuit, the actual energy being drawn from the high-tension supply, the valves serving merely to convert this into a suitable form for operating a loud-speaker and producing sound energy.

The grid circuit of the valve is taking no power if the valve is working correctly. We are simply applying voltage variations to the grid to control the power supply in the anode circuit.

Therefore, we can connect a second valve in parallel with the first without affecting the grid or input circuit in any way. If we keep the anode circuit of this second valve entirely separate and place in this circuit a similar loud-speaker, we shall obtain an equal power output from the second valve and the total power output will therefore be doubled. This method of working is sometimes used where it is desired to supply more than one speaker.

In many cases, however, it is not desired to employ two speakers, but if we parallel the anode circuits and still leave the one speaker in circuit, the impedances will no longer be correctly matched. We can overcome this defect, however, by the use of a transformer of a suitable ratio, so that the effective anode impedance is reduced by one-half.

FULL-SIZE BLUEPRINTS FOR EVERY REQUIREMENT

Each blueprint shows the position of each component and every wire and makes construction a simple matter. Copies of "Wireless Magazine" and of "Amateur Wireless" containing descriptions of all these sets can be obtained at 1s. 3d. and 4d. respectively, post free. Index letters "A.W." refer to "Amateur Wireless" sets and "W.M." to "Wireless Magazine" sets.

CRYSTAL SETS

All these 6d. each, post free.

★Regional Crystal Set	WM176
B.B.C. Brookman's Park Set	AW206

ONE-VALVE SETS

All these 1s each. post free.

Reflexed One for the Loud-speaker	WM66
Special One	WM116
Reinartz One	WM127
The A.1	WM153
Fan's Short-wave One	AW119
Super Reinartz One	AW127
B.B.C. Official One	AW208

TWO-VALVE SETS

All these 1s. each. post free.

Two-programme 2 (D, Trans)	WM56
Q-coil 2 (D, Trans)	WM62
Crusader (D, Trans)	WM69
Flat-dweller's 2 (HF, D)	WM76
Tetrode Short-wave Two (SG, D)	WM99
Key-to-the-Ether Two (D, Pentode)	WM107
Clipper Two (D, Trans)	WM135
Twinflex (Reflex)	WM138
Continental Two (D, Trans)	WM143
Stay-put Two (D, Trans-all A.C.)	WM155
Ether Ranger (D, Trans)	WM156
A.B.C. Two (D, Trans), 1s. 3d., with copy "W.M."	WM160
Brookman's Two (D, Trans)	WM168
★A.C. Two (D. Trans)	**WM175**
Economical 2 (D, RC)	AW66
Two-wave (D, Trans)	AW83
Trapped Reinartz (D, Trans)	AW92
Long Distance Two (HF, D)	AW110
Three-waveband Two (D, Trans)	AW112
DX Headphone Two (HF, D)	AW134
Ace of Twos (D, Pentode)	AW143
Home Two (D, Trans)	AW146
Globe DX Two (SG, D)	AW157
East to West Short-wave Two (D, Trans)	AW159
Auto Two (D, Trans)	AW174
All-Main Two (D, Trans)	AW180
Loud-speaker America 2 (D, Pentode)	AW190
Talisman Two (D, Trans)	AW194
Hyper-Selective Two (D, Pentode)	AW198

THREE-VALVE SETS

All these 1s. each. post free.

Five-guinea 3 (HF, D, Trans)	WM29
Britannia (D, RC, Trans)	WM67
Aladdin Three (HF, D, LF)	WM95
All-wave Screened-grid Three (HF, D, Pentode)	WM110
Gramophone Three (D, 2RC)	WM115
Standard Coil Three (HF, D, Trans)	WM117
Festival Three (D, 2LF-Dual Imp)	WM118
Wide-world Short-waver (SG, D, Trans)	WM120
New Year Three (SG, D, Pentode)	WM123
The Q3 (D, RC, Trans)	WM124
Lodestone Three (HF, D, Trans)	WM129
Simple Screen Three (HF, D, Trans)	WM131
Dynamic Three (SG, D, Trans)	WM130
At Home Three (D, 2RC)	WM141
Short Wave Link (D, RC, Trans)	WM142
Binowave S.G. Three (SG, D, Trans)	WM152
Fanfare (D, 2Trans)	WM157
Brookman's Three (SG, D, Trans)	WM161
Community Three (D, RC, Trans)	WM164
New Q3 (SG, D, Pentode)	WM167
Brookman's Push-pull Three (HF, D, Trans), 1s. 6d.	WM170
★Celerity Three (SG, D, Trans)	**WM173**
Economy 3 (D, 2RC)	AW48
Short-wave (D, RC, Trans)	AW50
Standard (D, 2 Trans)	AW56
Hartley DX (D, RC, Trans)	AW63
Q-coil 3 (D, RC, Trans)	AW84
British Station Three (HF, D, Trans)	AW122
Simplicity Screen-grid Three (HF, D, Trans)	AW132
"Proms" Three (D, 2RC)	AW137
Adaptable Three (D, 2Trans)	AW139
All-purpose Short-wave Three (D, RC, Trans)	AW147
Screen-grid Q-Coil Three (HF, D, Trans)	AW150
All Round Three (D, RC, Trans)	AW155
All Britain Three (HF, D, Trans)	AW158
Bantam Three (D, RC, Trans)	AW160
Listener's Three (HF, D, Trans), price 4d. free with copy of "A.W."	AW169
Binowave Three (D, RC, Trans)	AW172
Clarion Three (SG, D, Trans)	AW175
Local and Continental Three (HF, D, Trans and D, RC, Trans)	AW189
Broadcast Three (SG, D, Trans)	AW192
James Dual-range Three (HF, D, Trans)	AW196
All-wave High-mag Three (D, 2 Trans)	AW199
Knife-edge Three (D, RC, Trans)	AW201
Talisman Two-Three (D, RC, Trans)	AW203A
World-Wide Short-wave Three (HF, D, Trans)	AW207
Everybody's Three (SG, D, Trans)	AW209
1930 Ether Searcher (SG, D, Trans)	AW211

FOUR-VALVE SETS

All these 1s. 6d. each. post free.

Frame-aerial Four (HF, D, 2RC)	WM85
Touchstone (HF, D, RC, Trans)	WM109
Binowave Four (SG, D, RC, Trans)	WM119
Standard-coil Four (HF, D, 2RC)	WM122
Dominions Four (2SG, D, Trans)	WM134
The Drum Major (HF, D, RC, Trans)	WM137
Music Player (HF, D, RC, Trans)	WM144
Arrow Four (SG, HF, D, Trans)	WM154
1930 Monodial (2SG, D, Trans)	WM158
All-electric Four (SG, D, RC, Trans)	WM162
Outpost Four (SG, D, 2 Trans)	WM165
★Brookman's Four (2SG, D, Trans)	**WM174**
All-purpose 4 (HF, D, RC, Trans)	AW43
Explorer Four (HF, D, RC, Trans)	AW120
Summertime Searcher (2HF, D, Trans)	AW128
Overseas Shortwaver (HF, D, 2 Trans)	AW133
Facility Four (HF, D, 2RC—Q-coil)	AW154
Broadcast Picture Four (HF, D, 2RC)	AW163
The Orchestra Four (D, RC, Push-pull)	AW167
All Europe Four (2HF, D, Trans)	AW173
Stability Four (HF, D, RC, Trans)	AW182
Clarion All-electric Three (SG, D, Trans,—A.C. Rectifier)	AW200
*Music-lover's Gramo-radio (SG, D, RC, Trans), 1s. 6d.	AW202A
*Music-lover's Gramo-radio (Loud-speaker), 1s.	AW202B
*Music-lover's Gramo-radio (Motor-board), 9d.	AW202C

FIVE-VALVE SETS

All these 1s. 6d. each. post free.

1928 Five (2HF, D, 2 Trans)	WM46
Fidelity Five (HF, D, 2RC-parallel)	WM130
All-wave Lodestone Five (HF, D, Push-Pull)	WM146
1930 Five (2HF, D, RC, Trans)	WM171

PORTABLE SETS

	Price Post Free
Chummy 4 (with modification for LS and HT)	WM80a 1/6
Wayfarer Portable (Super-het)	WM139 1/6
1929 Chummy (SG, D, Trans, RC)	WM145 1/6
Picnic Portable (D, RC, Trans)	WM148 1/-
Enchanter Portable (2HF, D, RC, Trans)	WM150 1/6
Daventry Loud-speaker Portable (2HF, D, RC, Trans)	AW107 1/6
Town and Country (HF, D, RC, Trans)	AW111 1/6
House Portable (SG, D, RC, Trans)	AW168 1/6
Arcadian Portable (SG, D, 2Trans), with Linen-diaphragm Loud-speaker (half-scale)	AW177 1/6
£5 5s. Portable (D, Trans)	AW181 1/-
Holiday Portable Three (D, RC, Trans)	AW188 1/-
Music Leader (SG, D, RC, Trans), with copy "A.W."	AW203 -/4

AMPLIFIERS

All these 1s. each, post free

Super-power Unit (2 v.)	WM103
Signal Booster (HF Unit)	WM128
Auditrol Amplifier	WM132
Concentrator (HF Unit)	WM169
Screened-grid HF Unit	AW75
One-valve L.F. Unit	AW79
Hook-on Short-waver	AW104
Purity Amplifier	AW108
Add-on Distance-getter	AW117
Screened-grid H.F. Amplifier	AW138
"A.W." Gramophone Amplifier (3RC)	AW162
Searcher Unit (HF)	AW176
"A.W." Gramophone Amplifier	AW205
Beginner's Amplifier (9d.)	AW210

MISCELLANEOUS

	Price Post Free
A.C. Mains Eliminator	WM41 1/-
Portable Cone Loud-speaker	WM73 1/-
Linen-diaphragm Loud-speaker	WM90 1/-
Simple Cone	WM111 1/-
Buzzer Wavemeter	WM121 -/6
James H.T. Unit for A.C. Mains	WM125 1/-
Lodestone Loud-speaker	WM126 1/-
James H.T. Unit for D.C. Mains	WM133 1/-
Short-Wave Adaptor for Dominions Five	WM140 1/-
Two-ampere Low-tension Unit	WM147 1/-
A.C. Mains Amplifier	WM149 1/-
A.C. Mains Unit for All-wave Lodestone Five	WM151 1/-
H.T. Unit for A.C. Mains	WM159 1/-
"W.M." Linen-diaphragm	WM172 1/-
H.T. from A.C. Mains	AW76 1/-
H.T. Eliminator for A.C. (200v. output)	AW102 1/-
Knife-edge Wavetrap	AW131 -/6
All-metal Eliminator for H.T.	AW135 1/-
Pedestal Cone Loud-speaker	AW164 1/-
Listener's Speaker, price 4d., with copy of "A.W."	AW170 -/4
Arcadian Linen-diaphragm Loud-speaker (full-size)	AW177a 1/-
D.C. Unit (HT)	AW178 1/-
Short-wave Adaptor (IV)	AW183 1/-
High-tension Battery Charger	AW191 1/-
Mains Unit for S.8 Valves	AW193 1/-
Scratch Filter	AW195 -/6
Simplest H.T. Unit (A.C.)	AW197 1/-
B.P. Wavetrap	AW204 -/6

**The three blueprints are obtainable for 2s. 6d.*

A blueprint of any one set described in the current issue of the "Wireless Magazine" can be obtained for half-price up to the date indicated on the coupon (which is always to be found on page iii of the cover) if this is sent when application is made. These blueprints are marked with an asterisk (★) in the above list and are printed in bold type. An extension of time will be made in the case of overseas readers.

Send, preferably, a postal order (stamps over sixpence in value unacceptable) to

Wireless Magazine

Blueprint Dept. 58/61
Fetter Lane - E.C.4

Half-price **BLUEPRINT** Coupon Valid until Jan. 31, 1930
FOR ANY ONE SET CONSTRUCTIONALLY DESCRIBED IN THIS ISSUE.

Send Fee of 1s. **INFORMATION** Coupon Valid until Jan. 31, 1930
NOT MORE THAN TWO QUESTIONS TO BE ASKED AT A TIME

Printed in England: Published by BERNARD JONES PUBLICATIONS, LTD., 58/61 Fetter Lane, London, E.C.4.
Sole Agents for Africa: CENTRAL NEWS AGENCY LIMITED Sole Agents for Australasia: GORDON & GOTCH, LIMITED. January, 1930