

BUYING A PORTABLE - 16 PAGE ILLUSTRATED SUPPLEMENT

Valve tester (Page 396)

Differential Reaction - (Page 398)

£1

Wireless Magazine

A Modern

5 Valve Superhet (Page 32)

VOL. 9. NO. 52

MAY 1929

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16

Extra
Pages

PORTABLES

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Radio—Screened Grid H.F. stage followed by steep slope detector and a powerful amplifier; all normal broadcasting wavelengths covered, change from medium to long waves being effected by switch; tuning by two slow motion dials.

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Moving Coil Loud Speaker incorporated.

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Housed in a pleasing cabinet of solid oak, polished a rich antique shade. Worthy of its surroundings in the most luxurious home (see illustrations on left).

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Beautifully constructed from selected mahogany and french polished by hand. Bronze furnishings (see top right-hand illustration).

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For those who have no electric supply, a special model is available; operated by batteries, with hand-wound gramophone motor, and with logarithmic air column speaker in place of moving coil unit. Price on application.

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Editor :
BERNARD E. JONES

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

Wireless Magazine

The Best Shillingsworth in Radio

Vol. IX :: MAY, 1929 :: No. 52

Research Consultant :
W. JAMES

Assistant Editor :
D. SISSON RELPH

All Your Portable Needs—

PORTABLES, Ladies and Gentlemen, portables! Would you choose and buy them? Would you wish—of course, you would—to get the very best from their operation? Would you like to design your own or go still further and build one?

Here in this issue, whatever your need is, I meet it. Our sixteen-page Portable Supplement, printed on special paper, contains particulars of more than a hundred sets, arranged on a progressive price basis, the illustrations numbering about sixty. Dimensions, weight, finish, price, and maker—all are given, the whole providing you with comparative data to enable you to select the portable to suit your pocket and other conditions.

PRACTICAL ADVICE Our Assistant Editor offers some practical advice on "Getting the Best from A Modern Portable"; our Research Editor contributes a special article on "Designing a Portable"; and our Technical Editor offers, in his Wayfarer, his idea of what a portable should be.

Mr. Reyner has been engaged on the experiments for this set for a long time, and, as I said last month, he was able to have the set built by two or three different amateurs who have individually reported on its design and performance.

Thus he was able to incorporate any practical suggestions in his final design, and we hope that the Wayfarer, although importantly described as a five-valve super-het, will prove in construction and operation, at the hands of our readers, just as simple and satisfactory as we know it to be.

There are three other interesting sets in this issue, all different. The Twinflex is a modern reflex two-valver without crystal detector, a set for the man who likes to work wonders with only two valves. The At-home Three is a set of the fire-side family broadcast type, which can be built all complete for £11 or so. Thirdly, the Dominions Four is, this month, converted to a short-wave super-het.

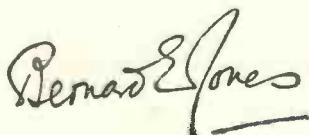
GENERAL ELECTION Soon after the publication of this issue, we shall be passing through the excitement of a general election. For the first time in our history the politicians will be using the public broadcast service, and from the article this month, contributed by a B.B.C. official, you will be able to gather fairly well the part which broadcasting is expected to play.

All sides of the triangle have been quick to see the advantage of reaching millions of listeners at a time, and never again will an election be fought without the aid of the microphone.

Our occasional friend "Devannion"—the radio detective—re-visits us this month, and our other mythical but more regular friends, "Professor Megohm" and "Young Amp," engage in an illuminating but onesided discussion on "What Are Alternating Currents?"

You will be glad to read, I think, the J. Godchaux Abrahams article on "Russia's Revolutionary Radio" which, I suppose, gives as true a picture as, in the nature of things, it is possible to give on the use which the Soviet is making of broadcasting.

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



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Look Out Next Month for the 1929 Chummy Four—Designed by W. James

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Lonesome?

Midst the glory of the silent hills—in the quiet of great open spaces—even the heart of a busy metropolis, loneliness will sometimes overtake you.

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You will get prompt replies by mentioning "Wireless Magazine"

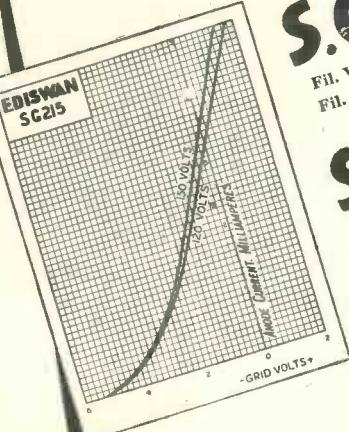
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Fil. Volts - 2.0 Amp. Factor 140
Fil. Current 0.15 amp. Impedance 140,000

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Fil. Current 0.1 amp. Impedance 100,000

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S.G.215

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specially designed for H.F. amplification.
Used in a suitable circuit, it will give
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22/6

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GRID
Amplification 140
Impedance 140,000

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VALVES

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Valves to Use in Your Set

TWO-VOLT VALVES: Three-electrode Types

Make.	Type.	Impedance.	Amp. Factor.	Fil. Volt.	Fil. Cur.
Ediswan	RC ₂	150,000	30	2	.1
Mazda	RC ₂₁₀	86,000	40	2	.1
Cosmos	SP16B	70,000	35	1.8	.09
Six-Sixty	210RC	68,000	35	2	.1
Ediswan	RC ₂₁₀	67,000	40	2	.1
Cossor	210RC	60,000	40	2	.1
Mullard	PM1A	51,000	36	2	.1
Marconi	DEH ₂₁₀	50,000	35	2	.1
Osram	DEH ₂₁₀	50,000	35	2	.1
Mazda	HF ₂₁₀	28,000	20	2	.1
Six-Sixty	210HF	27,000	13	2	.1
Ediswan	HF ₂₁₀	25,000	20	2	.1
Marconi	HL ₂₁₀	23,000	20	2	.1
Osram	HL ₂₁₀	23,000	20	2	.1
Mullard	PM1HF	22,500	18	2	.1
Cossor	210HF	20,000	15	2	.1
Six-Sixty	210L _f	18,000	8.5	2	.1
Cosmos	SP16G	17,000	16	1.8	.09
Mazda	GP ₂₁₀	14,000	13	2	.1
Ediswan	LF ₂₁₀	13,000	13	2	.1
Cossor	210LF	10	2	.1	
Marconi	DEL ₂₁₀	12,000	11	2	.1
Mullard	PM1L _f	12,000	11	2	.1
Osram	DEL ₂₁₀	11	2	.1	
Mullard	PM2DX	10,700	13.5	2	.25
Cosmos	SP16R	10,000	9	1.8	.09
Six-Sixty	215P	7,300	6.4	2	.15
Mazda	LF ₂₁₅	7,000	7	2	.15
Ediswan	PV ₂₁₅	6,600	8	2	.15
Cossor	220P	5	2	.2	
Marconi	DEP ₂₁₅	5,000	7	2	.15
Osram	DEP ₂₁₅	7	2	.15	
Cosmos	SP18RR	4,500	6.5	2	.2
Mullard	PM ₂	4,400	7.5	2	.2
Cossor	220P	8	2	.3	
Six-Sixty	230SP ₁	4,000	3.9	2	.3
Mazda	P ₂₂₇	2,900	4	2	.27
Ediswan	PV ₂₂₅	2,700	3	2	.25
Mullard	PM ₂₅₂	2,600	5.4	2	.3
Marconi	DEP ₂₄₀	2,500	4	2	.4
Osram	DEP ₂₄₀	2,000	1	2	.4
Cossor	230XP	2,000	1	2	.3

FOUR-VOLT VALVES: Three-electrode Types

Make.	Type.	Impedance.	Amp. Factor.	Fil. Volt.	Fil. Cur.
Mazda	RC ₄₀₇	100,000	40	4	.075
Six-Sixty	4075RC	64,000	34	4	.075
Ediswan	RC ₄₁₀	61,000	40	4	.1
Cossor	410RC	40	4	.1	
Marconi	DEH ₄₁₀	60,000	40	4	.1
Osram	DEH ₄₁₀	40	4	.1	
Mullard	PM _{3A}	55,000	38	4	.075
Ediswan	HF ₄₁₀	22,000	25	4	.1
Mazda	HF ₄₀₇	21,000	18	4	.075
Cossor	410HF	20,000	20	4	.1
Six-Sixty	4075HF	16,500	13	4	.075
Mazda	GP ₄₀₇	14,000	14	4	.075
Mullard	PM ₃	13,000	14	4	.075
Ediswan	LF ₄₁₀	10,500	13	4	.1
Cossor	410LF	15	4	.1	
Marconi	DEL ₄₁₀	8,500	15	4	.1
Osram	DEL ₄₁₀	15	4	.1	
Six-Sixty	410P	8,000	7.3	4	.1

FOUR-VOLT VALVES—Continued

Make.	Type.	Impedance.	Amp. Factor	Fil. Volt.	Fil. Cur.
Mullard	PM4DX	7,500	15	4	.1
Mazda	LF ₄₀₇	5,700	8	4	.075
Ediswan	PV ₄₁₀	5,500	5.5	4	.1
Marconi	DEP ₄₁₀	5,000	7.5	4	.1
Osram	DEP ₄₁₀	5,000	7.5	4	.1
Ediswan	LF _{410A}	4,500	9	4	.1
Mullard	PM ₄	4,450	8	4	.1
Cossor	410P	4,000	8	4	.1
Six-Sixty	425SP	3,600	3.2	4	.25
Mullard	PM ₂₅₄	3,500	3.15	4	.25
Mazda	P ₄₁₅	2,900	5.5	4	.15
Marconi	P ₄₂₅	2,250	4.5	4	.25
Osram	P ₄₂₅	2,250	4.5	4	.25
Cossor	415XP	2,000	4	4	.15
Ediswan	PV ₄₂₅	2,000	3	4	.25

SIX-VOLT VALVES: Three-electrode Types

Make.	Type.	Impedance.	Amp. Factor	Fil. Volt.	Fil. Cur.
Mazda	RC ₆₀₇	90,000	40	6	.075
Six-Sixty	6075RC	74,000	37	6	.075
Cossor	610RC	50	6	.1	
Marconi	DEH ₆₁₀	60,000	40	6	.1
Osram	DEH ₆₁₀	40	6	.1	
Mullard	PM _{5B}	53,000	40	6	.075
Ediswan	RC ₆₁₀	50,000	40	6	.1
Marconi	HL ₆₁₀	30	6	.1	
Osram	HL ₆₁₀	30	6	.1	
Marconi	LS _{5B}	25,000	20	5.25	.8
Osram	LS _{5B}	25,000	20	5.25	.8
Ediswan	HF ₆₁₀	21,000	25	6	.1
Cosmos	DE ₅₀	9	6	.09	
Cossor	610HF	20,000	20	6	.1
Mazda	HF ₆₀₇	20	6	.075	
Six-Sixty	6075HF	20	6	.075	
Mullard	PM _{5X}	14,700	17.5	6	.075
Mazda	GP ₆₀₇	12,500	14	6	.075
Ediswan	LF ₆₁₀	10,000	15	6	.1
Mullard	PM _{6D}	9,000	18	6	.1
Cossor	610LF	15	6	.1	
Marconi	DEL ₆₁₀	7,500	15	6	.1
Osram	DEL ₆₁₀	15	6	.1	
Marconi	LS ₅	6,000	5	5.25	.8
Osram	LS ₅	6,000	5	5.25	.8
Six-Sixty	610P	7.2	6	.1	
Mazda	LF ₆₀₇	5,300	9	6	.075
Mullard	PM ₆	5,200	7.1	6	.1
Ediswan	PV ₆₁₀	4,200	5	6	.1
Six-Sixty	625SP	3,600	3.2	6	.25
Cossor	610P	8	6	.1	
Marconi	DEP ₆₁₀	8	6	.1	
Mullard	PM ₂₅₆	3,500	3.15	6	.25
Osram	DEP ₆₁₀	8	6	.1	
Ediswan	PV ₆₂₅	3,000	3	6	.25
Marconi	LS _{5A}	2,750	2.5	5.25	.8
Osram	LS _{5A}	2,750	2.5	5.25	.8
Mazda	P ₆₁₅	2,600	6	6	.15
Marconi	P ₆₂₅	2,400	6	6	.25
Osram	P ₆₂₅	2,400	6	6	.25
Cossor	610XP	5	6	.1	
Mullard	DFA ₉	2,000	5	6	.6
Mazda	PX ₆₅₀	1,750	3.5	6	.5
Ediswan	PV _{625A}	1,600	4	6	.25
Marconi	P _{625A}	1,600	3.7	6	.25
Osram	P _{625A}	1,600	3.7	6	.25

(Continued on page 310)

Make the Melody LOUDER and CLEARER



Get better Radio—louder—clearer full-toned melody that delights the ear—change now to Cossor Valves. Cossor Valves made possible the wonderful Cossor Melody Maker. They improve any Receiver. Use them in yours. Every Wireless Dealer sells them.



with

Cossor

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Send at once!

7939

When replying to advertisements, please mention "Wireless Magazine"

Valves to Use in Your Set—(Continued from page 303)

FOUR-ELECTRODE VALVES: Screened-grid

Make.	Type.	Impedance.	Amp. Factor.	Fil. Volt.	Fil. Cur.
Mullard...	PM12	230,000	200	2	.15
Six-Sixty	215SG	220,000	190	2	.15
Cossor ...	220SG		200	2	.2
Marconi...	S215		170	2	.15
Osram ...	S215	200,000	170	2	.15
Ediswan	SG215	140,000	140	2	.15
Mullard...	PM14	230,000	200	4	.075
Six-Sixty	4075SG	220,000	190	4	.075
Cossor ...	410SG	200,000	200	4	.1
Ediswan	SG410	115,000	140	4	.1
Marconi...	S625		110	6	.25
Osram ...	S625	175,000	110	6	.25
Ediswan	SG610	100,000	140	6	.1

FIVE-ELECTRODE VALVES: Pentodes

Make.	Type.	Impedance.	Amp. Factor.	Fil. Volt.	Fil. Cur.
Ediswan	5E225	65,000	80	2	.25
Six-Sixty	230PP	64,000	80	2	.3
Mullard...	PM22	62,500	82	2	.3
Marconi...	PT235		90	2	.35
Osram ...	PT235	55,000	90	2	.35
Cossor ...	230QT	20,000	40	2	.3
Mullard...	PM24	28,600	62	4	.15
Six-Sixty	415PP	27,000	60	4	.15
Cossor ...	415QT	20,000	40	4	.15
Mullard...	PM26	25,000	50	6	.17

MAINS VALVES: Three- and Four-electrode

Make.	Type.	Impedance.	Amp. Factor.	Fil. Volt.	Fil. Cur.
Marconi...	S Point 8	200,000	160	.8	.8
Osram ...	S Point 8		160	.8	.8
Marconi...	H Point 8	55,000	40	.8	.8
Osram ...	H Point 8		40	.8	.8
Marconi...	HLPoint 8	17,000	17	.8	.8
Osram ...	HLPoint 8		17	.8	.8
Marconi...	P Point 8	6,000	6	.8	.8
Osram ...	P Point 8		6	.8	.8
Marconi...	KH1	30,000	40	3.5	2.0
Osram ...	KH1		40	3.5	2.0
Marconi...	KL1		7.5	3.5	2.0
Osram ...	KL1	3,750	7.5	3.5	2.0
Cossor ...	MRC	80,000	50	4	1.0
Ediswan	MI41RC	50,000	45	4	1.0
Cossor ...	MHF	20,000	20	4	1.0
Cosmos ...	AC/G	17,500	35	4	1.0
Ediswan	MI41	9,000	16	4	1.0
Cossor ...	MLF	8,000	8	4	1.0
Cossor ...	MP	6,500	5.5	4	1.0
Cosmos ...	AC/R		10	4	1.0
Cossor ...	MXP	3,000	3.5	4	1.0

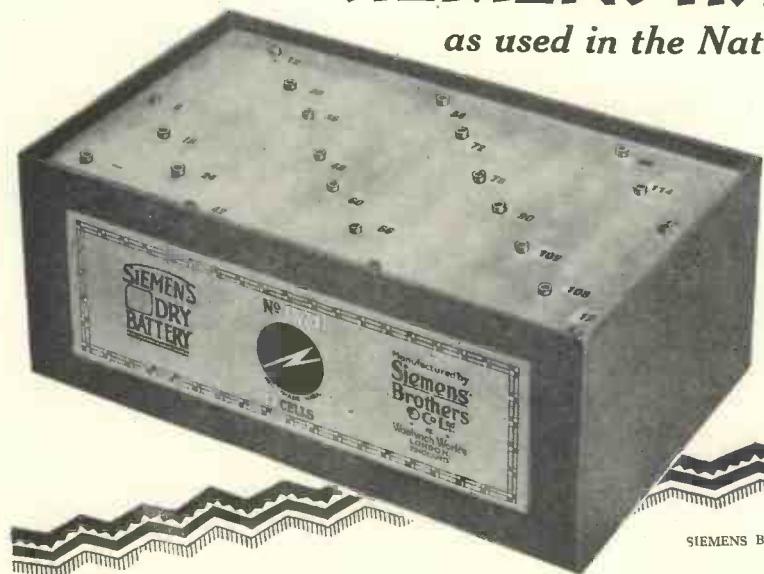
A glance through the constructional articles in this issue will give the novice some hints regarding the best valves for the various types of circuits

WHEN DESIGNING YOUR PORTABLE SET

be sure to allow for a

HIGH CAPACITY SIEMENS H.T. BATTERY

as used in the National Portable Set



No. 1075. 126 volts. Size 10 x 6 x 4 in. high. Weight 12½ lb.

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RADIO BATTERIES

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recommend dealers
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boards at least
18" square.

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Overall diameter of
metal frame - - 10 $\frac{1}{2}$ in.
Overall depth - - 2 $\frac{1}{4}$ "
Overall depth with
No. 66K Unit - - 4 $\frac{1}{2}$ "
Overall depth with
No. 66A Unit - - 3 $\frac{7}{8}$ "

Moving Coil results with the **BLUE SPOT** chassis

You can now build a wonderful speaker in the easiest possible way with the new Blue Spot chassis, a Blue Spot 66K unit, and a baffle board which your dealer can supply cut to size. Only a screwdriver is needed to fit the unit in position on the chassis. The spindle is automatically centred in the cone. All there is then to do is to tighten up the nuts and screw the chassis to the baffle board —there you have a perfect speaker equal

to anything you have yet heard. Equally good results can be obtained by bolting the assembled chassis to the front of a cabinet of your own design or choice. Hear the Blue Spot unit with the special chassis at your nearest wireless retailers, and compare it with any moving-coil speaker. Listen for the bass ! Price of Blue Spot unit (66K, adjustable), 25/-.

Price of Blue Spot Chassis, 12/6.

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T

Mention of the "Wireless Magazine" will ensure prompt attention

WAVELENGTHS OF THE EUROPEAN STATIONS

IN ORDER OF
WAVELENGTH

UNDER THE PLAN
DE BRUXELLES

A view in the Grande Place, Brussels

Wave-length	Station and Call Sign	Country	Kilo-cycles	Wave-length	Station and Call Sign	Country	Kilo-cycles
25.53	Chelmsford (5SW)	Great Britain	1,751	374	Helsingfors	Finland	800
211.3	Beziers	France	1,420	378	Manchester (2ZY)	Great Britain	793
219	Flensburg	Germany	1,370	382.2	Toulouse (Radio)	France	785
222	Cork (5CK)	Irish Free State	1,350	391.6	Hamburg	Germany	766
238	Bordeaux	France	1,260	396	Plymouth (5PY)	Great Britain	757
240	Nürnberg	Germany	1,250	400	Mont de Marsan	France	749
243.9	Newcastle (5NO)	Great Britain	1,230	401	Glasgow (5SC)	Great Britain	748.3
245	Lille (PTT)	France	1,224	404	San Sebastian	(EAJ8)	
248	Linz	Austria	1,209		Berne	Spain	744
250	Kiel	Germany	1,200	406	Dublin (2RN)	Switzerland	739
	Cassel	Germany		411	Radio Maroc (Rabat)	Irish Free State	730
253	Montpellier	France	1,185	414	Kattowitz	France	724
255	Toulouse (PTT)	France	1,175	416	Frankfurt	Poland	721
258.4	Leeds (2LS)	Great Britain	1,161	421.3	Madrid (EAJ7)	Germany	712
263.2	Cologne	Germany	1,140	426	Grenoble (PTT)	Spain	703
265	Kosice	Czecho-Slovakia	1,130	428	Radio Flandre (Lille)	France	701
267.8	Muenster	Germany	1,120	430	Brunn	France	697
268	Strasbourg	Alsace Lorraine	1,118	432.3	Stockholm	Czecho-Slovakia	694
270.3	Sheffield (6LF)	Great Britain	1,109	438	Rome	Sweden	655
272.7	Kaiserslautern	Germany	1,100	443	Paris (Ecole Sup. PTT)	Italy	676
276	Turin	Italy	1,080	448	Belgrade	France	668
280	Liege	Belgium	1,070		Danzig	Jugo-Slavia	664
280.4	Koenigsberg	Germany	1,070	452	Wilno	Germany	654
	Magdeburg	Germany		455.9	Klagenfurt	Poland	
283	Berlin	Germany	1,061		Innsbruck	Austria	658
	Stettin	Germany		456	Bolzano	Austria	
	Dundee (2DE)	Great Britain			Salamanca (EAJ22)	Italy	
	Hull (6KH)	Great Britain			Aachen	France	648
288.5	Bradford (2LS)	Great Britain	1,040	458	Langenberg	Germany	647
	Bournemouth (6BM)	Great Britain		462.2	Lyons (PTT)	France	635.1
	Edinburgh (2EH)	Great Britain			Berlin	Germany	630
291.3	Radio Lyons	France	1,030	473	Daventry Ex. (5GB)	Great Britain	622
	Liverpool (2LV)	Great Britain		476	Zurich	Switzerland	613
294.1	Stoke-on-Trent (5ST)	Great Britain	1,020	482	Oslo	Norway	604
	Swansea (5SX)	Great Britain		489	Milan	Italy	595
299.3	Bratislava	Czecho-Slovakia	1,000	496	Brussels	Belgium	586
301	Bordeaux (PTT)	France	997	504	Vienna	Austria	577
302.6	Belfast (2BE)	Ireland	991.1	512	Munich	Germany	559
	Bucharest	Roumania		520	Sundsvall	Sweden	550
305	Agen	France	982	537	Budapest	Hungary	548
305.6	Marseilles (PTT)	France	981	545	Hanover	Germany	530
311	Aberdeen (2BD)	Great Britain	964	548	Lausanne	Switzerland	441
317.5	Dresden	Germany	945	566	Geneva	Russia	395
321.2	Breslau	Germany	937	680	Moscow	Russia	363
322	Vitus (Paris)	France	930	760	Leningrad	Russia	300
323	Cardiff (5WA)	Great Britain	928	825	Hilversum	Holland	279
326.4	Gleiwitz	Germany	919	1,000	Kalundborg	Denmark	259
330	Bremen	Germany	909	1,073	Stamboul	Turkey	243
	Naples	Italy		1,155	Motala	Sweden	223
333	Reykjavik	Iceland	900	1,232	Warsaw	Poland	215
336	Petit Parisien	France	892	1,325	Moscow	Russia	207
339	Copenhagen	Denmark	883	1,395	Eiffel Tower	France	203
342	Prague	Czecho-Slovakia	873	1,444	Lahti	Finland	199
346	Goteborg	Sweden	865	1,470	Daventry (5XX)	Great Britain	192
348	Barcelona	Spain	857	1,504	Zeesen	Germany	182
354.2	Graz	Austria	847	1,562.5	Radio Paris	France	171
358.9	London (2LO)	Great Britain	838	1,650	Angora	Turkey	163
361.9	Leipzig	Germany	829	1,748	Huizen	Holland	162
	Seville (EAJ5)	Spain		1,840	Kovno	Lithuania	150
370	Radio LL (Paris)	France	811	1,852			
374	Stuttgart	Germany	802	2,000			

LOOK OUT FOR W. JAMES'S PORTABLE NEXT MONTH

THE NEW ROLLS-CAYDON "REGIONAL"

16 gns.

In four Colours:
Blue,



5 Valves

*Dark Brown, Light
Brown, Green*

The product of a firm with EXPERIENCE behind it, and the only instrument at such a low price incorporating a
CELESTION LOUD SPEAKER

The low notes are there

SEE AND HEAR

this Instrument at your Local Dealers, or at

ROLLS-CAYDON SALES
77 ROCHESTER ROW, WESTMINSTER

VICTORIA 6986

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

IN TUNE WITH THE TRADE!

FETTER LANE'S Review of Catalogues and Pamphlets

Easy Easy Terms

FOLLOWING Lord Beaverbrook's dictum in the *Daily Express*, the economical scheme of deferred payments has been given a considerable boost. Even radio enthusiasts are beginning to inquire into the uses of the hire-purchase system, and Peto-Scott's, of 77 City Road, E.C.1, have adopted what seems to me to be a very friendly and helpful motto : "Make way while you pay."

In addition, this is the title of a new comprehensive booklet just issued, which has come my way for review. It deals with many interesting sets which can be obtained on the easy payment way, and not the least interesting fact is that kits of parts to build up many good WIRELESS MAGAZINE sets (the Touchstone, for example) can be had for very small "down" deposits.

Peto-Scott's do an extensive business, of course, and I am asked to say that this catalogue can serve only as a general guide. Almost any known make of receiver or component can be obtained in the "easy" way—a proposition, surely, worth considering by the family man. **22**

Portables In Situ

YOU know, it doesn't need a very big Technical Brain (or I should not be writing on this subject !) to see that many portable sets, and particularly the ultra-light models, have midget batteries.

Thus some users of some portables described in the portable-set supplement this month may like to have an independent source of "juice" when using their sets at home, and when the set is not acting as a proper portable.

It really is a good economical idea when the portable is in the house to use external batteries or an eliminator, and when it is on tour, use the self-contained batteries.

Because ordinary dry batteries tend to run down, whether in use or not, a mains eliminator is better for house use than spare H.T.'s.

The Regentone people make some very good A.C. and D.C. mains

supply units which strike me as being eminently suitable for the job. Why not get a folder which describes these handy "juice" suppliers? The folk responsible are the Regent Radio Supply Co., 21 Bartlett's Buildings, Holborn Circus, E.C.4. **23**

Eloden Loud-speakers

I ALWAYS "fall" for an attractively got-up catalogue, and I must confess that parts which are "Made in England" do not always receive the artistic catalogue description they merit.

F. L. Lesingham, of 13 Victoria Street, S.W.1, who are sole agents for Great Britain for Eloden loudspeakers, have just sent me the 1929 Eloden catalogue, and a very pretty effort it is.

There is the usual Eloden story of loud-speakers in the making, and some most unusual views, in Continental style, of Elodens under interesting conditions. For instance, these loud-speakers were installed in the Graf Zeppelin, and are in many German broadcasting stations.

The normal commercial Eloden models look very tempting from the illustrations and descriptions given in this catalogue, and if you want to be tempted—well, get the catalogue! **24**

A SPECIAL SERVICE FOR READERS

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.

Here we review the newest booklets and folders issued by five 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 1d. stamp, to "Catalogue Service," WIRELESS MAGAZINE, 58/61 Fetter Lane, E.C.4. Valid till May 31.

Lecodyne Gramo-Radio

GRAMO-RADIO is a craze (if I may use that expression) which undoubtedly has caught public fancy. Doubtless it has been strengthened by the knowledge that the largest gramophone manufacturers themselves are dabbling in electric reproduction, and getting very good results, too.

Well, what I am interested in at the moment is a folder from the London Electrical Co., Sherborne Lane, E.C.4, describing the Lecodyne G3 table grand gramo-radio set.

This comprises a silent-drive gramophone motor, a three-valve receiver, a loud-speaker and all necessary batteries. A simple switching arrangement easily changes over from radio to gramo-reproduction, and back again when you have exhausted your stock of records.

If one may judge from the folder, the instrument is very neat and attractive in appearance. **25**

Philips All-electric Set

I LIKE to be classed just as an ordinary "ham" or "fan," and as one or the other of these I marvel ofttime at the way some of the giant commercial concerns get away with what amateurs and much-limited constructors might spend a lifetime in perfecting.

Take all-from-A.C. sets, for example. I have spent many hours in playing about with simple methods of working simple sets from alternating-current mains. Some of the arrangements have pleased me, and others haven't. But none of them has, I have felt, been suited to absolutely non-technical users. Many other keen amateurs must have felt as I have done.

Yet here we have the well-known firm of Philips producing an ultra-simple all-from-A.C. two-valver, self-contained, fool-proof and comparatively cheap—almost any voltage : works on from 40 to 100 cycles. One-knob tuning : provision for pick-up. It is all described in a leaflet which may be had for the asking from 145 Charing Cross Road, W. **26**



VALUE FOR MONEY

C2 HORN SPEAKER

The type C2 speaker is a full-sized full-toned instrument capable of giving good all round results for ordinary use. It stands 23 ins. high and has a flare of approximately 14 ins in diameter. Quality and price considered this loud speaker is an amazing bargain.

Price

£2 : 5 : 0

You may have a weakness for a cone speaker, or on the other hand you may prefer a horn instrument, but whatever your choice, you want value for money. In these two speakers you not only get that, but you incidentally get the best instruments of their type. There is no cone speaker that gives better results than the B.T.H. Cone, and there is no horn speaker to rival the C2. Ask your dealer to demonstrate these speakers to you; test them against any other instrument at anywhere near their price. Your "value-for-money" choice will undoubtedly be B.T.H.

B.T.H. SPEAKERS



B.T.H. CONE SPEAKER

For those who prefer the cone type of instrument here is the ideal. The B.T.H. Cone is a speaker of exceptionally good tone, giving sufficient volume for a large room and having the all-round quality and finish of an instrument many times its price.

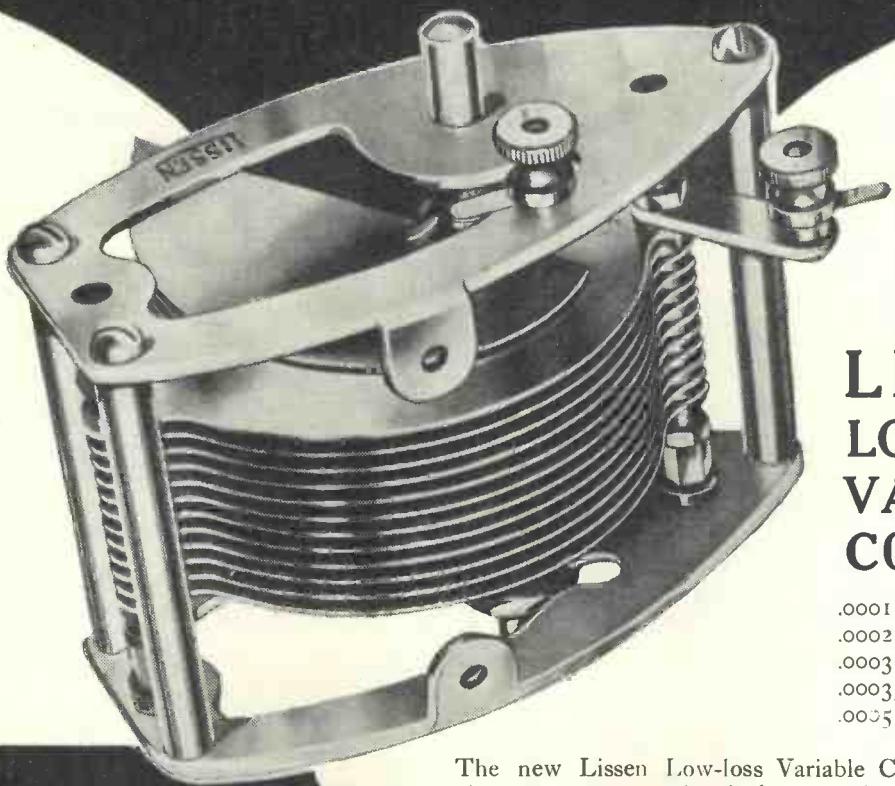
Price

£3 : 0 : 0

3180 The British Thomson-Houston Co. Ltd., Crown House, Aldwych, W.C.2

Better service results from mentioning "Wireless Magazine" when writing to advertisers

A CONDENSER THAT will give you STRONGER SIGNALS



LISSEN LOW-LOSS VARIABLE CONDENSER

.0001 mfd. capacity	5/9
.0002 "	6/-
.0003 "	6/-
.00035 "	6/3
.0005 "	6/6

The new Lissen Low-loss Variable Condenser gives you stronger signals because there are no condenser losses. It gives you free and facile tuning, easy and definite separation of stations, even when they are close together.

Notice the unshakeable rigidity of its construction, the long bearing, the absence of end pressure or distortion of the vanes. The spindle is extended for ganging purposes, feet are provided for baseboard mounting, or you can mount it on the panel with standard one-hole fixing. Notice, too, the new and convenient position of the fixed vane terminal, well away from any danger of accidental contact with the moving vanes.

Compare it with any other condenser at any price at all—you will say it justifies everything that Lissen claims for it.

LISSEN REACTION CONDENSER

Embodies many of the exclusive features of the big Lissen Condenser, including no end pressure on any end plate to distort frames or vanes. "A" Type 4/-

"B" TYPE, with insulated bushes for mounting on panel. Price 4/6

LISSEN REACTION CONDENSER

LISSEN LIMITED, 500-520 Friars

Lane, Richmond, Surrey (Managing Director : Thos. N. Cole)



A sketch of the London station's transmitting aerial.

PARADOXICAL as it seems, the chief advantage of a "portable" radio set does not lie in its portability. Indeed, in most cases, the use of the word is misleading, and the term "transportable" is nearer the truth.

Completely Self-contained Sets

Do not misunderstand me, though. I have no wish to disparage the attempts that are being made by manufacturers to reduce the weights of their sets. I want to make it quite clear that the chief advantage of a "portable" is that it is a *completely self-contained receiver*.

Aerial, batteries, loud-speaker—all are housed in one unit of reasonable dimensions. There are no external connections.

With this chief consideration in mind, then, let us look a little more closely at this popular type of set.

We understand that when a "portable" is mentioned we mean simply a self-contained receiver, without regard to its weight or the ease with which it can be carried.

Great Increase in Popularity

This "self-containedness" ranks as the most important feature of a portable, because it is the reason for the great increase in the demand for this type of receiver.

In buying a portable, you know exactly what you are "letting yourself in for." There are no extras. You walk into the dealer's, choose your set, take it home and listen-in—not forgetting to call at the post office on the way for a licence, which will

cost 10s. extra!

It is much easier to choose a portable than any other type of set, when you know exactly what you can spend on it.

If you are thinking of buying a set, turn to the portable supplement which forms part of this issue of the WIRELESS MAGAZINE; you will immediately see which receivers come within your means, for the particulars are arranged on a progressive price basis.

Having fixed the price, I suggest

Although there is a choice of about sixty different makes of portable sets, there is not such a great variety of types, as the following analysis reveals:

Five-valve sets with two high-frequency stages, detector, and two low-frequency stages ..	67%
---	-----

Four-valve sets with one screened-grid high-frequency amplifier, detector, and two low-frequency amplifiers (approximately equivalent in performance to the former class) ..	16%
--	-----

83%

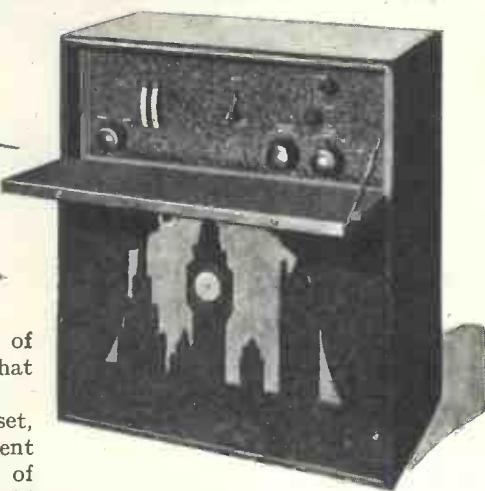
The reason for this is, of course, that these types have been found by long commercial experience to give the best all-round results.

that you next consider the type of case you prefer. Portables can be roughly divided into two classes.

There are those that are vertical and others in which the main portion of the set is placed in a horizontal position for operating, while the

GETTING the BEST from a MODERN PORTABLE

By
**D. SISSON
RELPH**



frame aerial and loud-speaker (in the lid) are held in a vertical position.

For Use in the Home Exclusively

For use in the home exclusively many prefer the vertical type, if only for the reason that they are usually more attractive in appearance. But in cases where it is intended to move the set about frequently the suitcase type has a number of advantages.

You may be wondering why I have put price and shape before the number of valves and circuit. The reason is because there is little choice in the latter. Approximately 67 per cent. of the sets on the market have five valves and 16 per cent. have four.

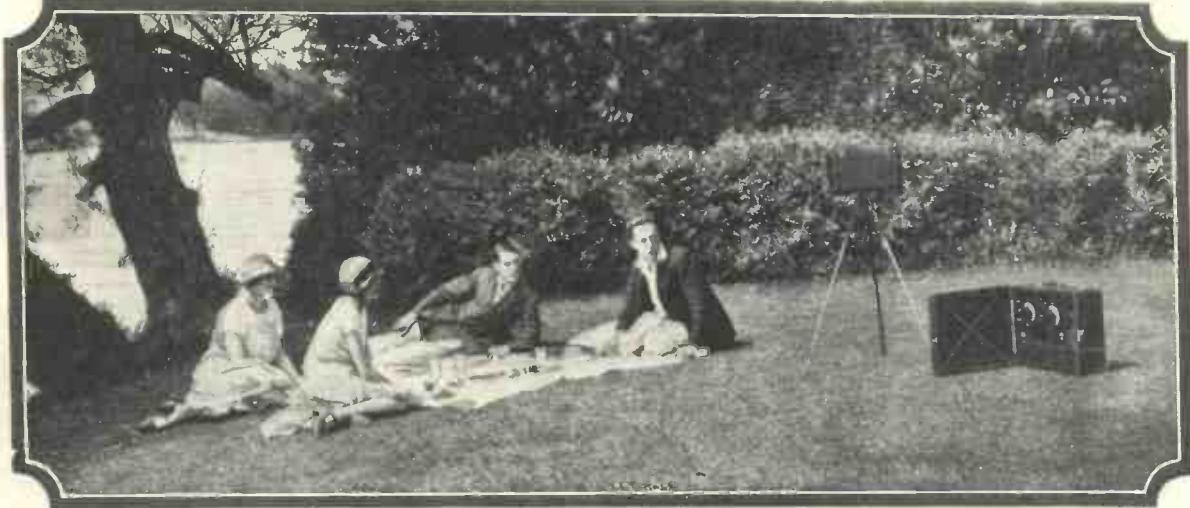
It is important to note, though, that most of the four-valvers employ one screened-grid high-frequency amplifier in place of the two three-electrode high-frequency stages incorporated in most five-valvers.

Equivalent Performance

Under normal conditions as much can be expected from one screened-grid stage as from two ordinary stages.

Therefore, as regards performance, there should be little difference in 83 per cent. of the sets available,

Getting the Best from a Modern Portable (Continued)



No picnic is complete nowadays without a portable radio receiver. Great strides have been made in design recently, and excellent value for money can be had from more than fifty manufacturers

although, of course, different makes do give different results, even when they utilise the same types of circuit.

What "Tuning" Means

The next point to consider is the number of controls, and here I must, for the benefit of the novice, mention something about tuning. Tuning means adjusting a set to the wavelength used by a particular broadcasting station.

In a portable, the aerial must be "tuned" and so must each high-frequency stage if the maximum sensitivity is to be obtained.

This would mean, then, in the case of a set with two high-frequency amplifiers, detector and two low-frequency stages (the most common type of circuit used) that the frame aerial (every portable set, of course, has its own aerial enclosed in the case) and each of the high-frequency stages would be "tuned" and, therefore, there would be three tuning dials.

Reducing the Number of Controls

Experience has shown, however, that few listeners are willing to turn three knobs, and so one stage is untuned (*aperiodic* is the technical term), and the number of tuning dials thus reduced to two.

Besides the tuning dials, there are usually three other controls—a "reaction" or "volume" control, a switch to change the wavelength range, and a switch to put the set on and off.

The novice should be aware that two wavelength bands are utilised for broadcasting. The medium or short waveband extends from about 250 to 550 metres and the long waveband from 1,000 to 2,000 metres.

Every newspaper contains a list of the wavelengths of the most important stations and a complete list of wavelengths appears on page 312 of this issue of the WIRELESS MAGAZINE

Undoubtedly the best plan in

It is a matter of opinion, of course, but in the long run, I think, most listeners would rather have perfect reception from one station than only mediocre results from three or four.

Adaptability of Some Receivers

Adaptability of a set is another feature that should not be overlooked. Used with an external aerial and earth (this can be arranged without difficulty with most sets), a portable will give as good results as an "ordinary" set of similar type.

A number of sets are also adaptable for the plugging-in of an external loud-speaker (useful for dancing or running an extension into another room) and using external batteries or even a mains supply unit (to conserve the life of the small batteries that are often put in a portable because of considerations of size and weight).

Maintenance Costs

Cost of upkeep is a point that I mention with some diffidence. I do not think it is unfair to manufacturers, however, and it is only fair to the novice, to say that the average five-valve portable set is more costly in upkeep than an ordinary set of similar type.

This is because, as already mentioned, considerations of size and weight make it imperative to use batteries of small dimensions and capacity in a portable. Thus, it often happens that a five-valve portable set is supplied from batteries that are



A turndown is a most useful accessory for a portable set; it enables the operator to take full advantage of the directional properties of the frame aerial with the minimum of trouble. The model shown is by the Igranic Electric Co., Ltd.

Selecting a portable is to hear the set demonstrated before buying it. This is not a difficult matter to arrange in most localities; drop a line to the maker of any set described in the supplement in this issue that takes your fancy and ask for the address of the nearest dealer who can demonstrate the receiver to you.

When having a demonstration I suggest that you pay more attention to the quality of reproduction than to the quantity of stations received.

A Special Article by D. Sisson Relph

really only big enough for a three-valve set.

Consequently, the cells are discharged at an uneconomic rate and renewals are more frequent than if batteries of adequate size had been installed in the first place.

I must confess that I have never used one particular set for more than a few days, so I have no personal experience of actual upkeep costs.

Cost of a Year's Upkeep

However, I should estimate that a five-valve set *used four hours a day* would not cost more than £5 a year for battery renewals even if the current consumption were heavy. Some makers have made commendable efforts to keep the consumption of their sets low.

Perhaps readers of the WIRELESS MAGAZINE who have had sets in regular use will write and tell us exactly what upkeep costs them; such information would be of great value to other listeners and to manufacturers.

Operating a Portable Set

Having discussed the choice of a set at some length, it is time we took into consideration the operation of the receiver when it has been bought.

If you have had no previous experience of radio I advise you to get your set from a dealer who will connect all the batteries up and deliver it in working order; you will thus be saved trouble at the start.

The most important thing to remember about working a portable set is that the edge of the frame aerial must be in line with the station to be received. With most portables this means that the front edge of the cabinet must be in line with the transmitting station.

This will be clear from the heading to this article, which shows how a set would be placed to receive signals from the transmitting station illustrated.

Actually, this directional property



Many portables are provided with plugs so that a mains supply unit can be used for providing power, thus conserving the life of the batteries when the set is used at home extensively. This is a high-tension unit made by the Regent Radio Co., Ltd.

of a frame aerial is a great advantage for, as long as the stations do not lie along the same directional line with reference to the receiver, it is easy to cut out an unwanted signal.

On the other hand, it is difficult to receive the weaker of two stations that lie in almost the same line with reference to the receiver.

The first thing to do, then, when operating a receiver for the first time

is to set the front edge in line with the station it is desired to receive. For this purpose, a turntable is a great convenience as it enables one to swing the set quickly in any desired direction.

Wavelength Switch

Having "directed" the set, adjust the wavelength switch to the proper position. That is, if the station you are searching for works on a wavelength between 250 and 550 metres, put the switch in the "Short Wave" position, while, if it works on a wavelength between 1,000 and 2,000 metres use the "Long Wave" position.

Next switch the set on; usually this is done by pulling out a small knob, but in some sets the adjustment of the wavelength switch automatically puts the set on also.

Now find out which is the "reaction," or "volume," control (some sets are not fitted with this, but the majority are). Turn it to the right (in a clockwise direction) until the set sounds "live."

Most Sensitive Condition

If it is turned too far, usually a howl will be produced. Should this occur, immediately turn the knob back a little, the set will then be in its most sensitive condition for reception.

It is now time (and quite time too, the novice will say!) to "tune" the
(Continued on page 394)



By lake, sea, or hedgerow, a portable adds to the pleasures of the day's outing. This party is enjoying a programme in the silent "background" of a woodland glen. Wouldn't you like to join them?

DO YOUR PETS LIKE RADIO?

HOW peculiarly the sounds that issue from the loud-speaker react on different household pets is manifest from the following instances. Cats, dogs, birds, and fish have been experimented with, and the results are very varied and bewildering.

A Goldfish Listens-in

A goldfish in a bowl in the same room as the receiving set would always quicken its movements the moment the set was turned on and would keep on the whole time the

Cats take a liking or a dislike to radio for no apparent reason. One cat would not only try to get out of the room as soon as the set was tuned in, but would get out of the house at the first possible chance. Another would try to get as near the set as the other enthusiastic radio fans would allow it to do so. This was evidently a musical and wireless cat. (No joke about the whiskers here).

A spaniel dog was in a room with people who were listening to the last Armistice service broadcast from the

knew his master's voice for he jumped at the set and ruined it, in order to get at his master who was broadcasting.

Some useful experiments could be tried along these lines. Masters could broadcast to their dogs, calling their names and trying by devious ways to ascertain whether the dogs would know them without hesitation.

Deceiving the Cat!

When certain birds were imitated from 2LO during a children's hour, a

These fine puppies are too drowsy to care much about anything; but how would they like radio?

Many readers of the WIRELESS MAGAZINE must have pets that respond to radio in the same way as those mentioned in this article. Win a prize by taking a snapshot next time yours performs some amusing antic!



set was on, never varying its pace or resting. The moment the set was turned off the fish would stop and rest, and would continue to rest until the music or speech started again.

Wireless Response Only

The piano could be played in the room, and we might talk as much as we liked—that made no difference to the movements of the fish. In another room where the wireless programme could not be heard, the fish was silent and quiet when it desired to be so.

Cenotaph. The band did not move the spaniel, neither did the Silence, but as soon as the bugle call began, the dog looked up intently wondering what it was all about. It growled when the commands were being given and went behind the loud-speaker to search for the man who dared to speak so harshly.

Dogs who are great favourites with their masters or mistresses have failed again and again to detect their owner's voice on the loud-speaker, although every inducement has been tried. One dog, however, evidently

year ago, a cat tried to get at the set with determination, probably thinking that the bird was very near at hand. The nightingale's song that was broadcast during last summer at least made another cat very curious, although she was not quite sure whether she was being leg-pulled or whether there was a real bird.

They Are So Sceptical

Household pets are not easily fooled. Perhaps that is the reason why most of them are so sceptical about radio.

E. B. R.

The WAYFARER

**AN EFFICIENT
PORTABLE FIVE-
VALVE SUPER-HET**



**Designed by
J.H.REYNER,
B.Sc.,A.M.I.E.E.
At the
FURZEHILL
LABORATORIES**

TOWARDS the end of 1928 I had occasion to handle a number of portable receivers, some manufactured and some home-constructed. Viewed in the light of past experience with such receivers, they were undoubtedly good. In addition to local programmes quite a number of foreign programmes were obtainable after nightfall.

Ease of Operation

If one omitted to take into account the fact that they were self-contained, however, I doubt whether we should be so satisfied with the performance. I could not help mentally comparing the ease of operation of even the best set which I handled with that of a straightforward three-valve set on an outside aerial.

The tuning was critical, reaction had to be pushed to the limit, and the reaction and tuning controls were by no means independent. We should not tolerate such a set for use on an average aerial. Why should it be necessary to put up with these

disadvantages in a self-contained or so-called portable receiver, which, despite the fact of its self-contained and very small frame aerial, has, as a rule, one or two extra valves to counteract these defects?

We began experiments, therefore, at the Furzehill Laboratories in order to determine whether, with reasonable equipment, it would be possible to obtain a receiver as easy to handle as the average three-valve set, capable of giving a good performance not only on local, but also on distant stations, and which did not require the use of excessive reaction with all its attendant evils.

One of the difficulties which has to be overcome is that of the double

waveband and, after some consideration, we decided to adopt a super-heterodyne arrangement as being the most suitable.

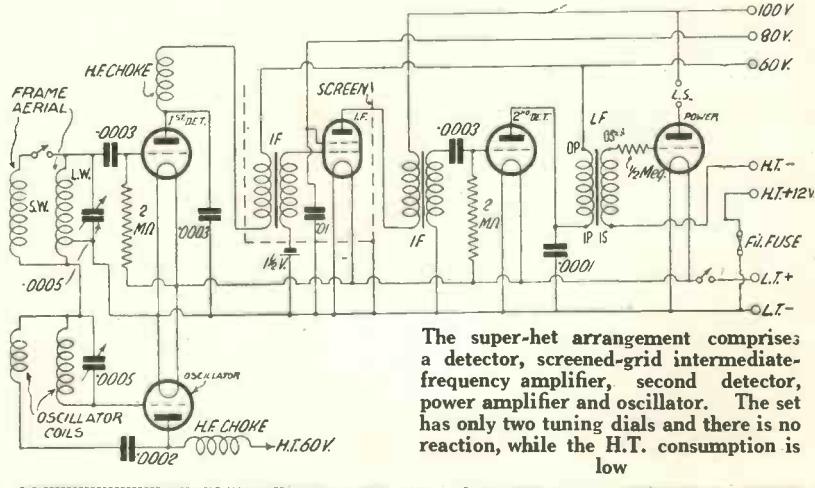
Use of Intermediate Frequency

With this arrangement, the amplification is carried out at an intermediate frequency, that is to say, lower than the actual frequency at which reception is taking place, but distinctly higher than an audible frequency. It appeared that the screened-grid valve could conveniently be used in this connection as it would give good amplification without any tendency to instability.

The results were immediately promising and after prolonged experiment, lasting for more than two months, a design was finally evolved which appeared to have the merits of simplicity and effectiveness.

Past experience, however, has shown that a receiver built up in this manner as a result of long and patient research has not necessarily proved a good receiver in actual practice. It may be that some

CIRCUIT OF THE WAYFARER PORTABLE FIVE



The super-het arrangement comprises a detector, screened-grid intermediate-frequency amplifier, second detector, power amplifier and oscillator. The set has only two tuning dials and there is no reaction, while the H.T. consumption is low

The Wayfarer Portable Five (Continued)

ELSTREE TEST REPORT OF THE WAYFARER

THE following test report, taken at Elstree, will serve as an indication of the tuning. Many other stations were tuned-in at good strength, so that the list given may be exceeded under favourable conditions:

SHORT WAVES

Station	Wave-length	Oscillator	Frame
Budapest	545	159	152
5GB	482	136	129

Frankfurt .. 422 102 107

2LO .. 358 79 80

Nurnberg .. 240 40 30

LONG WAVES

Radio Paris 1,780 126 127

5XX .. 1,562 118 116

Hilversum .. 1,071 72 57

It should be noted that there are two settings of the oscillator dial which both tune-in the same station. Choose the one giving the strongest results.

of the values are particularly critical and cannot easily be duplicated in practice.

Consequently, if the design is prepared from the data obtained, the original receiver may work satisfactorily, but there is an element of chance regarding the performance of duplicate models made to the same specification. It was decided, therefore, to take further precautions in the matter and a scheme was adopted which has never hitherto been put into operation.

Preliminary Design Tested

From the data obtained, a preliminary design was prepared and working drawings, photographs and instructions were drawn up exactly as if the design was to be published. These advance particulars were submitted to a number of constructors in different parts of the country. They were given the normal information to work from and were asked to find out whether the receiver was a satisfactory one or not.

Their results were, in every case, highly encouraging. Criticism was

asked for and was obtained on several minor points which were duly noted and suitable modifications were intro-

duced into the final design. The point is, however, that the design as such

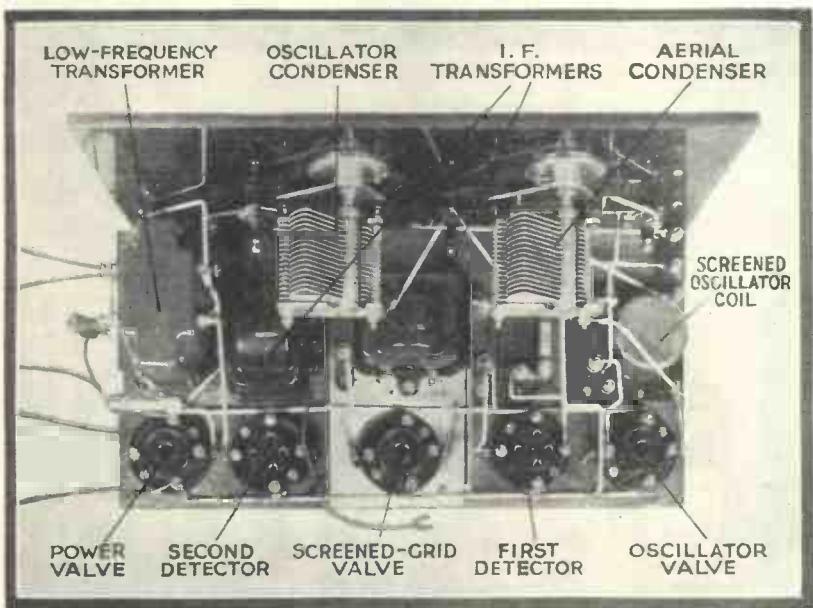
has been proved out by actual practical trial before being released to WIRELESS MAGAZINE readers.

The receiver may, therefore, be built with every confidence that all possible precautions have been taken to ensure perfection.

Circuit of the Receiver

The circuit of the receiver is shown on page 321. It will be seen that five valves are employed, four of which are used in the amplifying and detecting arrangement, while the fifth is an oscillating valve.

The signals received on the frame aerial are tuned in the normal way and are mixed with oscillations from a local oscillator. The mixing of these



This plan view clearly shows the arrangement of the parts in the Wayfarer

duced into the final design. The point is, however, that the design as such

two oscillations produces a number of subsidiary frequencies, one of which, that corresponding to the difference between the two frequencies in question, is selected and further amplified in the intermediate stages. These are tuned to resonate at a frequency of 30 kilocycles per second (corresponding to a wavelength of 10,000 metres).

Two I.F. Transformers

One such tuned transformer couples the first detector valve to the screened-grid valve and a second similar transformer couples the screened-grid valve to the second detector.

It should be noted that, owing to

INDEPENDENT REPORTS ON THE WAYFARER

THE receiver was submitted to constructors in London, Manchester, and Exeter. Two London constructors made up the receiver; both of them obtained immediate satisfaction and reported signals strong and quality excellent. 2LO, 5GB, and 5XX were all at full volume, while Budapest, Langenberg, Radio Paris, Hilversum, and several other stations were tuned-in on the first run over the dials.

The report from Manchester was equally satisfactory, indicating that the receiver is quite suitable for this district—Manchester, 5GB, Langenberg, Dublin, 5XX, and Radio Paris being

received without difficulty, while the receiver gave evidence of being able to give a still better performance.

Exeter reports that the receiver is working very satisfactorily. It was tested out at Yeoford, North Devon, which is situated in a valley and is remote from any local station. On the long waves, 5XX, Radio Paris, and Eiffel Tower were received at good strength, while on the low waves 5GB, Langenberg, Stuttgart, Toulouse, Cardiff, and some unknown station, were tuned-in at good strength without difficulty. Quality of reception is reported as being all that could be desired.

Designed at the Furzehill Laboratories by J. H. Reyner

the high wavelength of the intermediate amplifier special H.F. chokes have to be used.

This second detector rectifies the 30-kilocycle oscillation and delivers low-frequency oscillations of the normal type which are further magnified by a single stage of low-frequency amplification.

Variable Oscillator

The train of operation, therefore, is quite simple and straightforward. The oscillations produced by the local oscillator are variable in frequency and are so arranged that they differ from those being received on the frame by 30 kilocycles.

If, for example, a wavelength of 400 metres is being received, this corresponding to a frequency of 750 kilocycles, then the oscillator is adjusted to a frequency of 720 or 780 kilocycles. This, of course, is not done by any process of mathematical calculation, but by simply rotating the dial until signals are heard in the ordinary way.

Only Two Controls

There are thus only two controls on the receiver, the frame tune and the oscillator tune. These are

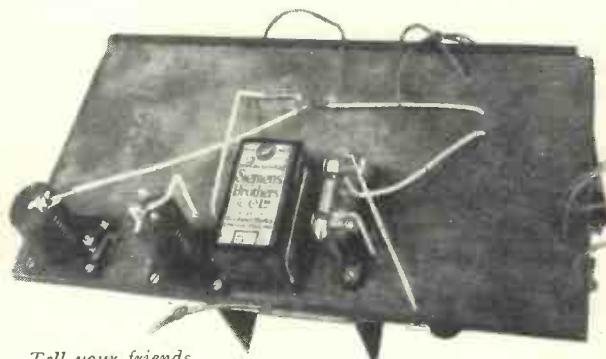
both rotated together and when they are in tune signals will be heard. There is no reaction and no other control whatever beyond the wave-changing arrangements and the on-off switch.

The wave-changing arrangements are operated by two simple push-pull switches. The first of these changes over the wavelength range of the special dual-wave oscillator-coupler, while the second switch alters the frame connection.

The question of the frame itself was a matter which required long and careful attention for, owing to the fact that no reaction what-



Front view of the Wayfarer, showing the internal components.



Back view of the Wayfarer, showing the positions of the batteries

pull switch which placed the short-wave portion in parallel with the long-wave portion.

Nine Frames Tried!

This may appear a somewhat simple solution to arrive at, and indeed it is often the simplest solutions which are of the most value in practice, but it should be emphasised that no

fewer than nine frames were tried out before the final details were arrived at! Particular care, therefore, should be taken to follow the details given as accurately as possible.

ever is used, it was obviously necessary to use an arrangement having the greatest possible efficiency consistent with reasonable size. Moreover, it was desirable to obtain both wave-ranges in the same frame linked together by some simple switching arrangement and at first these two problems seemed incompatible.

After long and careful research, however, a design of frame was finally decided upon which only required the use of a simple push-

pull switch which placed the short-wave portion in parallel with the long-wave portion.

Question of Instability

As a matter of fact, in practice it was found that the damping effect was not as serious as was at first expected, but that the set did not handle so nicely and there was a

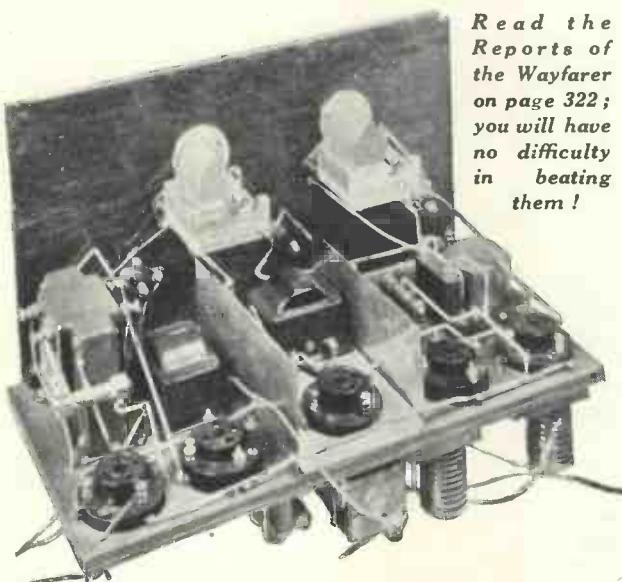


A view of the few components in the Wayfarer mounted under the baseboard

After long and careful research, however, a design of frame was finally decided upon which only required the use of a simple push-pull switch which placed the short-wave portion in parallel with the long-wave portion.

Another view of the Wayfarer cabinet, with the cone loudspeaker mounted in position

The Wayfarer Portable Five (Continued)



Read the Reports of the Wayfarer on page 322; you will have no difficulty in beating them!

This photograph shows the Wayfarer completely assembled, but without valves in position, the two special high-frequency chokes must be placed where shown

tendency to instability on the long waves. It was decided in the end to keep the frame separate from the set and, in order to do this neatly and conveniently, the frame is housed in the end of the receiver itself.

Position of the Frame Aerial

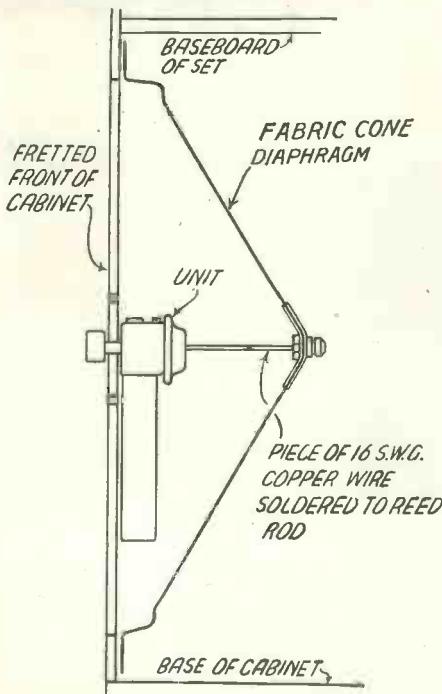
The end portion is made entirely separate and is hinged so that it can be rotated through 180 degrees independently of the set itself if desired. Consequently, the receiver may be used with the frame shut up in its normal carrying position, in which case the whole receiver must be rotated in order to find the best orientation for the frame, or, alternatively, the receiver may be placed in any convenient position and the frame itself swung round on its hinges until it is in the correct relative direction.

Construction of Frame

The frame itself is of skeleton formation and is made up by utilising two sheets of thin paxolin held together at the corners by four ebonite spacers over which the winding is placed. This appears at first to be a somewhat expensive construction, but is not actually so as the necessary paxolin sheets can be obtained comparatively cheaply. As has already been pointed out, the efficiency of the

the valves in order are: oscillator, first detector, intermediate amplifier (screened-grid), second detector, and L.F. valve.

The photographs and diagrams show quite clearly the small screened



How the cone loud-speaker is arranged in the Wayfarer

frame has no little bearing upon the performance of the receiver and as the actual size of the frame is remarkably small, it is not desirable to take chances in this direction.

The layout of the receiver itself is simple in the extreme. The five valve holders are all in a line at the back of the baseboard. Looking down on top of the receiver portion with the panel towards one,

dual-wave oscillator coupler, the two intermediate-frequency tuned transformers (also screened), and finally, on the right, the L.F. transformer, which is of standard type. The intermediate transformers incidentally are supplied as a matched pair and are tuned in themselves. There is no further adjustment to be made on them when they are received.

Panel Controls

The panel contains two controls, namely the frame-tuning condenser and the oscillator-tuning condenser, together with the two wave-changing switches and the on-off switch. When the whole is mounted up it can be pushed into the set from the back when the controls appear through a vignette in the front. Ready access is obtainable to all the valves and the batteries by removing the back of the case.

The batteries and loud-speaker are housed underneath the set and here again ample room is provided. It might appear at first sight that a certain amount of space has been wasted but this is not the case for the whole receiver only occupies 15½ in. by 16½ in. by 7 in., so that it cannot be considered at all a bulky arrangement while its weight is only 27½ lb. with an Oldham SMV4, and 30 lb. with an SMV7.

Small H.T. Batteries

Weight is kept low by the use of small-size dry batteries for the H.T., for the consumption of the receiver is only of the order of from 10 to 15 milliamperes (actually 11 milliamperes on the model described herewith), so that the use of relatively small-sized batteries is quite sufficient.

The batteries used are of the standard single-capacity type, but are not of the so-called popular types which have a slightly smaller capacity.

It will be observed that some small additional screening is desirable in the intermediate stage. This is done by constructing a U-shaped piece of copper. The valve holder, intermediate transformer and screen-grid shunting condenser are mounted on a small piece of thin three-ply wood which

J. H. Reyner's Special Five-valve Super-het

is then placed inside this trough. The whole may then be screwed down on the baseboard in the position indicated on the diagram and photographs.

Order of Assembly

No instructions need be given regarding the actual construction. The panel components should be assembled first and the panel then placed on one side while the baseboard components are assembled. With the exception of the screening of the intermediate stage just mentioned, this is absolutely straightforward.

Certain components have been mounted on the underside of the baseboard in order to preserve a clean and simple layout on the top. The number of wires which have to go to these components, however, is quite small and the extra complication produced is well worth the trouble. The two high-frequency chokes should be carefully mounted in the positions shown.

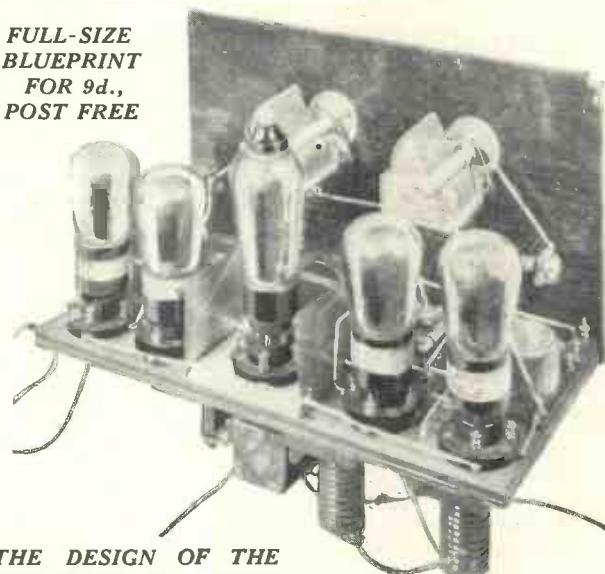
Wiring Up

The receiver may be wired up very largely without the panel in position, after which the panel may be placed in

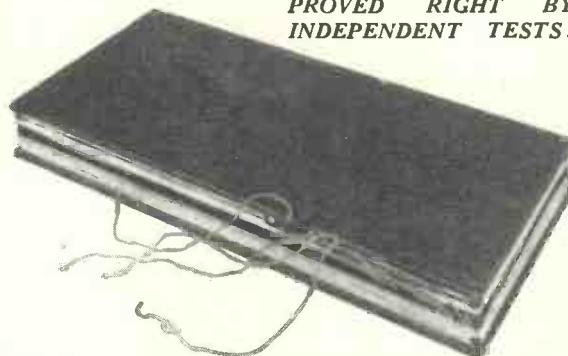
its correct location and the wiring completed. The whole operation of wiring the receiver will occupy little more than one hour even if considerable trouble is taken.

Actually, the receiver will work quite well if the wiring is fairly rough, and one of the receivers made up from the advance particulars was actually wired

**FULL-SIZE
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THE DESIGN OF THE WAYFARER HAS BEEN PROVED RIGHT BY INDEPENDENT TESTS!



The frame aerial for the Wayfarer. The side pieces are sheets of paxolin, separated by bars of ebonite

COMPONENTS REQUIRED FOR THE WAYFARER

- 1—Ebonite panel, 12 in. by 7 in. (Trolite, Will Day, or Northern Radio).
- 2—.0005-microfarad slow-motion variable condensers (Utility Mite).
- 3—On-off switches (Wearite, Lissen, or Huntley).
- 3—Rigid valve holders (W.B.).
- 2—Antimicrophonic valve holders (W.B., or Formo).
- 1—Screened oscillator coupler (Bulgin).
- 1—.0003-microfarad fixed condenser (Dubilier, horizontal type, with insulated grid-leak clip).
- 1—.0002-microfarad fixed condenser (T.C.C., Graham-Farish, or Lissen).
- 1—.0003-microfarad fixed condenser (T.C.C., Graham-Farish, or Lissen).
- 1—.01-microfarad fixed condenser (T.C.C., Graham-Farish, or Lissen).
- 1—.0001-microfarad fixed condenser (T.C.C., Graham-Farish, or Lissen).
- 1—.0003-microfarad fixed condenser (T.C.C., type S.P.).
- 1—Pair matched intermediate-frequency transformers (Claude Lyons).
- 2—Iron-cored high-frequency chokes (Wearite).

- 1—Low-frequency transformer, 4 to 1 (Marconiphone, Cossor, or R.I. & Varley).
- 2—2-megohm grid leaks (Mullard, Graham-Farish, or Lissen).
- 1—.5-megohm grid leak (Mullard, Graham-Farish, or Lissen).
- 1—1½-volt dry cell (Siemens, type G.T., or Ever Ready).
- 2—54-volt high-tension batteries (Siemens, type 828).
- 1—2-volt unspillable accumulator (Oldham, SMV4 or SMV7).
- 2—Pieces of copper, 7½ in. by 5 in. and 7½ in. by 6½ in. (Ready Radio, Northern Radio, or Raymond).
- 2—Paxolin sheets, 15½ in. by 6½ in. by ¼ in. (Wearite).
- 4—Ebonite spacers, grooved to take frame-aerial winding (Wearite, Ready Radio, or Northern Radio).
- 1—Adjustable loud-speaker unit (Blue-spot).
- 1—60-milliamper fuse with holder (Bulgin or Ready Radio).
- 1—7½-in. fabric cone (Goodman).
- 1—Cabinet with baseboard (Pickett).

Another photograph of the Wayfarer. The valves are in position ready for use

throughout with flexible wire, no soldered joints being made at all.

Clear Leads

There is only one point about which care must be taken. This is that the leads from the right-hand condenser on the panel, looking from the front, must be kept well clear of the leads from the left-hand condenser

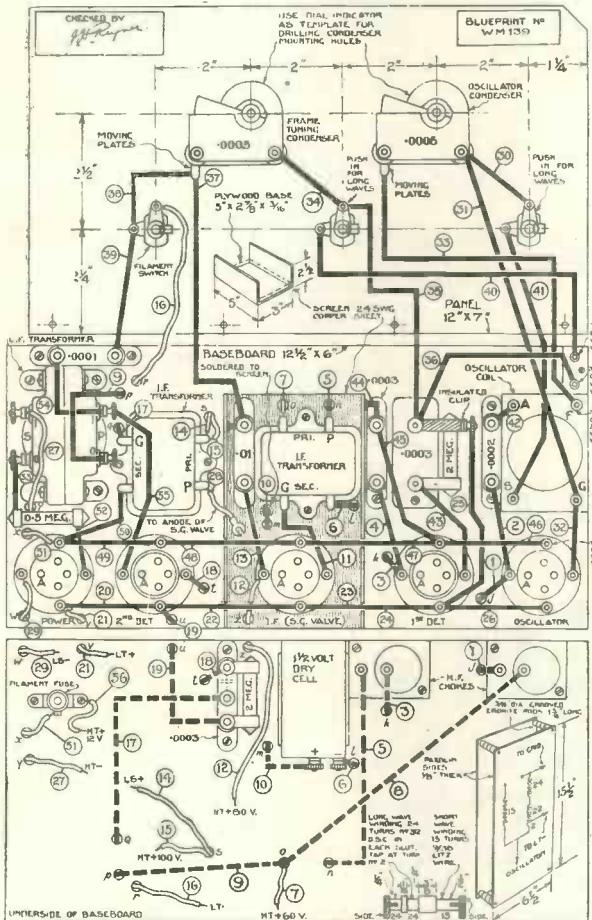
and also from the oscillator coupler. The right-hand condenser tunes the frame aerial while the left-hand condenser tunes the oscillator coupler, and it is desirable that the wires between these components shall be kept apart from each other as far as possible.

It does not follow that the receiver will not work if this is not done, but the operation will not be so pleasant as there will be a certain interaction between the two circuits. Attempts were made to overcome this by screening, but it was found to be definitely undesirable unless the screening was made somewhat complex, and, provided the wires are kept apart, no difficulty will ensue.

A word may be said regarding the loud-speaker. This may be of any convenient type, but the instrument must not contain a condenser across

The Wayfarer Portable Five (Continued)

LAYOUT AND WIRING DIAGRAM



This layout and wiring diagram of the Wayfarer can be obtained for half-price (that is, 9d., post free), if the coupon on page iii of the cover is used by May 31. Ask for No. W.M.139. Wiring up can be carried out in the numerical order indicated.

the terminals as this causes howling. If, therefore, a unit such as the Bluespot is used, the internal condenser must be removed. The material for the cone is most important, as a poor material gives weak signals. Preferably use the Goodman cone specified.

Suitable Valves to Use

For testing the receiver, the following types of valve should be inserted : Oscillator, L.F. valve; 10,000 to 20,000 ohms. First detector, H.F. valve; about 20,000 ohms. Intermediate amplifier, screened-grid valve. Second detector, H.F. valve; about 20,000 ohms. L.F. stage, Suitable power valve. (See pages 308 and 310).

to the local station in the test report. On swinging the left-hand dial over the scale, signals will be heard. It will be found that there are two tuning points on the left-hand dial at which stations can be heard. In between these two the familiar heterodyne whistle will be heard, indicating that the oscillator is actually in tune with the incoming signal.

This, of course, is not desired and the

Valves tried in this receiver and found to give good results are: Oscillator, Mullard PMI L.F.; first and second detectors, Cosmos SP16/G; screen valve, Edisan SG215; power valve, BTH 227P.

High-tension

Having inserted the various valves in their correct positions, the full H.T. should be taken to 108 volts, the oscillator and detector taps to 60 volts, while the screening grid should be taken to 80 volts. Then on switching on the receiver it is ready for use.

Place the right-hand dial at, or about, the reading corresponding

oscillator must actually be a slight degree out of tune before the correct intermediate frequency will be produced so obtaining the required signal.

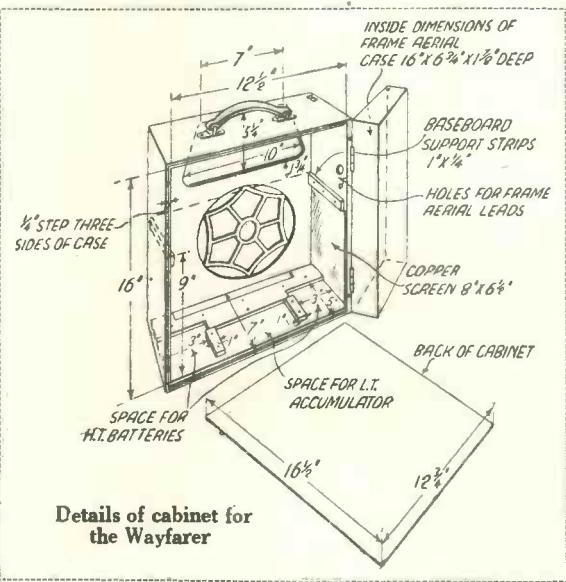
Distant Daylight Reception

Having found the local station in this way, the two dials should be rotated step by step. Rotate the right-hand dial a little, following it up with the left-hand dial. When the two dials are in tune, a slight rushing noise will be heard even if no station is present, and in this manner quite a number of distant stations will be obtained after dark. If the receiver is worked properly several of these stations, particularly on the long-wave-band, can be obtained during daylight.

Wave-change Switches

The wave-changing switch should be pushed in for the long waves and pulled out for the short waves. It is necessary, of course, to operate both switches—that is, they must both be in or both be out together.

It may be found that the intermediate stage oscillates, in which case a loud rushing noise will be heard when the dials are in tune. If this is so, reduce the value of H.T. on the detector stages, or increase the by-pass condenser on the second detector from .0001 to .0002 or .0003 microfarad ; thus the best setting for the particular receiver will readily be found.



Details of cabinet for the Wayfarer

B.B.C. Officials at Savoy Hill Discuss the Question:

How Will BROADCASTING Affect the GENERAL ELECTION?



Testing a record number of microphones for the relay of Herbert Hoover's inaugural Presidential address by the National Broadcasting Company of America

THE General Election seems a long way off as these lines are being written and no one can say what possible service broadcasting may render to the nation in connection with the campaign.

Selling Programme Time

In a recent debate in the House of Commons, one member said that he thought it would be a great mistake to overdo political propaganda by wireless. Another remarked that the American broadcasting organisation sold "time"; was it to be suggested, therefore, that political parties here should buy "time" from the B.B.C.?

One week the representative of one party might broadcast; next week the representative of another party would efface the impression created by the first speaker; then in the fol-

lowing week someone else would speak and the same thing would happen again. In the end, no party would gain by it.

All that could be suggested as the upshot of a long discussion was that if microphone facilities were used at all, the Government should have an equal opportunity with each of the other parties, that is, for each speech by one of the other parties the Government should have the right of reply—against a Liberal speech the Government should broadcast two replies.

The B.B.C. takes up the position that the political parties should agree among themselves as to their proportionate use of the microphone; but in this connection the Corporation has in mind the use of broadcasting facilities from the studio.

It is not to be supposed for one

moment that political propaganda should be indulged in to the exclusion of normal programme business, or that speech, political or otherwise, should occupy a greater proportion of total programme time than is at present allocated to the spoken word.

In the United States

The fact that in the United States of America programme "time" is secured by those with the more adequate financial backing has no relation whatever to conditions in this country; nor can it be recalled that anyone outside the House of Commons has ever suggested that political parties here should buy "time" from the B.B.C.

The analogy was not quite correct. Have not listeners been assured,

How Will Broadcasting Affect the General Election ? (Contd.)

times out of number, that broadcasting conditions in Britain are so different, so much better, than they are in America; that there is, in fact, no comparison in procedure? Then why moralise over the recent Presidential election and the methods adopted by broadcasters in the United States, when trying to decide whether the British political parties should use the microphone at a General Election?

A General Assumption

The suggestion that a speech by one party would cancel out a speech on behalf of another party seems rather like pusillanimity. It is the general assumption that that is and always has been the object of speakers of various complexions. It probably accounts for the efforts of a political candidate to secure the use of the chief hall in his constituency on the eve of an election, to enable him to get in the last word in his own behalf and, incidentally, a last thrust at his opponent.

But what matters to listeners, Savoy Hill assumes, is, in the first place, that overmuch political speechifying must be taboo. In the second place, the situation as regards studio broadcasts is that the B.B.C. should not act as arbiters; but that the political parties should themselves decide on the order and extent of their speeches.

One might mention here a point in connection with the reaction of women listeners to the de-rating debate between representatives of the three chief parties which shed an original light on the utility of this kind of broadcast. The comment occurred in several letters received by Savoy Hill and it was to the following effect:

Many housewives have small opportunity of analysing a leading national question for themselves. Their political opinions, if any, are generally based upon those held by their husbands; in fact, the only political discussions with which they come in contact are those which take place in their own homes between husband and sons; hence the views of the womenfolk are coloured.

The receiving set, on the other hand, enables them to hear the authoritative opinions of political experts

evenly balanced. In this respect there is nothing one-sided about broadcast politics.

It seems therefore that so long as the debate method is adhered to in the studio, broadcasting has its value; but added to this—and here is the third point—the relaying from outside halls of, say, three or four speeches by the party leaders would probably be welcomed during the fortnight before the General Election.

Then, right on the eve of the election, each of the party leaders could go to the London studio and give the main points in the programme of the party which he represents, confining himself solely to these matters and avoiding anything in the nature of recriminations, which might justify the other parties in seeking an opportunity for reply.

Finally, the broadcasting of speeches by any of the ordinary candidates should be prohibited; otherwise there would be a plethora of politics and the microphone would be kept working overtime to give every one his turn.

These suggestions do not pretend to solve the difficult problem, whether broadcasting should be introduced into party polemics; but they do at any rate point the way to a straightforward use of this most powerful medium, if it is to be used at all, in order to reach the thousands of listeners who have no opportunity of attending meetings.

Song Plugging

Since the B.B.C. took a firm stand over the question of song plugging, many critics have declared that it should have been possible for Savoy Hill to find a "middle course," involving some less drastic action than the banning of all dance number titles and the singing of verses. Therein is displayed a lack of real knowledge respecting the events which pre-dated the B.B.C.'s decision.

Two years ago this summer, when there was much talk about the vast sums paid by some music publishers to some dance bands to induce the latter to exploit the former's productions, a mass meeting of publishers was summoned to Savoy Hill and it was pointed out to them that the B.B.C., being the most important

channel of exploitation, was likely to be involved in the minds of the public in what was even then being labelled a crying abuse.

The publishers replied, perhaps naturally, that even if a band did receive payment to play a certain number, nothing could make a success of that tune unless it possessed some inherent qualities making for popularity. To this the B.B.C. answered that the merits of dance numbers were not under discussion.

Publishers' Conference

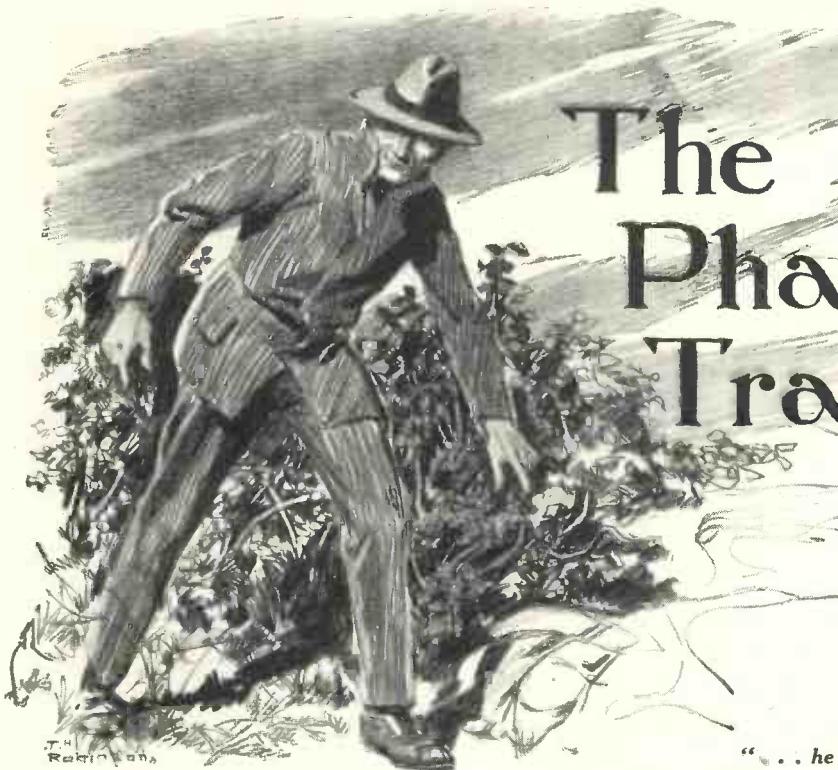
All that was asked was that the publishers should confer among themselves on the principle involved, especially in view of the fact that the B.B.C., prevented, as it was, under the terms of its licence, from accepting any financial consideration in respect of matter broadcast, might conceivably be made to appear a party to the prevailing custom of payment.

The publishers thereupon conferred among themselves and at the end of a long afternoon sitting announced that they had decided unanimously that payments should be stopped.

Some of the smaller publishers recently declared their intention of abrogating the Savoy Hill agreement and with the return of the *status quo* and the inability of the B.B.C. to control such a situation, the only possible course, short of the cancellation of all dance music by outside bands, was adopted.

To some dance bands the decision has made no difference, as their only purpose in broadcasting is to give listeners suitable rhythm to which they may dance; and if listeners are dancing they are not paying much attention to any words that are being chanted as an accompaniment to the tune. If there is, however, really any artistic aid to dance music in song plugging, it is a pity that the innocent dance bands should have to suffer along with the others.

The idea that the B.B.C. has deliberately set out to spoil listeners' enjoyment of dance music is very far from the truth, and if at any time assurance were given by the interested parties that the old methods of payment had been abolished for good and all, the B.B.C. would reconsider the matter.



*A Further Adventure of
 Devannion, the Radio Detective, Related by
 DONOVAN BAYLEY*

" . . . he would find in a hedge a package . . . "

TAKEN by and large, the British Government is a bulky and peaceable creature, extremely averse from trouble. Indeed, to the unwary it seems to doze its life away; but, a thing very few people notice, it has transparent eyelids, and an infinite number of watts behind its punch when it does reach out its paw.

A few months ago—things move so rapidly nowadays that the story can already be released—the Department for Maintaining Brotherly Love, which is the branch of the Ministry concerned, found that its sleep was being jeopardised by some crude fellows who, somewhere in the mysterious recesses of the ether, were refusing to give a damn for any of the rules and regulations that should have applied to them.

Of course, no Ministry can slumber happily if that is happening. Wars, great strikes, famines, floods, pests, all such things can drift tranquilly by, and the unconcerned Departments can, and should, take no heed. But when some ignorant and care-free member, or members, of the public take to breaking Regulations, the thunderbolts grow restless in their pigeon-holes, and the lightnings strain at their leashes.

Only those who have poked an inquisitive stick into a hornets' nest can have an approximate idea, even, of the state of things in the usually

restful Department when a properly accredited informant came in with the news that somewhere out in the unregulated world some ungoverned subject was transmitting dance records, every Sunday evening, on 36.14 metres, without a licence.

"Then why haven't you taken the appropriate remedial action, as laid down in the Regulations?" Branleigh, the informant's immediate superior officer, asked sharply.

"Because we haven't been able to trace him, sir."

"Isn't there such a thing as direction finding?"

"Yes, but it seems to have slipped up, somehow, this time. I'll put it all in my written report, of course, sir; but, for your own information, it appears to implicate what is, to all real intents and purposes, a Government Department, which is unthinkable."

"If you mean the B.B.C.", Branleigh said, sourly, "it's not a Department: it's a chartered libertine, endeavouring with a certain amount of success to amuse and instruct the public."

"I'll put it all in my report."

Branleigh became almost an ordinary, human man, full of curiosity.

"Do you mean to tell me that the B.B.C.'s kicked over the traces, that it's pumping out unauthorised stuff, that it's behaving like a mere human being?"

"I'll put it all in writing, sir."

Branleigh sighed: he knew how long it would take for that report, duly minuted upon by all sorts of people, to get through to him officially. He had always been a little troubled by the B.B.C., which was neither one thing nor the other—not a Government Department nor a company—and, reflecting coolly, he began to feel that there was really nothing, after all, that such an anomalous organisation might not do. However, he could only wait for the report to be reduced to writing, and come to him through the usual channels.

On Sunday evening, when he was temporarily an ordinary citizen, he spoke to his son, who was training with a coach for the Civil Service.

"Does your wireless set happen to be working, Cyril?" Branleigh asked. "I mean, the one you think you get Australia on."

"Of course it's working, pater."

"Then can you tune me in the unauthorised station claiming to be the new London short-wave station?"

Cyril looked at his watch.

"He'll be jerking it out in twenty-five minutes," the boy said, "but I don't know what good he thinks he's doing, because he isn't using enough power to paralyse a bee's knee."

"You might get him for me, all the same."

The Phantom Transmitter (Continued)

At the time stated, Mr. Branleigh listened to a soft voice which rolled its r's like a petrol driven mowing machine.

"This is the new shor-r-r-t wave station, London, calling the wor-r-r-rld," the announcer said. "We ar-r-re now going to play the recor-r-rd 'Let Er-r-rin Remember-r-r the Days of Old,' followed by 'Har-r-rd Hear-r-rted Hannah.' Stand by for one minute."

"Get me the B.B.C. on the telephone, Cyril," Branleigh said, when the announcer had carried out his threat. As soon as he had been connected up, he asked his question, which was full of guile. "Is that the B.B.C.? It is? Then what do you mean by casting contempt on an old Irish song by following it up with a comic record?"

The voice at the other end spoke very soothingly, for the mentally unbalanced will get on the wires: their twopences are as good as anybody else's.

"No, I'm not mad," Branleigh said. "What do you mean by it?"

"At the moment," said the voice, "we're transmitting a sermon by the Bishop of Balkingham."

"I mean, on your new short-wave station, on thirty-six-point-fourteen metres."

"Oh, that!" the voice exclaimed. "Well, as a matter of fact, that station doesn't exist."

"But I've just been listening to it."

"I know. It's very horrible. But it isn't ours. Will you please give me your name and address?"

"Better not," Branleigh said, ringing off.

Long before the report of his subordinate had reached him, Branleigh, who had heard the pirate himself now, got things moving, and they went on for weeks. The B.B.C. was written to, and pleaded not guilty. The Department's experts, with Branleigh urging them from the rear, did all their direction-finding stunts, which are very difficult and inconclusive on short waves at the best of times; but they thought that they established eventually that the transmissions which broke the Regulations, did appear, though indefinite, to come from 2LO.

Written to again, the B.B.C. assured the Department that this

was a misapprehension, and all very terrible, but that they were quite sure that it would be impossible to have a short-wave station about the place without knowing it.

That night, after the second news bulletin, one of their high officials took the public into his confidence, and explained what awfully bad form it was to pretend to be the B.B.C. when you were not.

"Please don't do it," he pleaded. "Please don't!"

On the following Sunday, the phantom pirate retorted by putting out a song, not badly sung, either, called "Where is My Wandering Wave To-night?" a parody of "Where is My Wandering Boy?"

The cat being thus out of the bag, the intelligent animal ran at once to the newspaper offices, which are inhabited by men who can put two and two together, and make four of it every time.

"This Thing is Sinister," Fleet Street said.

"Remarkably interesting," the Special Branch of the C.I.D. mused. "Can they be correlated?"

It was the C.I.D. which did what should have been done a fortnight earlier; they called in T. C. Devannion.

* * *

Chief-Inspector McKay, of the special branch, was a man who, met casually, inspired you with confidence. He was big, and happy, and full of love for his fellow men.

"So you're the famous Mr. Devannion," he said, when the two men met at the Yard. "Well, well, well, you look like one of those bright young men who haven't a care in the world, except on boat race night."

"I'm always very happy, thanks. What's the problem?"

"Nothing, you'd say, greatly in our line, but, all the same, we're interested. There's a very clever lad somewhere in this great city who's putting out a wireless transmission which he tells the world is coming from 2LO. It isn't; but he's getting away with his joke to this extent, that all our experts can do is to prove that it is, while all the time they know it can't be. Can you beat that?"

Devannion looked much more

interested, while McKay watched him sideways, and felt pleased.

"Of course," Devannion said, "the whole thing may be an elaborate joke by someone who has a grievance because he couldn't get a transmitting licence, but, even in that case, you'd like to know?"

"I wonder if you've ever considered what a responsibility looking after law and order is, Mr. Devannion. If you never have, think it over one day when you're not too busy and you'll appreciate how we feel here when something public's happening that we can't explain."

"There's a devil of a lot goes on under the surface of London that we've got to keep under the surface, or root out altogether. Perhaps you'd care to read through these papers. They'll tell you everything the proper authorities have found out, but, mostly, I'm afraid, they're a confession of what they haven't been able to learn."

Devannion read the reports, with the minutes upon them, while McKay waited.

"Well, Mr. Devannion? Does all that tell you anything?" he asked. "Can you say, from the data there what this Phantom Transmission is?"

"It tells me exactly what it has told the Government experts. Have you any theories?"

"No. All I've got is a two-valve set which my children are always dissing, and which, when they do, I have to call a man in to mend. That's the extent of my knowledge of wireless."

"What I meant was, have you any theories as to who would be likely to make illegal use of a pirate transmission?"

"Oh, I see. Well, any gang of rogues with a proper, healthy fear of trusting their secrets to the G.P.O. You find the Phantom, and we'll probably be able to tell you who he is, and look after him afterwards. Now, what help do you need?"

"None, I think, thanks."

"Well, you're going to have some. I'm inclined to take the same view as the papers, that there's something sinister in this."

From then till the end of the business, T. C. Devannion, to his own great amusement, was tended day and night by a couple of placid, good-

Read About Devannion—the Radio Detective!

humoured men, whose main value to the country was that they were highly intelligent without looking it, and perfectly ready to tackle anything from an armed and cornered criminal to a ton of dynamite behind a runaway horse.

Devannion's first work was to confirm, by his own independent experiments, the results obtained in Branleigh's Department. In those days—he has moved since—he lived in a top flat in Red Lion Square, and, naturally, most of the space was given over to gear, and, at the moment policemen, for the accommodation was restricted.

to his west, though the general effect he obtained was that they wandered in from anywhere.

This time, the records were those of quite ordinary dance tunes, apparently chosen haphazard, though, as in the case of the gramophone recitals given by the B.B.C. itself, the numbers of the records were given with faithful care.

So very particular, indeed, was the announcer that this information should be clear that Devannion wondered, for an instant or two, if it could be an advertising campaign by some dealer in potted music.

Then, viciously, a revolver bullet

you notice where the shots came from, sir?"

"The middle attic window of number two-hundred and twelve."

"No doubt he'll be gone, but we'll have a look."

Two-hundred and twelve, entirely occupied by businesses, proved to be empty when searched, but the disturbed dust on the sky-light showed that some one had gone through it on to the roof in rubber shoes.

"Well, that wasn't a Phantom Transmission," Devannion said, thinking of the bullets. "There was a real kick behind that. The problem's got some snap in it now."

"The mistake our people made, sir, was in asking you to call at the Yard, instead of meeting you quietly somewhere else. They might have known that the criminals would expect you to be in on it!"

"It's clear that those ruffians would be best in a good strong gaol. Will you get me a railway delivery van as soon as possible?"

"No, sir. You forget that the railways don't deliver on Sundays, but that the Post Office vans work every day of the seven. One of those would be better."

For the next three Sunday evenings Devannion, in the G.P.O. uniform, and accompanied by his guard, toured London.

The van, of course, was fitted internally with direction-finding apparatus, and this, in its turn, was furnished with meters for showing the strength of the signals received. It was owing to what these told him that, on the following Monday, he made a tour, still with his guard, on all the accumulator charging stations in and near Walthamstow, but, this time, in a railway delivery van.

Curious people, tuned-in to the Phantom Transmission on the Sunday after that, were startled by hearing it stop suddenly, after a clear, distinct voice had said, above the music,



To be as clear as possible of any damping effects from the iron fire-escape stairs, Devannion, with a small portable short-wave set, arranged, in this case, for use with a loop aerial, went up on to the roof on the following Sunday evening. The two guards, faithful to their trust, sat on the iron steps a few feet below him.

As did anyone else with suitable equipment, he readily found and tuned-in the Phantom Transmission, and listened to the announcer petting his r's. As far as he could determine, though it was very vague, the signals did seem to come from Oxford Street,

flattened itself into a silvery splash on the brickwork of the chimney beside Devannion's head, another hit the woodwork of the frame aerial, and a third smashed the ebonite panel of the set. Before anything else could happen, the two guards had pulled Devannion down into cover on the iron staircase.

"You've had a close shave, sir," one of the men said.

"No," the other denied. "That was a warning. He missed Mr. Devannion, but he hit the two other things he aimed at, the wire business and the set. He could have hit his head, too, if he'd wanted that. Did

The Phantom Transmitter (Continued)

"Hands up!" The Phantom had evidently been laid, because it was silent from then on.

* * *

It was not until Devannion was called to give evidence that some of the facts leaked out, and then only a trickle of them, for the Press, when the matter had been explained confidentially by the Authorities, was very loyal in suppressing much of the testimony, which, in addition, was made as technical as possible, in order to veil it in unintelligibility.

Not one word was said as to his own escape from death, for that did not come into the case, as the gunman was not on trial then. As far as possible, the thing was treated as if it were, outwardly, merely unlicensed transmission.

However, in fact, it was the break up of a dangerous conspiracy, and the fragments were collected at leisure, and taken care of, with the result that there was more peace for all in a neighbouring island than anyone with special knowledge had hoped.

It is not necessary to be so particular now. The house in Ramplin Avenue, Walthamstow, to which Devannion was able to direct Chief-Inspector McKay of the Special Branch of the C.I.D., was the inner circle of an organisation for supplying arms to a desperate faction in the Free State.

This faction, though nominally political, was in reality, predatory, and hoped to get opportunities for loot on a gigantic scale by fomenting a rising among the irreconcilables, the idea being to hold up such places as banks, post-offices, and large business concerns, where big sums of ready money could be found. The faction called itself communistic, and was in receipt of funds from Moscow, which it was, equally, deceiving.

There is, perhaps, no falser proverb than that which says that there is honour among thieves. The precautions taken to keep secret the identities of those issuing orders and directions is proof enough of that. No one, outside the inner ring, was trusted. The actual scheme itself was worked out by the international adventurer, who called himself just then Gavin Butler Ardreich, while he was in Sing-Sing, where they gave

prisoners ample chance of self-education.

It was simple. Relying on the extreme difficulty of direction-finding such a transmission as he meant to use, Gavin Butler Ardreich put a gramophone concert out, and gave a number with every record played, the numbers of the records, taken in the order played, broadcasting a message in cipher, which, decoded, instructed the lesser members of the conspiracy where to collect the parcels of arms and ammunition in transit, and to whom to hand them on, so that no man should be able to give a history of the journey of any

*Use the Special Coupon
on Page iii of the cover to
get a Half-price Blueprint
of any Set constructionally
described in this issue.*

single consignment if he determined to turn traitor.

All that he knew was that if he went to, for example, a certain field in Finchley he would find in the hedge a package which it was his part to deposit under a specified bridge in the neighbourhood of Chester, for instance, by the following night.

Payment of salary and expenses was made in currency notes sent in registered envelopes from various quarters of London, and no receipt was expected. Failure to deliver the goods to time resulted in deduction from the sums delivered as wages, and followed automatically, showing that the inner ring was perfectly aware of the actions of its agents, though those agents had not the smallest conception who their paymaster was.

"The first thing I noticed," Devannion explained, "was the coincidence of the offender with the tenth harmonic of 2LO, and the second significant point was that the Phantom was received mainly, and certainly at its strongest, within a ten-mile circle having Walthamstow as its centre, more or less."

"I then noticed that the absence of any help at all from direction-finding apparatus in pinning the transmission down to a definite spot must indicate something peculiar, and suggestive of anything but a straightforward method of sending."

"The conclusion I arrived at ultimately was that a peculiar modula-

tion was being put out—with no carrier—on 180.7 metres, which is one half of London's wave. Now, the fifth harmonic of the modulatory station coincided with the tenth from London, the normal modulation from 2LO being reversed, and a fresh modulation superposed, and thus, on the short wave, only the fresh modulation was heard.

"Since the modulation was on a quite different wave from the offending signals everyone picked up—36.14 metres—no one spotted that, and the direction-finding gear would, if anything, lead them to London.

"But it was easy to narrow the thing down to Walthamstow by the use of a galvanometer indicating the actual signal strength received by my aerial, and the problem was to discover who there was in that place we might reasonably suspect. A round of inquiries at the accumulator charging stations revealed that the prisoners were sending one or two batteries to be charged to every depot in the district. It was absence of any sign of ripple that told me that the power was not being obtained direct from the mains.

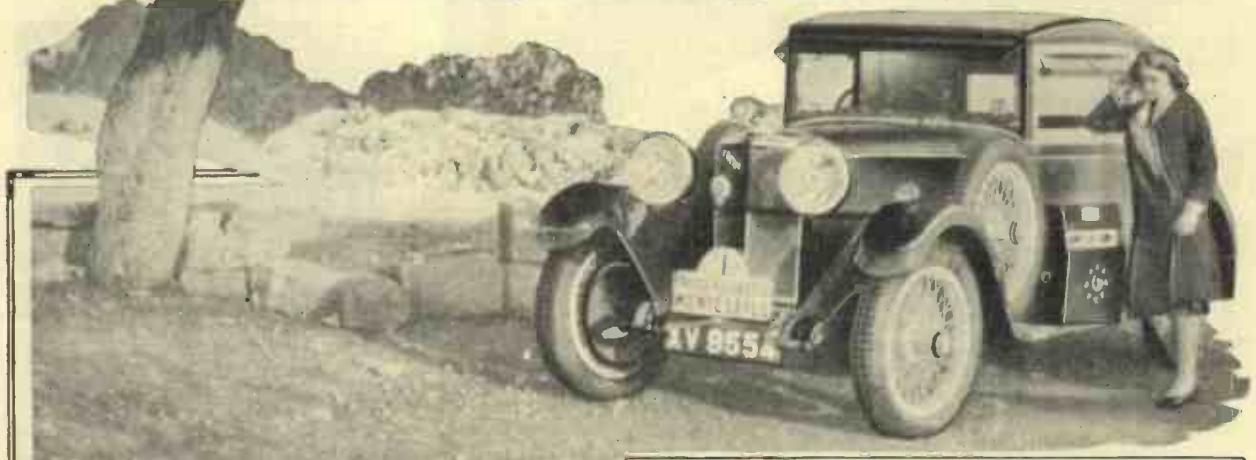
"The circumstance that I took down the numbers of the records as read out by the announcer was fortunate, but I did that because I have always found that no detail should ever be neglected. That is why I sent one of my assistants to verify the actual numbers on the records, and it was not until he ascertained that the figures announced were different from those used by the gramophone record makers that I suspected a code."

"The credit of deciphering the code belongs entirely to Scotland Yard. The messages warned us that we had dangerous men to deal with, and the warning probably saved our lives. It was then that I grew personally interested, apart from my interest in the abstract problem, for I'd begun then to feel that a spot of prison would do such people no harm."

"If they'd only been able to trust each other," McKay said, "they wouldn't have had to give their orders by wireless, and we'd probably be still hunting them. But criminals never can trust each other. That's how we always get them in the end."

**Portable Set Buyers' Guide —
Supplement to "Wireless Magazine"**

HOW TO CHOOSE, BUY AND OPERATE YOUR PORTABLE!



**RECEIVERS TO SUIT EVERY POCKET
FOR USE IN THE HOME OR ON THE
OPEN ROAD**

POINTS ABOUT THIS GUIDE

In the following pages you will find particulars of 100 portable receivers, illustrated by 60 photographs, ranging in price from ten to fifty guineas.

As far as possible the same details have been given for each receiver, so that the prospective buyer can make comparisons.

It should be specially noted that some sets are adaptable for various purposes. For instance, many portables can be used with an external aerial and earth, external batteries or a mains supply unit. Other sets have provision for the use of an external loud-speaker in addition to that incorporated in the case. Such arrangements often materially affect the general utility of a receiver.

Every photograph appears in its own descriptive paragraph unless otherwise indicated. Comments on sets are based on information obtained from the makers and not on personal experience. When a set can be obtained on deferred terms, the fact is indicated by a note after the price.



SHOW THIS SUPPLEMENT TO THOSE OF YOUR FRIENDS WHO WANT TO BUY PORTABLES!

How to Choose, Buy and Operate Your Portable (Continued)

CANTOPHONE PORTABLE TWO

Circuit : Two valves; detector and L.F.
Wavelength Range : 250 to 500 and
1,350 to 1,800 metres.

Overall Dimensions : 12 in. by 9 in. by
5 in.

Weight : (a) without batteries, 7 lb.,
(b) in complete working order, 10 lb.

Finish : Handsewn leather attache case.
Adaptable for external aerial and
earth, and external loud-speaker.

Price : £10 10s. (including phones).

Remarks : A headphones set; London
30 miles, Daventry 100 miles. Will
operate a loud-speaker up to 5 or 6
miles from London. Very low bat-
tery consumption.

Maker : Cantophone Wireless Co.,
310 Regent Street, W.1.



Each photograph appears in its own descriptive paragraph unless otherwise indicated.



Read the special article on portables that begins on page 317.

Overall Dimensions : 13½ in. by 7 in. by
13½ in.

Weight : in complete working order,
16 lb.

Finish : Leather-cloth, blue and other
colours.

Adaptable for external aerial and earth,
and external loud-speaker or phones.

Price : £10 17s. 6d.

Maker : Eric J. Lever (Trix), Ltd., 8/9
Clerkenwell Green, E.C.1.

EMPIRE THREE

Circuit : Three valves.

Wavelength Range : 250 to 500 metres.
Overall Dimensions : 18 in. by 16 in.
by 5 in.

Weight : in complete working order,
15 lb.

Finish : Black imitation leather or real
leather.

Adaptable for external aerial and earth.
Price : £10 10s. (deferred terms).

Maker : Empire Electric Co., 10 Fitzroy
Square, London, N.W.1.

S.R.S.

Circuit : Three valves; detector, two
L.F.

Wavelength Range : 250 to 2,500
metres.

Overall Dimensions : 13 in. by 13 in.
by 6 in.

Weight : (a) without batteries, 11 lb.;
(b) in complete working order, 19 lb.

Finish : Mahogany only.

Adaptable for external aerial and earth,
and external loud-speaker.

Price : £10 10s.
Maker : Station Radio Stores, 38
Palmer Street, Westminster, S.W.1.

TRIX PORTABLE TWO

Circuit : Two valves, detector and one
L.F.

Wavelength Range : 250 to 550 metres.

EMPIRE FOUR

Circuit : Four valves.

Wavelength Range : 250 to 500 metres.

Overall Dimensions : 18 in. by 16 in.
by 5 in.

Weight : in complete working order,
16 lb.

Adaptable for external aerial and earth.
Price : £12 12s. (deferred terms).

Maker : Empire Electric Co., 10 Fitzroy
Square, London, N.W.1.

SUPER THREE

Circuit : Three valves; H.F., detector,
pentode.

Weight : in complete working order,
24 lb.

Finish : Leatherette covered.

Adaptable for external aerial and earth,
external loud-speaker and external
batteries.

Price : £12 12s. (cash).

Maker : Steval, Ltd., 133 Oxford St.,
London, W.I.

CASTAPHONE PORTABLE

Circuit : Four valves; H.F. (aperiodic),
detector (leaky-grid), 1st L.F.
resistance-coupled, 2nd L.F. trans-
former-coupled.

Wavelength Range : Dual wave.

Overall Dimensions : 16 in. by 16 in.
by 8 in.

Weight : in complete working order,
26 lb.

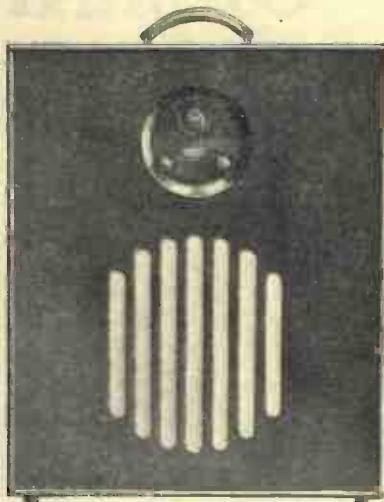
Finish : Polished walnut.

Adaptable for external aerial and earth,
external loud-speaker, external bat-
teries, and mains working.

Price : £14 14s.

Remarks : Complete with Mullard
valves, types PM1 and PM2 output.
Ripault's high-tension battery.
Kathenode L.T. accumulator. Self-
contained cone speaker.

Maker : Gordon Castagnoli, Castophone
Radio Works, Colchester, Essex.



NATIONAL

Circuit : Five valves; two H.F stages
(choke coupled aperiodic); detector
(leaky grid), two L.F stages, trans-
former-coupled.

Wavelength Range : 200 to 600, and
800 to 2,000 metres.

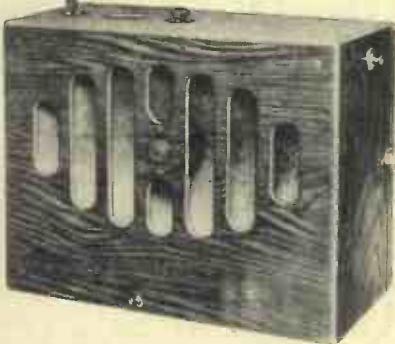
Overall Dimensions : 13 in. by 16 in.
by 8½ in.

Weight : in complete working order,
27 lb.

Finish : Polished oak.

Price : £15 (deferred terms).

Maker : National Electric Co., 10-12-
14 Beak Street, W.I.



Above is a photograph of the National portable.



Details of Sets Costing from £10 : 10 : 0 to £15 : 15 : 0



ORMOND FIVE

Circuit : Five valves; two choke-coupled H.F., leaky-grid detector, and two L.F., one R.C. and one transformer-coupling.
Wavelength Range : 240 to 550 and 1,000 to 2,000 metres.
Overall Dimensions : 18 in. by 8½ in. by 14½ in.

Weight : (a) without batteries, 20 lb.; (b) in complete working order, 32 lb.

Finish : Jacobean oak.

Adaptable for external aerial and earth; can be arranged for external batteries and mains working to order.

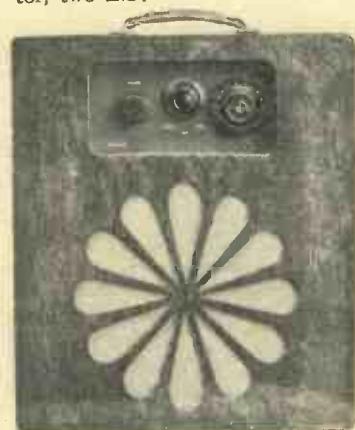
Price : £15.

Remarks : English and Continental stations easily received on both wavebands. One-dial tuning.

Maker : Ormond Engineering Co., Ltd., 199 Pentonville Road, Kings Cross. N.I.

C.W.C.

Circuit : Five valves; two H.F., detector, two L.F.



Wavelength Range : 250 to 600 metres, 1,000 to 2,000 metres.

Overall Dimensions : 16 in. by 18 in. by 7½ in.

Weight : in complete working order, 28 lb.

Finish : Mahogany or oak.

Adaptable for external aerial and earth, external loud-speaker, external batteries, and mains working.

Price : £15 15s. (deferred terms).

Maker : Cooks Wireless Co., Ltd., C.W.C. Works, Ipswich.

MELOSET

Circuit : Five valves; two H.F., detector, L.F. and power.

Wavelength Range : 200 to 600, and 1,000 to 2,000 metres.

Overall Dimensions : 16 in. by 12 in. by 7 in.

Weight : (a) without batteries, 22 lb.; (b) in complete working order, 28 lb.

Finish : Mahogany and oak.

Adaptable for external aerial and earth, external loud-speaker, and mains working.



Price : £15 15s. (deferred terms).

Maker : Truphonic Radio Ltd., Truphonic House, Hanover Park, Peckham, S.E.15.

PEERLESS SUITCASE

Circuit : Five valves; two H.F., detector, two L.F. (transformers).

Wavelength Range : 200 to 500, and 1,000 to 2,000 metres.

Overall Dimensions : 15 in. by 12 in. by 5½ in.

Weight : (a) without batteries, 14 lb.; (b) in complete working order, 25 lb.

Finish : Various.

Adaptable for external aerial and earth, external loud-speaker, and external batteries.

Price : From £15 15s. (deferred terms).

Maker : Bedford Electrical & Radio Co., Ltd., 22 Campbell Rd., Bedford.

**In any Correspondence with
Manufacturers please men-
tion "Wireless Magazine"**

S.R.S.

Circuit : Five valves; two H.F., detector, two L.F.

Wavelength Range : 250 to 2,500 metres.

Overall Dimensions : 13 in. by 13 in. by 6 in.

Weight : (a) without batteries, 11 lb.;

(b) in complete working order, 22 lb.

Finish : Mahogany.

Adaptable for external aerial and earth, and external loud-speaker.

Price : £15 15s.

Remarks : One of the smallest and lightest portables on the market. Switch changes wave range and operates filaments.

Maker : Station Radio Stores, 38 Palmer Street, Westminster, S.W.1.

STANAPHONE SUITCASE MODEL

Circuit : Five valves; two choke-coupled H.F., grid-leak detector, and two transformer L.F.

Wavelength Range : 250 to 550, and 1,000 to 2,000 metres.

Overall Dimensions : 15 in. by 12 in. by 9½ in.

Weight : in complete working order, 27 lb.

Finish : Hide.

Adaptable for external aerial and earth, external loud-speaker, external batteries, and mains working.

Price : £15 15s. (deferred terms).

Remarks : A separate cabinet can be provided for use at home, containing larger batteries or eliminator and a special plug. This connects the internal batteries in the portable and connects up with the eliminator or batteries, in the special cabinet. The portable stands on top of the cabinet, and if used with an outside aerial, provision is made for connecting this to a terminal provided at the back of the cabinet, and so bringing into use a wave-trap, to eliminate the local.

Believed to be the only makers in England to combine these two valuable innovations.

Maker : M. Stanley & Co., 174 London Road, Liverpool.

STANAPHONE TRANSPORTABLE

Circuit : Five valves; two choke-coupled H.F., grid-leak detector, two transformer L.F.

Wavelength Range : 250 to 550, and 1,000 to 2,000 metres.



How to Choose, Buy and Operate Your Portable *(Continued)*

Overall Dimensions : 18 in. by 14 in. by 8 in.

Weight : in complete working order, 30 lb.

Finish : Oak or mahogany.

Adaptable for external aerial and earth, external loud-speaker, external batteries, and mains working.

Price : £15 15s. (deferred terms).

Remarks : An extra cabinet can be provided, same as described for Suitcase model (page 3).

Maker : M. Stanley & Co., 174 London Road, Liverpool.

AEONIC SUITCASE PORTABLE

FIVE

Circuit : Five valves; two choke-coupled H.F., leaky-grid detector, transformer and R.C. coupled L.F. stages.

Wavelength Range : 230 to 550, and 1,000 to 2,000 metres.

Overall Dimensions : 15 in. by 12½ in. by 8½ in.

Weight : in complete working order, 27 to 30 lb.

Finish : Brown hide attache case. Adaptable for external aerial and earth.

Price : £16 16s. (deferred terms).

Maker : Aeonic Radio, Ltd., 90 Regent Street, W.1.

(Photograph on page 386)



Do not overlook the special article on page 317 if you want some hints on choosing a set.

Finish : Leatherette.

Adaptable for external aerial and earth, and external batteries if leads are lengthened.

Price : £16 16s. (deferred terms).

Maker : Lissen, Ltd., Friars Lane, Richmond, Surrey.

POPULAR

Circuit : Five valves; two H.F., detector, two L.F.

Wavelength Range : 250 to 2,000 metres.



Before buying a Set it is a good plan to hear the models your local dealer has in stock. Conditions vary so much in different places.

Co., Ltd., 25 Eccleston Street, Victoria, S.W.1.

CELEBRO

Circuit : Five valves; two H.F., detector, one L.F. transformer, one L.F. R.C. Coupled.

Wavelength Range : 240 to 560, and 1,070 to 2,000 metres.

Overall Dimensions : 15½ in. by 12½ in. by 9½ in.

Weight : (a) without batteries, 16 lb.; (b) in complete working order, 25 lb.

Finish : Brown hide and blue Rexine.

Adaptable for external aerial and earth.

Price : Hide £16 16s.; Rexine, £15 15s.

Maker : Celebitone Ltd., Celebitone Works, Chase Estate, Park Royal Road, North Acton, N.W.10.

Overall Dimensions : 14 in. by 14 in. by 9 in.

Weight : in complete working order, 27 lb. (approx.).

Finish : Pegamoid.

Adaptable for external loud-speaker.

Price : £16 16s. (deferred terms).

Maker : Langham Radio, Ltd., 96 Regent Street, W.1.

REGIONAL

Circuit : Five valves; two H.F., detector, two L.F.

Wavelength Range : 250 to 550, and 1,000 to 2,000 metres.



By mentioning "Wireless Magazine" you will be able to get further details from manufacturers without delay. Write for them now.



The price indicated is in every case for a complete installation ready for immediate use by the buyer.

Circuit : Five valves; two stages choke-coupled H.F., leaky-grid detector, two stages transformer-coupled L.F.

Wavelength Range : 250 to 550, and 1,000 to 2,000 metres.

Overall Dimensions : 15½ in. by 12½ in. by 9 in.

Weight : (a) without batteries, 17 lb.;

(b) in complete working order, 27 lb.

Finish : Suitcase covered with Rexine,

antique leather finish.

Adaptable for external aerial and earth.

Price : £16 16s. (deferred terms).

Remarks : Can be supplied in case with real cowhide for £17 17s.

Maker : Classic Radio & Gramophone

FIVE-VALVE COMPETITION PORTABLE RECEIVER

Circuit : Five valves; two H.F., detector, two L.F.

Wavelength Range : 250 to 530, and 950 to 2,000 metres.

Overall Dimensions : 15½ in. by 15 in. by 8½ in.

Weight : (a) without batteries, 18½ lb.;

(b) in complete working order, 30 lb.



Details of Sets Costing from £15:15:0 to £18:12:0

Overall Dimensions : 15 in. by 11 in. by 7½ in.

Weight : in complete working order, 26 lb.

Finish : Red leather despatch case; four colours—green, blue, brown, and light brown.

Adaptable for external aerial and earth, and external loud-speaker.

Price : £16 16s. (deferred terms).

Remarks : Complete with Celestion loud-speaker. Distinct advance in design on usual inexpensive sets.

Maker : Rolls Caydon Sales, Ltd., Rolls Caydon House, 77 Rochester Row, S.W.1.

ROVER

Circuit : Five valves; two choke-coupled H.F. stages, detector, and two L.F. transformer-coupled stages.

Wavelength Range : 200 to 500, and 1,000 to 2,000 metres.

Overall Dimensions : 18½ in. by 14½ in. by 9 in.

Weight : (a) without batteries, 19 lb.; (b) in complete working order, 31 lb.

Finish : Mahogany or oak.

Adaptable for external aerial and earth, and external loud-speaker.

Price : £16 16s. (deferred terms).

Remarks: The Rover is fitted with a revolving turntable which is included



in the price, and a waterproof cover which is not included in the price. In addition, a jack is provided to accommodate an electrical pick-up for playing gramophone records.

Maker : The Peto-Scott Co., Ltd., 77 City Road, E.C., and 62 High Holborn, London, W.C.

ROYAL

Circuit : Five valves; two H.F. (aperio-

dic), detector (leaky grid), two L.F. (R.C. and transformer.)

Wavelength Range : 250 to 600, and 1,000 to 2,000 metres.

Overall Dimensions : 15½ in. by 12½ in. by 8½ in.

Weight : (a) without batteries, 13 lb.; (b) in complete working order, 25 lb.

Finish : Nut brown, best hide.

Adaptable for external loud-speaker.

Price : £16 16s.

Remarks : Slow-motion control of tuning and reaction. No leads visible anywhere. Every set calibrated.



Maker : Royal Radio Co., 4/5 Dorset Mews North, Upper Gloucester Place, N.W.1.

ADVANCE

Circuit: Three valves; detector, and two L.F.

Wavelength Range : 200 to 600, and 1,000 to 2,000 metres.

Overall Dimensions : 16 in. by 17 in. by 9 in.

Weight : in complete working order, 28 lb.

Finish : Mahogany, cabinet type.

Adaptable for external aerial and earth, and external loud-speaker.

Price : £17 15s. (deferred terms).

Remarks : Also suitcase type same price.

Maker : Advance Radio Co., Carlton House, Regent Street, S.W.1.

EDISON BELL PICNIC

Circuit : Five valves; two H.F., detector and two L.F.

Wavelength Range : 250 to 550 and 1,000 to 2,100 metres.

Overall Dimensions : 13½ in. by 13½ in. by 10 in.

Weight : in complete working order, 26 lb.

Finish : Dark blue leatherola.



Adaptable for external aerial and earth. Price: £18 12s.

Maker : Edison Bell Ltd., Edison Bell Works, London, S.E.15.

DUNHAM PORTABLE

Circuit : Five valves; two H.F., detector, two L.F.

Wavelength Range : 250 to 600, and 980 to 2,000 metres.

Weight : (a) without batteries, 15 lb., portable; 20 lb. transportable; (b) in complete working order, 20 lb., portable; 25 lb. transportable.

Finish : Real leather, natural finish, or special finishes (morocco, crocodile, etc.) to order. Oak or mahogany (walnut, etc., to order).

Adaptable for external aerial and earth, external loud-speaker, external batteries, and mains working.

Price : Portable, £17 11s. Transportable, £18 12s. (deferred terms).

Maker : C. S. Dunham, Elm Park, London, S.W.



This is a photograph of the Dunham Portable Set



How to Choose, Buy and Operate Your Portable (Continued)



Trix
Portable
Set

TRIX PORTABLE FIVE

Circuit : Five valves; two H.F., detector, and two L.F.
Wavelength Range : 250 to 550, and 1,000 to 2,000 metres.
Overall Dimensions : 17 in. by 16 in. by 9 in.
Weight : in complete working order, 26 lb. (leather case model).
Finish : Walnut, mahogany, solid leather, and lacquer.
Adaptable for external aerial and earth, external loud-speaker, external batteries, and mains working.
Price : £18 13s. 10d. (deferred terms).
Remarks : Turntable included. Patented attachment for providing mains or battery operation at will.
Maker : Eric J. Lever (Trix), Ltd., 8/9 Clerkenwell Green, E.C.1.

BURNE-JONES SUITCASE FIVE

Circuit : Five valves; two H.F., detector, and two L.F.
Wavelength Range : 250 to 600, and 1,000 to 2,000 metres.



Overall Dimensions : 15 in. by 15 in. by 9½ in.

Weight : (a) without batteries, 16½ lb.; (b) in complete working order, 27 lb.
Finish : Grained leatherette, choice of colours.

Adaptable for external aerial and earth, and external loud-speaker.

Price : £18 18s. (deferred terms).

Maker : Burne-Jones & Co., Ltd., Magnum House, 296 Borough High Street, London, S.E.1.

BURNE-JONES TRANSPORTABLE FIVE

Circuit : Five valves; two H.F., detector, and two L.F. (one R.C. and one transformer).

Wavelength Range : 250 to 600, and 1,000 to 2,000 metres.

Overall Dimensions : 18 in. by 17 in. by 8½ in.

Weight : (a) without batteries, 17½ lb.; (b) in complete working order, 28 lb.

Finish : Polished mahogany.

Adaptable for external aerial and earth, and external loud-speaker.



Price : £18 18s. (deferred terms).

Maker : Burne-Jones & Co., Ltd., Magnum House, 296 Borough High Street, London, S.E.1.

FLAWLESS FIVE

Circuit : Five valves.

Wavelength Range : 200 to 2,000 metres.

Overall Dimensions : 15 in. by 12 in. by 9 in.

Weight : in complete working order, 28 lb.

Finish : Leather covered.

Adaptable for external batteries.

Price : £18 18s. (cash).

Remarks : Excellent range of Continental stations.

Maker : Steval, Ltd., 133 Oxford Street, W.I.

NULLI SECUNDUS "UNIVERSAL"

Circuit : Five valves; two H.F. detector, two L.F.

Wavelength Range : 300 to 600 and 1,000 to 1,900 metres.

Overall Dimensions : 12½ in. by 9½ in. by 15½ in.

Weight : in complete working order, 28 lb.

Finish : Grey and jade green, despatch case.

Adaptable for external aerial and earth, and external loud-speaker.

Price : £18 18s. (deferred terms).

Maker : C. Creswick Atkinson, 356 High Street, Bedford.



GODWINEX JUNIOR

Circuit : Five valves; two H.F., detector and two L.F.

Wavelength Range : 200 to 500 and 1,000 to 2,000 metres.

Overall Dimensions : 16 in. by 16 in. by 7 in.

Weight : in complete working order, 25 lb.

Finish : Polished oak and mahogany.

Price : £19 19s. (oak), and £20 9s. (mahogany); deferred terms.

Remarks : Mullard valves, Exide unspillable accumulator, Godwinex high-tension and grid-bias batteries. Godwinex cone loud-speaker. Guaranteed for 12 months.

Maker : J. Dyson & Co., Ltd., St. Stephens House, 2 Coleman Street, E.C.2.

LISSEN FIVE-VALVER

Circuit : Five valves; two H.F., detector, and two L.F.

Wavelength Range : 250 to 530 and 950 to 2,000 metres.

Overall Dimensions : 15½ in. by 15 in. by 8½ in.

Weight : (a) without batteries, 18½ lb.,

(b) in complete working order, 30 lb.

Finish : Hide, oak, or mahogany.



Details of Sets Costing from £18 : 14 : 0 to £21 : 12 : 6



Look out in the next issue of the "Wireless Magazine" for more important information about portable sets

Adaptable for external aerial and earth, external loud-speaker, but for external batteries only if leads are lengthened.
Price : £19 19s., all models (deferred terms).
Maker : Lissen, Ltd., Friars Lane, Richmond, Surrey.

PORTADYNE JUNIOR

Circuit : Five valves.
Wavelength Range : 200 to 500 and 900 to 2,000 metres.
Overall Dimensions : 12½ in. by 15 in. by 9 in.
Weight : in complete working order, 25 lb.
Finish : Real hide, lizard fabric, Oxford blue fabric.
Price : £19 19s. (deferred terms).
Maker : Whittingham, Smith & Co., 110 Kew Green, Kew, London.

RIALTON PORTABLE

Circuit : Four valves; two H.F. (choke-coupled), detector, pentode.
Wavelength Range : 250 to 2,000 metres.
Overall Dimensions : 14 in. by 12 in. by 9 in.
Weight : in complete working order, 26 lb.
Finish : Leatherettes, oak, and mahogany.
Adaptable for external aerial and earth.
Price : £19 19s.
Remarks : Oak and mahogany; leatherette models at a slightly higher price.
Maker : Rialton Radio, 27 Old Bond Street, W.I.

ALL BRITISH SUPER FIVE

Circuit : Five valves; two H.F., detector, two L.F.
Wavelength Range : 250 to 2,000 metres.
Overall Dimensions : 15 in. by 8½ in. by 8½ in.

Weight : in complete working order, 30 lb.
Finish : Oak, mahogany, or walnut.
Adaptable for external aerial and earth.
Price : £20, in oak (deferred terms).
Remarks : Single dial tuning.
Maker : B. & J. Wireless Co., 2 Athalstane Mews, Stroud Green Road, N.4.

BURGOYNE MODEL A

Circuit : Five valves; two H.F., detector, and two L.F.
Wavelength Range : 250 to 550, and 1,000 to 2,000 metres.
Overall Dimensions : 15 in. by 12 in. by 8 in.
Weight : (a) without batteries, 15½ lb.; (b) in complete working order, 26 lb.
Finish : Brown hide.
Adaptable for external aerial and earth, and external loud-speaker.
Price : £21 (deferred terms).
Maker : Burgoyne Wireless Ltd., 34a York Road, King's Cross, London, N.1.

DISTA

Circuit : Four valves; screened-grid H.F., detector, L.F., and power.
Wavelength Range : 200 to 600, and 900 to 2,000 metres.
Overall Dimensions : 14 in. by 14 in. by 9 in.
Weight : (a) without batteries, 22 lb.; (b) in complete working order, 30 lb.
Finish : Leather cloth.
Price : £21 (deferred terms).
Maker : Truphonic Radio, Ltd., Truphonic House, Hanover Park, Peckham, S.E.15.



In some cases it has not been possible to obtain photographs; write to the makers for a folder, mentioning "W.M."

Overall Dimensions : 13 in. by 16½ in. by 7 in.
Weight : in complete working order, 21 lb.
Finish : Walnut cabinet.
Adaptable for external aerial and earth, and loud-speaker.
Price : £21 (deferred terms).
Maker : Halcyon Wireless Co. Ltd., 313/319 Regent Street, W.1.
(Photograph on page 386)

LECODYNE PORTABLE FIVE

Circuit : Five valves; two H.F., detector, and two L.F.
Wavelength Range : 250 to 2,000 metres.
Overall Dimensions : 17½ in. by 16½ in. by 7½ in.



Weight : (a) without batteries, 18 lb.; (b) in complete working order, 30 lb.
Finish : Highly polished walnut.
Adaptable for external loud-speaker.

Price : £21.
Remarks : Fitted with Celestion loud-speaker, Hellesen high-tension and grid-bias batteries, Exide unspillable accumulators and Mullard or Osram valves.
Maker : London Electrical Co., 1 Sherborne Lane, King William Street, E.C.4.

HART COLLINS PORTABLE FIVE

Circuit : Five valves; two H.F., detector, and two L.F.
Wavelength Range : 250 to 500, and 500 to 2,000 metres.
Overall Dimensions : 14½ in. by 12 in. by 8½ in.
Weight : in complete working order, 24 lb.
Finish : Leather case and walnut case model.
Adaptable for external aerial and earth.
Price : £21 12s 6d.
Remarks : The walnut case model is a little more expensive—also adaptable for external loud-speaker.

HALCYON CABINET THREE

Circuit : Three valves; H.F., detector and pentode.
Wavelength Range : 250 to 600, and 1,000 to 2,000 metres.



How to Choose, Buy and Operate Your Portable (Continued)



In each case the photograph appears in its own descriptive paragraph unless otherwise stated

Maker : Hart Collins, Ltd., 38a Bessborough Street, London, S.W.1.

AERIAL FIVE

Circuit : Five valves; two stages choke-coupled H.F., leaky-grid detector, two stages transformer L.F.

Wavelength Range : 250 to 550 and 1,000 to 2,000 metres.

Overall Dimensions : 15½ in. by 14½ in. by 8½ in.

Weight : (a) without batteries, 20 lb.; (b) in complete working order, 31 lb.

Finish : Oak, mahogany or walnut.

Adaptable for external aerial and earth.

Price : £21 15s. (oak); £22 16s. (mahogany or walnut).

Maker : Classic Radio & Gramophone Co., Ltd., Components House, 25 Eccleston Street, Victoria, S.W.1.



Beginners should note that a set with one screened-grid H.F. stage will be practically as good as one with two ordinary (three electrode) H.F. Stages

BRITISH RADIogram PORTABLE

FIVE

Circuit : Five valves; two choke-coupled H.F. stages, detector, and two L.F. transformer-coupled stages. **Wavelength Range :** 200 to 550, and 1,000 to 2,000 metres.

Overall Dimensions : 18½ in. by 14½ in. by 9 in.

Weight : (a) without batteries, 20 lb.;

(b) in complete working order, 32 lb.

Finish : Mahogany or oak.

Adaptable for external aerial and earth, and external loud-speaker.

Price : £21 15s. (deferred terms).

Remarks : The Radiogram is fitted with a working turntable, together with a waterproof cover included in the price. In addition a jack is provided to accommodate an electrical pick-up for playing gramophone records.



able carrying strap, and turntable fitted as standard.

Maker : Cooks Wireless Co., Ltd., C.W.C. Works, Ipswich.



Maker : The British Radio Gramophone Co., Ltd., 77 City Road, London, E.C.1.

C.W.C. "HORIZONTAL" MODEL

Circuit : Five valves; two H.F., detector, and two L.F.

Wavelength Range : 250 to 600, and 1,000 to 2,000 metres.

Overall Dimensions : 15½ in. by 15½ in. by 7 in.

Weight : (a) without batteries, about 18 lb.; (b) in complete working order, about 28 lb.

Finish : Mahogany or oak, french polished.

Price : £22 10s. (deferred terms).

Remarks : The set has been designed so that all controls are mounted horizontally; such a panel makes it more accessible than most receivers of this nature on the market, as it can be easily operated when stood on the ground, without undue stooping. Waterproof cover, detach-



(Description of this Advance set at top of next page)



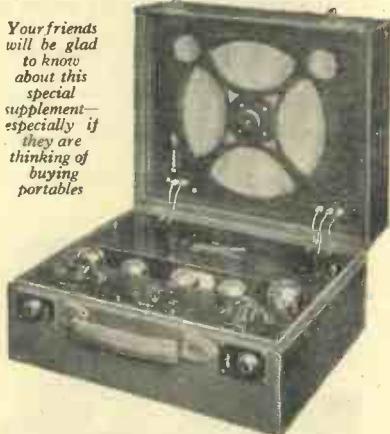
Details of Sets Costing from £21 : 15 : 0 to £24 : 0 : 0

ADVANCE

Circuit : Five valves; two H.F., detector, two L.F.
Wavelength Range : 200 to 600, and 1,000 to 2,000 metres.
Overall Dimensions : 16 in. by 17 in. by 9 in.
Weight : in complete working order, 30 lb.
Finish : Mahogany, cabinet type.
 Adaptable for external aerial and earth, and external loud-speaker.
Price : £22 15s. (deferred terms).
Remarks : Also suitcase type, same price.
Maker : Advance Radio Co., Carlton House, Regent Street, S.W.1.

BURGOYNE PENTODE MODEL

Circuit : Five valves; two H.F., detector, two L.F., pentode in last stage.
Wavelength Range : 250 to 550, and 1,000 to 2,000 metres.
Overall Dimensions : 15½ in. by 12 in. by 8 in.
Weight : (a) without batteries, 15½ lb.; (b) in complete working order, 26 lb.
Finish : Brown hide.
 Adaptable for external aerial and earth, and external loud-speaker.
Price : £23 2s. (deferred terms).
Remarks : H.T. consumption certified 7.5 to 8 milliamperes. Mullard P.M. valves and components employed throughout.
Maker : Burgoyne Wireless, Ltd., 34a York Road, King's Cross, London, N.1.



POR TAD YNE DE LUXE

Circuit : Five valves.
Wavelength Range : 200 to 500, and 900 to 2,000 metres.
Overall Dimensions : 13½ in. by 15 in. by 9½ in.
Weight : in complete working order, 28 lb.

Finish : Real leather in lizard, crocodile or suede.
 Adaptable for external loud-speaker.

Price : £23 2s. (deferred terms).
Maker : Whittingham, Smith & Co., 110 Kew Green, Kew, London.

UWANA PORTABLE

Circuit : Three valves; screened-grid H.F., detector, pentode. Mica dielectric variable condensers to prevent shorting.
Wavelength Range : 200 to 600 and 1,000 to 2,000 metres.
Weight : 30 lb.
Finish : Hide, and various fancy colours in rubber-cloth and leather.
 Adaptable for external aerial and earth, external loud-speaker, external batteries, and mains working.
Price : £23 2s. (deferred terms).
Maker : S. Berendsen, Ltd., 10 Philpot Lane, E.C.3.



PYE DUAL FIVE PORTABLE

RECEIVER No. 25

Circuit : Five valves; two choke-coupled H.F. stages, detector, two L.F. stages.
Wavelength Range : 230 to 550 and 900 to 1,900 metres.
Overall Dimensions : 16 in. by 16 in. by 7½ in.
Weight : (a) without batteries, 15 lb.; (b) in complete working order, 30 lb.
Finish : Walnut, hand French polished.
 Adaptable for external aerial and earth, and external loud-speaker.
Price : £23 10s.
Remarks : Waterproof cover, 15s.
Maker : Pye Radio, Ltd., Radio Works, Cambridge.

H.P.L. SUPER FIVE-VALVE PORTABLE

Circuit : Five valves, two H.F., detector, and two L.F.
Wavelength Range : 250 to 550, and 1,000 to 2,000 metres.

Overall Dimensions : 18 in. by 15½ in. by 6 in.

Weight : in complete working order, 23 lb.

Finish : Oak cabinet.
 Adaptable for external aerial and earth, and external loud-speaker.

Price : £23 12s. 6d.
Remarks : Plug for gramophone pick-up.

Maker : Heath Plugs, Ltd., Kennington Cross, London, S.E.11.



REDCLIFFE FIVE-VALVER

Circuit : Five valves; two H.F., detector, and two L.F.
Wavelength Range : 300 to 500, and 1,000 to 2,000 metres.
Overall Dimensions : 18 in. by 18 in. by 7½ in.
Weight : in complete working order, 30 lb.
Finish : Polished mahogany, oak or walnut.
 Adaptable for external aerial and earth, external loud-speaker, external batteries (extra charge of 15s. for switch at back), and mains working.
Price : £24. Pentode, £1 extra; super-power valve, 10s. extra.
Remarks : Patent aerial, giving equal volume on long and short waves. Two years' guarantee. Single switch for long and short waves and "off." Ball-bearing turntable.
Maker : Redcliffe Radio Manufacturing Co., Phoenix Works, Temple Gate, Bristol.

CAVENDISH THREE

Circuit : Three valves; screened-grid detector, and pentode.
Wavelength Range : 230 to 600, and 800 to 1,800 metres.
Overall Dimensions : 14 in. by 12 in. by 9 in.
Weight : (a) without batteries, 18 lb.; (b) in complete working order, 26 lb.



How to Choose, Buy and Operate Your Portable (Continued)



Finish: Mahogany and oak; various leatherettes in crocodile, hide, and lizard.
Adaptable for external aerial and earth, loud-speaker, batteries and for mains working.
Price: £24 17s. 6d. (deferred terms).
Maker: Cavendish Trading Co., Ltd., 5a Palace Chambers, Bridge Street, S.W.1.

PEERLESS SCREENED-GRID

MODEL

Circuit: Four valves; screened-grid H.F., detector, two L.F. (one R.C., one transformer-coupled).
Wavelength Range: 250 to 550, and 1,000 to 2,000 metres.
Weight: (a) without batteries, 22 lb.; (b) in complete working order, 30 lb.
Finish: Oak or mahogany.
Price: £25 (deferred terms).
Maker: Bedford Electrical & Radio Co., Ltd., 22 Campbell Road, Bedford.



SIFAM FOUR

Circuit: Four valves, two five-electrode, detector, and pentode. Special super-het circuit.

Wavelength Range: 180 to 2,800 metres.
Overall Dimensions: 18 in. by 18 in. by 6 in.
Weight: in complete working order, 30 lb.
Finish: Walnut and leatherette covered (blue).
Adaptable for external aerial and earth.
Price: £25, leatherette; £26 10s., walnut.
Remarks: This set incorporates a special super-heterodyne circuit giving unusual selectivity.
Maker: Sifam Electrical Instrument Co., Ltd., Bush House, W.



received in most localities on the enclosed loud-speaker at good strength with an excellent quality of reproduction. Very economical in battery consumption.

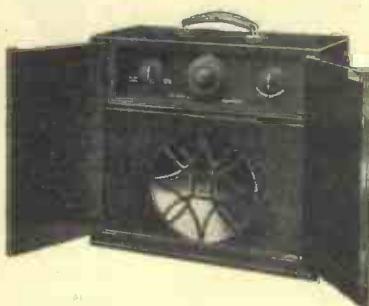
Maker: Burndept Wireless (1928), Ltd., Eastnor House, Blackheath, London, S.E.3.

The sets in these pages are arranged in order of price. In some cases there are two or more prices for different finishes of the same receiver.



GODWINEX DE LUXE PORTABLE

Circuit: Five valves; two H.F., detector, and two L.F.
Wavelength Range: 200 to 500 and 1,000 to 2,000 metres.
Overall Dimensions: 18 in. by 18 in. by 8½ in.
Weight: in complete working order, 32 lb.
Finish: Oak and piano finished mahogany.
Adaptable for external aerial and earth, and external loud-speaker.
Price: £25 15s. (deferred terms).
Remarks: Mullard valves, Exide unspillable accumulator. Godwinex cone loud-speaker. Guaranteed for 12 months.
Maker: J. Dyson & Co., Ltd., St. Stephens House, 2 Coleman Street, E.C.2.



This is the Godwinex De Luxe Portable



Details of Sets Costing from £24 : 17 : 6 to £26 : 5 : 0

HENDERSON MODEL P

Circuit : Five valves; two H.F., detector, two L.F. (one transformer, one R.C. stage).

Wavelength Range : 250 to 550, and 1,000 to 2,000 metres.

Overall Dimensions : 14½ in. by 13½ in. by 7½ in.

Weight : (a) without batteries, 14 lb.; (b) in complete working order, 24½ lb.

Finish : Highly polished mahogany.

Adaptable for external aerial and earth, external loud-speaker, and mains working.

Price : £26 (deferred terms).

Remarks : This receiver is particularly small in size, although full-sized batteries are employed. Ample volume is available.

Maker : W. J. Henderson & Co., Ltd., 351 Fulham Road, London, S.W.10.
(Photograph on page 13)

REACO DE LUXE MODEL

Circuit : Five valves.

Wavelength Range : 200 to 600, and 1,000 to 2,500 metres.

Overall Dimensions : 14 in. by 16 in. by 7½ in.

Weight : (a) without batteries, 14 lb. (approx.);

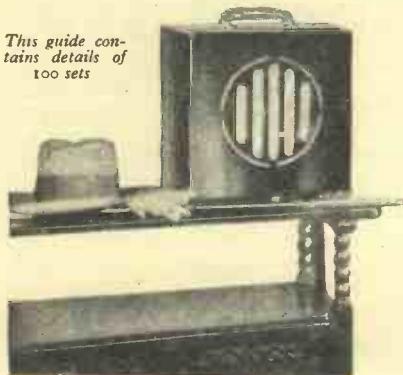
(b) in complete working order, 21 lb. (approx.).

Finish : Mahogany.

Price : £26 (deferred terms).

Maker : Read Radio Ltd., 32 Newman Street, Oxford Street, W.1.

This guide contains details of 100 sets



BABY GRAND

Circuit : Five valves; two H.F., detector, and two L.F.

Wavelength Range : 200 to 550, and 800 to 2,000 metres.

Overall Dimensions : 14 in. by 14 in. by 8 in.

Weight : in complete working order, 26 lb.

Finish : Leather, mahogany, and oak.

Price : £26 5s. (deferred terms).

Maker : Rees-Mace Manufacturing Co., Ltd., 39a Welbeck Street, London, W.1.

NULLI SECUNDUS " RELIANCE "

Circuit : Five valves; two H.F., detector, two L.F.

Wavelength Range : 300 to 1,900 metres.

Overall Dimensions : 16½ in. by 8 in. by 17½ in.

Weight : in complete working order, 32 lb.

Finish : Oak, mahogany, and walnut cabinets.

Adaptable for external aerial and earth, external loud-speaker, external batteries, and mains working.

Price : £26 5s. (deferred terms).

Remarks : Pilot lamp in centre of grid, indicating when set is working.

Maker : C. Creswick Atkinson, 35b High Street, Bedford.

NULLI SECUNDUS " ROVER "

Circuit : Five valves; two H.F., detector, two L.F.

Wavelength Range : 300 to 600, and 1,000 to 1,900 metres.

Overall Dimensions : 15½ in. by 9½ in. by 12½ in.

Weight : in complete working order, 30 lb.

Finish : Grey, lizard skin, finished leather, despatch case.

Adaptable for external aerial and earth, and external loud-speaker.

Price : £26 5s. (deferred terms).

Maker : C. Creswick Atkinson, 35b, High Street, Bedford.

POR TAD YNE TRANSPORTABLE

Circuit : Five valves.

Wavelength Range : 200 to 500, and 900 to 2,000 metres.

Overall Dimensions : 20 in. by 11 in. by 14 in.

Weight : in complete working order, about 35 lb.

Finish : Polished oak or walnut.

Adaptable for external loud-speaker.

Price : £26 5s. (deferred terms).

Maker : Whittingham, Smith & Co., 110 Kew Green, Kew, London.

SUPERFONE MAXUM FIVE

Circuit : Five valves; two choke-coupled H.F., leaky-grid detector, transformer and resistance-coupled L.F.

Wavelength Range : 250 to 500, and 1,000 to 2,000 metres.

Overall Dimensions : 14½ in. by 8½ in. by 7½ in.

Weight : in complete working order, 28½ lb.

Finish : Polished mahogany.

Adaptable for external aerial and earth, external loud-speaker, external batteries, and mains working.

Price : £26 5s.

Remarks : One-dial control, fitted slow-



motion movement; switch change from high to low wavelengths. Marconi valves, Exide unspillable 20-amp. actual accumulator, Tec 102-volt H.T. battery, 9-volt grid battery, Brown loud-speaker.

Maker : Radio Supply Co., Four Oaks, Warwickshire.

SUPERFONE MAXUM SCREENED IV

Circuit : Four valves; screened-grid, detector, two L.F. valves.

Wavelength Range : 250 to 500, and 1,000 to 2,000 metres.

Overall Dimensions : 12½ in. by 8½ in. by 14 in.

Weight : in complete working order, 28 lb.

Finish : Suitcase type.

Adaptable for external aerial and earth, external loud-speaker, and external batteries.

Price : £26 5s.

Remarks : Two-dial control, fitted slow-motion dial, switch change-over from high to low wavelengths. Brown speaker, Exide unspillable accumulator, Tec H.T. batteries, Marconi valves. Loud-speaker and frame aerial built into lid.

Maker : Radio Supply Co., Four Oaks, Warwickshire.

EFESCAPHONE "BLENHEIM"

SCREENED FOUR

Circuit : Four valves; screened-grid, detector, two transformer coupled L.F. stages with pentode super-power valve.

Wavelength Range : 235 to 600, and 1,000 to 2,000 metres.

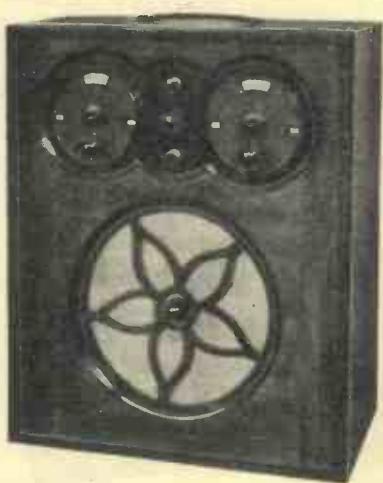
Overall Dimensions : 18½ in. by 15 in. by 8½ in.

Weight : (a) without batteries, 20 lb.; (b) in complete working order, 32 lb.

Finish : Polished mahogany.



How to Choose, Buy and Operate Your Portable (Continued)

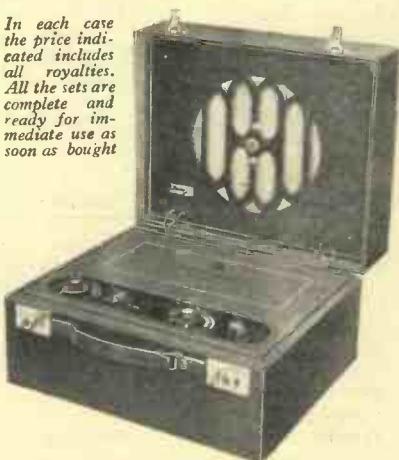


Adaptable for external aerial and earth.
Price : £26 15s. (deferred terms).
Maker : Falk, Stadelmann & Co., Ltd.,
83/93 Farringdon Road, London,
E.C.1.

RANGER SCREENED-GRID FOUR

Circuit : Four valves; screened-grid H.F., detector, and two L.F.
Wavelength Range : 250 to 550, and 1,000 to 2,000 metres.
Overall Dimensions : 16½ in. by 13 in. by 9½ in.
Weight : in complete working order, 28 lb.
Finish : Special preparation, practically indestructible, 75 per cent. leather, 25 per cent. rubber.
Price : £27 6s. (deferred terms).
Maker : Rolls Caydon Sales Ltd., Rolls Caydon House, 77 Rochester Row, Westminster, S.W.1.

In each case the price indicated includes all royalties. All the sets are complete and ready for immediate use as soon as bought



This is the Rolls Caydon Ranger model

SCREENED-GRID THREE

Circuit : Three valves; screened-grid H.F., detector, and pentode.
Wavelength Range : 250 to 550, and 1,000 to 2,000 metres.
Overall Dimensions : 18 in. by 14 in. by 8½ in.
Weight : in complete working order, 26 lb.
Finish : Handsome real oak.
Adaptable for external aerial and earth, and loud-speaker.
Price : £27 6s. (deferred terms).
Maker : Rolls Caydon Sales Ltd., Rolls Caydon House, 77 Rochester Row, Westminster, S.W.1.



CAVENDISH FOUR

Circuit : Four valves; two screened-grid, detector and pentode.
Wavelength Range : 230 to 600 and 800 to 1,850 metres.
Overall Dimensions : 16 in. by 13 in. by 9½ in.
Weight : (a) without batteries, 20 lb.; (b) in complete working order, 28 lb.
Finish : Mahogany and walnut; various colours in leatherette-crocodile, hide, and lizard.
Adaptable for external aerial and earth, loud-speaker, batteries and for mains working.
Price : £27 10s. (deferred terms).
Maker : Cavendish Trading Co., Ltd., 5a, Palace Chambers, Bridge Street, S.W.1.

G.E.C. PORTABLE FOUR

Circuit : Four valves; screened-grid H.F., detector, two transformer-coupled L.F. stages.
Wavelength Range : 230 to 550, and 900 to 1,850 metres.
Overall Dimensions : 15½ in. by 15½ in. by 10 in.
Weight : in complete working order, 35 lb.

Further details can be obtained from the makers; please mention "Wireless Magazine".



Finish : Antique red or Cambridge blue leatherette finish.

Price : £27 10s.
Remarks : Particular attention is drawn to the unusually large loud-speaker, the use of a super-power output valve and the inclusion of a new non-spillable accumulator.
Maker : General Electric Co., Ltd., Magnet House, Kingsway, W.C.2.

ORMOND LEATHER PORTABLE

Circuit : Five valves; two choke-coupled H.F., leaky-grid detector, and two transformer-coupled L.F.
Wavelength Range : 250 to 550, and 1,000 to 2,000 metres.
Overall Dimensions : 13½ in. by 16½ in. by 9½ in.
Weight : (a) without batteries, 16 lb.; (b) in complete working order, 28 lb.
Finish : Crocodile leather attache case. Brown.
Adaptable for external aerial and earth.
Price : £27 19s. 2d.
Remarks : One-dial tuning.
Maker : Ormond Engineering Co., Ltd., 199 Pentonville Road, Kings Cross, N.1.

HENDERSON MODEL S

Circuit : Five valves; two H.F., detector, and two L.F. (one transformer, one R.C. stage).
Wavelength Range : 250 to 550, and 1,000 to 2,000 metres.
Overall Dimensions : 17½ in. by 12½ in. by 9½ in.
Weight : (a) without batteries, 19 lb.; (b) in complete working order, 31 lb.
Finish : Highly polished mahogany.
Adaptable for external aerial and earth, external loud-speaker, and mains working.
Price : £28 (deferred terms).
Remarks : This receiver incorporates a complete Celestion C10 loud-speaker (not the movement only).



Details of Sets Costing from £26 : 15 : 0 to £31 : 10 : 0



Above is a photograph of the Henderson Model P, described on page eleven

Maker : W J Henderson & Co., Ltd., 351 Fulham Road, London, S.W.10.

EDDYSTONE

Circuit : Three valves; screened-grid H.F., detector, and pentode.

Wavelength Range : 250 to 550, and 1,000 to 2,000 metres.

Overall Dimensions : 15½ in. by 15½ in. by 10 in.

Weight : in complete working order, 34 lb.

Finish : Hide or Oak.

Price : £28.

Remarks : Fitted with Exide L.T. Triple-capacity H.T. and Celestion C.12 speaker movement.

Maker : Stratton & Company, Ltd., Balmoral Works, Bromsgrove Street, Birmingham.



A description of this McMichael set appears at the top of the next column

McMICHAEL FIVE-VALVER

Circuit : Five valves; two H.F., detector, two L.F. (transformer coupled). **Wavelength Range :** 250 to 550, and 1,000 to 2,000 metres.

Overall Dimensions : 15½ in. by 12½ in. by 8½ in.

Weight : (a) without batteries, 20 lb.; (b) in complete working order, 30 lb.

Finish : Tan leather case.

Adaptable for external aerial and earth, external loud-speaker, external batteries and mains working.

Price : £28 7s. (deferred terms).

Remarks : Total H.T. consumption, 7 milliamperes. Fitted with Celestion loud-speaker.

Maker : L. McMichael, Ltd., 179 Strand, W.C.

MEDIUM FIVE VALVE

Circuit : Five valves; two H.F., detector, and two L.F.

Wavelength Range : 200 to 550, and 800 to 2,000 metres.

Overall Dimensions : 18 in. by 17 in. by 8 in.



Weight : in complete working order, 27 lb.

Finish : Leather, mahogany and oak. Adaptable for external aerial and earth, and loud-speaker.

Price : £28 7s. (deferred terms).

Maker : Rees-Mace Manufacturing Co., Ltd., 39a Welbeck Street, London, W.I.

MARCONIPHONE MODEL 53

Circuit : Five valves; two H.F., detector, and two L.F.

Wavelength Range : 250 to 550, and 1,000 to 2,000 metres.

Overall Dimensions : 18 in. by 16½ in. by 7½ in.

IN ANY CORRESPONDENCE WITH MATTERS REGARDING THESE SETS, PLEASE MENTION "WIRELESS MAGAZINE" PORTABLE SUPPLEMENT



Seen in use at the Monte Carlo car rally in the top photograph on page one

Weight : in complete working order, 30 lb.

Finish : Walnut, semi matt polish.

Adaptable for external batteries, or H.T. mains unit.

Price : £29 8s. (deferred terms).

Remarks : Exceptional range is the main feature, 20 to 30 stations often being obtained under good conditions. Total H.T. consumption only 8-9 milliamperes.

Maker : Marconiphone Co., Ltd., 210-212 Tottenham Court Road, London, W.I.

BURGOYNE TRANSPORTABLE

Circuit : Five valves; two H.F., detector, two L.F., pentode in last stage. **Wavelength Range :** 250 to 550, and 1,000 to 2,000 metres.

Overall Dimensions : 16½ in. by 17½ in. by 8½ in.

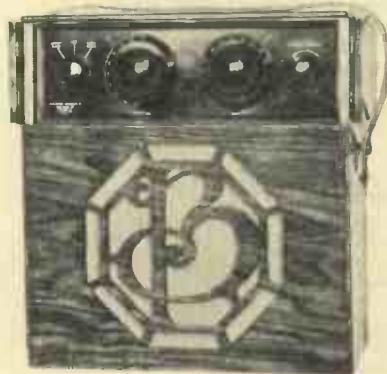
Weight : (a) without batteries, 20 lb.; (b) in complete working order, 35 lb.

Finish : Polished mahogany and walnut.

Price : £31 10s. (deferred terms).

Remarks : Mullard speaker unit. Double capacity H.T. battery, 124 volts.

Maker : Burgoyne Wireless Ltd., 34a York Road, King's Cross, London, N.1.



Above is the Burgoyne transportable mode



How to Choose, Buy and Operate Your Portable (Continued)

CANTOPHONE PORTABLE FIVE

Circuit : Five valves, two H.F., detector, and two L.F.
Wavelength Range : 250 to 500, and 1,350 to 1,800 metres.
Overall Dimensions : 17 in. by 14 in. by 7½ in.
Weight : (a) without batteries, 17 lb.; (b) in complete working order, 27 lb.
Finish : Light walnut.
Adaptable for external aerial and earth, external loud-speaker.
Price : £31 10s.
Remarks : One tuning control only. No plugging in of H.F. transformers or coils to change over wavelength.
Maker : Cantophone Wireless Co., 310 Regent Street, W.1



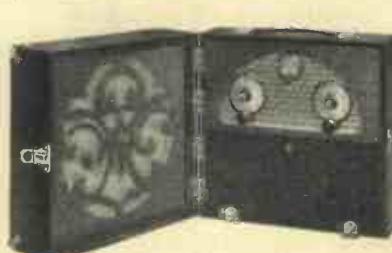
HALCYON SCREENED-GRID FOUR

Circuit : Four valves; screened-grid H.F., detector, two L.F.
Wavelength Range : 250 to 600, and 1,000 to 2,000 metres.
Overall Dimensions : 16 in. by 15 in. by 10 in.
Weight : in complete working order, 30 lb.
Finish : Walnut case.
Adaptable for external aerial, earth, and loud-speaker.
Price : £31 10s. (deferred terms).
Maker : Halcyon Wireless Co., Ltd., 313/319 Regent Street, W.1.

(Photograph on page 386)

METROPOLIS FIVE

Circuit : Five valves; super-het, using two screened-grid valves.
Wavelength Range : 250 to 550 and 850 to 3,000 metres.
Overall Dimensions : 13 in. by 12 in. by 8 in.
Weight : in complete working order, 22½ lb.
Finish : Leather covered in blue morocco or brown crocodile.
Adaptable for external aerial and earth, and external loud-speaker.



Price : £31 10s. (deferred terms).
Remarks : The lightest and most economical five-valve portable. Consumption only 5½ milliamperes. A spare accumulator is provided.
Maker : Empire Electric Co., 10 Fitzroy Square, London, N.W.1.

IGRANIC UNIVERSAL

Circuit : Five valves; two H.F., detector, and two L.F.
Wavelength Range : 250 to 500, and 1,000 to 2,000 metres.
Overall Dimensions : Receiver, 17 in. by 16½ in. by 8½ in.; battery case, 13½ in. by 11 in. by 5 in.
Weight : in complete working order, receiver, 22½ lb.; battery case (with batteries), 23½ lb.
Finish : Leather case.



Comments on sets are based on information obtained from the makers, and not on personal experience

Adaptable for external aerial and earth, external loud-speaker, external batteries, and mains working.
Price : £33 4s. 6d.
Remarks : Two screened-grid valves in H.F. stages. Separate case for batteries allows more efficient layout for receiver, enables batteries of adequate capacity to be employed, and divides the load to be carried.
Maker : Igranic Electric Co., Ltd., 149 Queen Victoria Street, E.C.4.

SELECTOR ATTACHE CASE PORTABLE

Circuit : Four valves; one screened-grid, one detector and two L.F.

Wavelength Range : 200 to 600, and 700 to 2,000 metres.

Overall Dimensions : 13 in. by 15½ in. by 8½ in.

Weight : in complete working order, 26 lb.

Finish : Blue morocco leather.



Adaptable for external aerial and earth, and external loud-speaker.

Price : £33 12s. (deferred terms).
Remarks : Tuning controlled by two dials—already calibrated for all stations.
Maker : Selectors Ltd., 1 Dover Street, W.1.

SELECTOR CABINET PORTABLE

Circuit : Four valves; one screened-grid, detector, two L.F.
Wavelength Range : 200 to 600, and 700 to 2,000 metres.
Overall Dimensions : 15 in. by 17 in. by 7½ in.
Weight : in complete working order, 26 lb.
Finish : Polished mahogany.
Adaptable for external aerial and earth.
Price : £33 12s. (deferred terms)



Details of Sets Costing from £31 : 10 : 0 to £36 : 15 : 0

Remarks : Tuning controlled by two dials—calibrated for all stations.
Maker : Selectors Ltd., 1 Dover Street, W.I.



HALCYON CABINET FIVE

Circuit : Five valves; two H.F., detector, and two L.F.
Wavelength Range : 250 to 600, and 1,000 to 2,000 metres.
Overall Dimensions : 14 in. by 17½ in. by 8½ in.
Weight : in complete working order, 38 lb.
Finish : Walnut cabinet.
Adaptable for external aerial and earth, and loud-speaker.
Price : £34 13s. (deferred terms).
Maker : Halcyon Wireless Co., Ltd., 313/319 Regent Street, W.I.

GRAND PORTABLE

Circuit : Five valves; two H.F., detector, and two L.F.
Wavelength Range : 200 to 550, and 800 to 2,000 metres.
Overall Dimensions : 19 in. by 20 in. by 8½ in.



Weight : in complete working order, 36 lb.

Finish : Leather, mahogany, and oak. Adaptable for external aerial and earth, and external loud-speaker.

Price : £35 14s. (deferred terms).

Maker : Rees-Mace Manufacturing Co., Ltd., 39a Welbeck Street, London, W.I.

SCREENED FIVE

Circuit : Five valves : one screened-grid H.F., one aperiodic, H.F., detector, and two L.F.

Wavelength Range : 200 to 600 and 800 to 2,000 metres.

Overall Dimensions : 17½ in. by 16½ in. by 8 in.

Weight : in complete working order, 30 lb.



Finish : Leather, mahogany, and oak. Adaptable for external aerial and earth, and loud-speaker.

Price : £35 14s. (deferred terms arranged).

Maker : Rees-Mace Manufacturing Co., Ltd., 39a Welbeck Street, London, W.I.

McMICHAEL SUPER SCREENED

FOUR

Circuit : Four valves; two screened-grid H.F., detector, and pentode.

Wavelength Range : 220 to 550, and 850 to 2,000 metres.

Overall Dimensions : 18 in. by 15½ in. by 7 in.

Weight : (a) without batteries, 25 lb.; (b) in complete working order, 37 lb.

Finish : Walnut cabinet, french polished.

Adaptable for external batteries and mains working.

Price : £36 15s. (deferred terms).

Remarks : Total H.T. consumption, 8 milliamperes. Fitted with Celestion loud-speaker.

Maker : L. McMichael, Ltd., 179 Strand, W.C.



Description of the
McMichael at
foot of previous
column

PHANTOM DE LUXE

Circuit : Five valves; two H.F., detector, and two L.F.

Wavelength Range : 250 to 550, and 1,000 to 2,000 metres.

Overall Dimensions : 16 in. by 12½ in. by 9 in.

Weight : in complete working order, 30 lb.

Finish : Red leather, lizard grained type.



There are details of 100 sets in this guide, illustrated by 60 photographs

Adaptable for external aerial and earth, and external loud-speaker.

Price : £36 15s. (deferred terms).

Remarks : Complete with Celestion loud-speaker. Represents the best finished quality despatch case type on the market.

Maker : Rolls Caydon Sales Ltd., Rolls Caydon House, 77 Rochester Row, Westminster, S.W.1.

TRANSATLANTIC PORTABLE

Circuit : Five valves; two H.F., detector, two L.F.

Wavelength Range : 250 to 2,000 metres.



How to Buy, Choose and Operate Your Portable (Continued)

Overall Dimensions : 14 in. by 14 in. by 10 in.

Weight : in complete working order, 32 lb.

Finish : Solid leather.

Price : £36 15s. (deferred terms).

Maker : Langham Radio, Ltd., 96 Regent Street, W.1



TRANSATLANTIC TRANSPORTABLE

Circuit : Five valves; two H.F., detector, two L.F.

Wavelength Range : 250 to 2,000 metres.

Overall Dimensions : 21 in. by 15 in. by 12 in.

Finish : Oak.

Price : £36 15s. (deferred terms).

Remarks : Single dial control.

Maker : Langham Radio, Ltd., 96 Regent Street, W.1

BEETHOVEN PORTABLE FIVE

Circuit : Five valves; three H.F., detector and pentode; special circuit, for which patents have been applied for.

Wavelength Range : 280 to 2,000 metres, by switching.

Overall Dimensions : 19½ in. by 13½ in. by 8½ in.

Weight : (a) without batteries, 20½ lb.; (b) in complete working order, 34½ lb.

Finish : Walnut, burr walnut, mahogany and oak.

Adaptable for external loud-speaker. Special plug for simultaneous or alternate use.

Price : £38 17s. (including cover and turntable); deferred terms.

Remarks : Gramophone plug socket

for pick-up with separate volume control (gramophone) on panel; gravity float accumulator; thumb-control single-dial tuning; red-glow pilot light.

Maker : Montague Radio Inventions and Development Company, Ltd., Empire House, 117-119 Regent St., W.1.

PEGASUS ROVER

Circuit : Eight valve super-het; detector, three I.F., detector, two L.F. and oscillator.

Wavelength Range : 250 to 550 metres and Daventry Senior (switch).

Overall Dimensions : 20 in. by 17 in. by 7 in.

Weight : in complete working order, 32 lb.

Finish : French polished oak or mahogany (waterproof cover supplied).

Adaptable for external aerial and earth, external loud-speaker, external batteries and mains working (to order).

Price : £40.

Remarks : Average H.T. consumption, 10 milliamperes; L.T. consumption, .9 to 1.0 ampere. Only Daventry 5XX received with switch "in" (no tuning range on long waves).

Maker : A. G. Franklyn, 3 Boar Lane, Leeds

MELVA PORTABLE

Circuit : Five valves; three screened-grid, detector, and pentode.

Wavelength Range : 200 to 600 and 800 to 2,700 metres.

Overall Dimensions : 17 in. by 18 in. by 10 in.

Weight : in complete working order, 40 lb.

Finish : Mahogany, burr walnut, and Morocco leather.

Price : £42 (mahogany).

Maker : Rialton Radio, 27 Old Bond Street, London, W.1



For description of this Igranic set see top of next column

IGRANIC NEUTROSONIC SEVEN

Circuit : Seven valves; super-het incorporating neutralised capacity principle in H.F. and L.F. stages. (H.F., oscillator, detector, two I.F., second detector, one L.F.).

Wavelength Range : 240 to 1,800 metres with two units.

Overall Dimensions : Receiver, 16½ in. by 12 in. by 10½ in.; battery box, frame aerial, and loud-speaker, 16 in. by 14½ in. by 13 in.

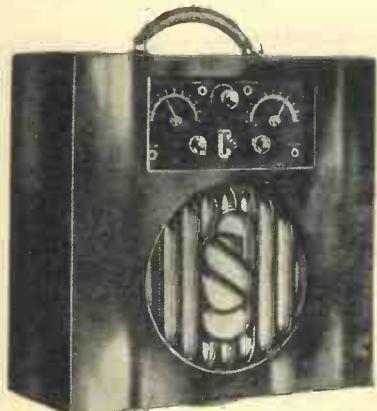
Weight : (a) without batteries, receiver, 24 lb.; (b) in complete working order, battery box, frame aerial and loud-speaker (with batteries), 51 lb.

Adaptable for external aerial and earth, external loud-speaker, external batteries, and for mains working.

Price : £42 12s.

Remarks : Batteries are carried in separate case, which can be supplied with frame aerial and loud-speaker, in three separate units. These can be attached to each other to form a single case for carrying.

Maker : Igranic Electric Co., Ltd., 149 Queen Victoria Street, E.C.4.



SELECTOR SUPER

Circuit : Seven valves; super-het.

Wavelength Range : 240 to 600, and 1,000 to 2,000 metres.

Overall Dimensions : 7½ in. by 18 in. by 17½ in.

Weight : in complete working order, 50 lb.

Finish: Polished mahogany.

Adaptable for external aerial and earth, external loud-speaker.

Price : £54 12s. (deferred terms).

Remarks : Reception of 30 British and Continental stations guaranteed.

Maker : Selectors, Ltd., 1 Dover Street, W.1.

Details of a few sets are unavoidably crowded out of this supplement; they will be found on page 386 of the "Wireless Magazine."



In This Article a Well-known Authority Reveals the Trend of Soviet Broadcasting

CASUAL listeners to the Leningrad and Moscow stations, the two Russian transmitters best heard in the British Isles, might erroneously jump to the conclusion that the Soviet broadcasting system is now worked on similar lines to the radio service offered to subscribers by other European stations.

This, however, is not the case, for although during the past two years considerable developments have taken place in the land of the Soviets and a large number of transmitters have been erected throughout the country, Russian broadcast programmes differ greatly from those heard in

**EXCLUSIVE TO ~
"WIRELESS MAGAZINE"**

**By J. GODCHAUX
ABRAHAMS**

*** RUSSIA'S REVOLUTIONARY RADIO !**

The banner features a stylized radio antenna icon on the left and decorative geometric patterns on the right.

other European countries.

It must be borne in mind that roughly 70 per cent. of the total population is illiterate and consequently incapable of appreciating or even understanding the usual kind of entertainment.

For this reason alone, all possible means are being taken by the governing authorities to raise the mentality of the lower classes in Russia by means of lectures and educational courses, as although "radio" has now existed in many out-of-the-way districts, it is still regarded as a diabolical magic, a thing to be feared.

Stoning the Instructors

To give an example: in a village situated in the Government of Wiatka, the entire population, convinced that wireless was witchcraft, and responsible for failing crops and the innumerable troubles which had befallen the district, raided the local wireless club, destroyed its electrical equipment, and stoned the official instructors out of the district.

At the expense of the Radio Pere-dacha, a burly and ignorant peasant, the headman of the village, was taken to Moscow where, having been given tuition and simple explanations, he was instructed to return home and to make a public speech to his followers through the microphone. Even then,

when seen talking to the instrument, he encountered considerable difficulty in convincing them that wireless was neither satanic magic nor witchcraft.

It is true that in the larger centres superstitious ignorance to that degree has already been swept away, and that the general public, more accustomed to the sight of outside aerials and wireless equipment, is only too willing to take advantage of radio.

But even then, in the case of such powerful transmitters as exist in Leningrad and Moscow, the programme must be graduated, for as the transmissions are heard far afield, they must contain simple sections which are well within the comprehension of the more unsophisticated listeners.

In this respect, much time is devoted to the radio news bulletins which, dating from November, 1924, have daily given the people, in simple language, information on every kind

of subject in a peculiarly condensed form.

Topical items are not given out baldly in conventional "journalese," for such a form would be both unacceptable and misunderstood by the average Russian peasant; on the contrary, the news, general or local, and national happenings, are presented in a conversational manner, similarly to a short talk given by a schoolmaster to somewhat backward children.

In most instances, the broadcast news bulletin replaces the daily news-

paper which, in view of the illiteracy of the average peasant, enjoys but a limited circulation outside the big cities.

So much for the crassly ignorant, whose minds the authorities are desirous of developing on pre-arranged lines, and especially whose opinions and beliefs are to be moulded to official thought.

For the more educated classes, special hours of the day and evening are reserved for talks on more advanced subjects. It is in this manner that the Soviet studios are compelled to arrange their programmes in order to cater for all units of the community.

Popular Radio Journals

Journals dealing with wireless matters, however, also exist in Russia and the most prominent are the weekly *Novosti Radio* (Radio Novelties) and the daily *Radioljubitel* (Radio Amateur) and *Radiowsjem* (Radio for All). These publications are sold at low prices and enjoy considerable favour amongst the younger generation; they are widely circulated in the clubs, rest rooms and inns.

Here it might be added that, although Moscow and Leningrad, as the more important centres, might at first appearance look like a forest of aerial masts—for in many instances as many as ten or a dozen wires may be seen strung over the roofs of the

Russia's Revolutionary Radio! (Continued)

larger types of community houses—the workmen's clubs and the rest rooms to which the proletariat adjourns in its leisure time, are all connected by cable to the transmitting centre.

They do not receive their wireless entertainment via ether, but by landline, each club being equipped with a number of loud-speakers and headphones at the free disposal of its members.

The Letter Box

Much is made, also, of the Letter Box feature in the programmes, during which hour the studio replies individually to communications sent by listeners. These cover a multitude of subjects from health tips to the building of a crystal receiver or eight-valve super-het, from cookery hints to the simple explanation of a new law, and for such replies, specialists in these diverse matters are brought to the microphone in order that the listeners may get authoritative answers to their queries.

Nightly, at the end of the Moscow Komintern daily programme, and frequently as late as 1.30 a.m. B.S.T., you will hear a gruff voice drawingl out with monotonous reiteration a series of short sentences in which you may recognise the names of foreign cities.

This is an official news bulletin broadcast for the benefit of the more distant provincial centres and villages; the sentences are repeated slowly in order that the listeners may take them down—in long hand, no doubt—and later exhibits such bulletins for the edification of their less fortunate fellow-creatures.

Sixty Separate Stations

According to the latest statistics, notwithstanding the fact that to-day Russia boasts of more than 60 separate broadcasting stations, the total number of registered listeners does not exceed 330,000 souls, of which 87 per cent., or roughly 270,000, are inhabitants of cities or towns, and about 60,000 country dwellers. Of the total number some 260,000 are possessors of small and inexpensive crystal receivers. Up to

the present, not more than 15,000 loud-speakers have been sold throughout the Soviet Republics.

It must be remembered, however, that the actual listening population is much greater than the figures shown in statistics for many hundreds of thousands are given the opportunity through clubs, schools and public buildings of hearing the programmes

STARTING RADIO YOUNG!



Radio class in one of the Soviet secondary schools

without going to the expense of installing a radio set.

The broadcast listener's tax has been reduced to a minimum and has now been fixed at 50 kopeks (about sixpence) per annum for the simple crystal receiver, and from three roubles (about 3s.) to eight roubles yearly for valve receivers, according to whether they are held by students, workmen, members of the Red Army, clubs, hotels, or factories.

Moreover, the authorities, in order to popularise the movement, and with a view to getting into close touch with the most out-of-the-way and distant districts, are liberal in their free distribution of receiving apparatus and loud-speakers. Every village or hamlet, however small, in Russia is being adequately equipped for the benefit of the poorer classes.

In addition wherever cables are available in cities and towns, subscribers to the telephone system may receive broadcast programmes in this manner at a cost of roughly two and a half roubles (say 2s. 6d.) per month. By calling up the exchange in the conventional manner, they may be switched over to the station they wish to hear. In Moscow alone, 5,000 subscribers have availed themselves of this new service, and pre-

parations are being made to deal with a five-fold increase in the membership.

As will be seen from the latest list of Russian broadcasting stations published in these pages, their installation has been so widespread that even in the most remote corners of Siberia and Central Asia, the inhabitants are not compelled to purchase expensive apparatus to capture the wireless entertainments.

Capital Relays

Most of the transmitters erected in such important centres as Leningrad, Odessa, Irkutsk, Tomsk, Vladivostock, Kiev, Baku and others, broadcast their own individual programmes, which from time to time, as suitable occasions arise, are strengthened by a relay of entertainments from the capital.

It need hardly be stated that all important political demonstrations or meetings, anniversary celebrations of red-letter days in Bolshevik history taking place in Moscow or Leningrad, are carefully fed to the greatest number of transmitters possible in the circumstances, and the speeches on these memorable days are broadcast through loud-speakers in the public squares and open streets.

In the larger cities it is not an uncommon sight to find even tram-cars equipped with radio apparatus and loud-speakers halted at convenient spots on sidings and discoursing lurid and inflammatory harangues to large groups of keenly interested audiences.

A Super-Super Broadcaster

As the dissemination of official propaganda and education courses is the chief aim of the Soviet authorities in charge of the radio system, it is not surprising to learn that the project for the erection of a *super-super* transmitter has not been definitely shelved; in fact, Professor Bondschi Brujewitsch, one of the leading wireless pioneers in Russia, still contemplates the erection on a suitable site, in the neighbourhood of Moscow, of a station capable of serving the larger portion of Russian territory.

An Exclusive Article by J. Godchaux Abrahams

His project is based on the construction of four transmitters, each of 250 kilowatts power, to be linked up, as required, in order to ensure the reception of the signals by simple crystal sets many thousand kilometres distant from the broadcasting centre.

Both Moscow and Leningrad, as the chief centres, have been recently endowed with new and powerful broadcast transmitters, and in addition, during the past few months, the Posts and Telegraphs have erected in the Soviet capital another 25-kilowatt station, which is said to be still in an experimental stage.

Alternative Programmes

To-day, the Moscow listener is given daily three alternative programmes from which to choose his entertainments, and nightly from one of these he receives the relay of an outside operatic or dramatic performance.

The studio authorities tap, according to their own sweet will, any theatre in the city, without any special permission being required; in the same manner, artists may be called upon to give their services free for the benefit of the masses. The programmes, however, do not necessarily consist of concerts broadcast by professionals, for many volunteers are willing to work for the community. A curious feature in the capital programme is that of the concert given by the Persimphan, or orchestra without a leader!

Special Radio House

Leningrad recently opened a specially planned Radio House which contains three studios, one of which can accommodate an audience of from 800 to 1,000 people. In-addition, two floors are devoted to electrical laboratories equipped with a complete series of long- and short-wave wireless receivers incorporating the most up-to-date circuits.

These are available to a number of qualified students, and apart from their utility for experiments, are used to capture foreign European transmissions which, in their turn, are passed to the transmitter for public broadcast.

Much is made in Russia of relays

of foreign musical entertainments as a feature of the programmes, and at least twice weekly Moscow, Leningrad and Kharkov devote an hour or two to a tour through the ether.

Every encouragement is given to the study of radio telephony and telegraphy by the authorities, and a large number of wireless clubs have been inaugurated in which interested amateurs may receive free tuition. Experiments made by the more advanced groups are considered to be of sufficient general interest to be broadcast, and an hour is devoted twice weekly by both the Leningrad and Moscow studios to a transmission on short waves, accompanied by the necessary explanations.

At the beginning of the present year, the Educational Department of the Union of Soviets having decreed that the study of radio shall be a compulsory subject in all Russian secondary schools, a special class for this purpose has been opened in

in Russian or the local language or dialect; on certain days, for instance, news bulletins and lectures are broadcast from Leningrad in the Finnish language, and for the purposes of publicity thrice weekly details of the forthcoming programmes are given out in Esperanto.

Exchanges of entertainments are frequently made with Moscow, each station in turn taking the pick of the other's programme.

Russian Children's Hour

And now a final word or two with regard to the Children's Hour, a feature which must necessarily exist in any country blessed with a broadcasting system.

In Russia, the children are distinctly classified according to their ages, some are respectively called Young Lenin (presumably an endearing term!), others the Octobriat or October Pioneers, in happy commemoration of the historical month during which the Bolsheviks Revolution came to a head. The Young Lenin hours caters for tiny tots and aims, by entertaining methods, to inculcate principles slightly different from those recognised as laudable in other countries. Lectures for the October Pioneers, on the other hand, destined to youths, are of a more advanced nature; they are, according to their official description, "highly educational and instructional," and every endeavour is made in the course of these broadcasts to mould the opinions of these youngsters during the impressionable age.

Combating Illiteracy

It must not be thought, however, that all the time is devoted to the tuition of revolutionary maxims, or anti-religious propaganda—an item of the early morning Sunday transmissions—for to the credit of the Soviet authorities, it must be stated that every effort is being made to combat illiteracy and ignorance in the republics, and that radio has been largely developed with that aim in view.

"Broadcasting," says an official report, "has been instituted for everybody's profit; as such, it is in



A typical village scene in Russia, where many of the peasants use crystal sets

each one. During these courses, under supervision, the pupils build wireless receivers, the material for which is supplied by the authorities at a very low cost to the learners.

Generally speaking, each individual Soviet Republic owns a station from which transmissions are made either

Russia's Revolutionary Radio! (Continued)

Revised List of the Principal Russian Broadcasting Stations

Station	Wavelength	Kilocycles	Power	Station	Wavelength	Kilocycles	Power
Armavir	720	416.7	1	Nijni-Novgorod	385	780	1.8
Artiemovsk	795	377.3	1.2	Novosibirsk	1,117	268.6	4
Aschchabad	799.1	374	4	Odessa..	750	399.8	1.2
Astrakhan	696	431	1	Omsk ..	517	580	1.2
Baku ..	1,280	234.2	1.2	Orenburg ..	640	468.8	1
Bogorodsk ..	750	400	0.7	Pjatigorsk ..	357	840	1.2
Dnepropetrovsk ..	435	690	1	Petrovaplovsk ..	428	700	0.4
Eriwan ..	2,002	149	1.2	Petrozavodsk ..	825	364	2
Gomel ..	925	324.3	1.2	Poltava ..	425	705.8	1
Grosny ..	370	810	1.2	Rostov-on-Don ..	878	341	4
Irkutsk ..	1,100	272.7	0.5	Samara ..	415	721	1.2
Ivanovo-Voznesensk ..	800	375	1.2	Smarkand ..	875	343	2
Khabarovsk ..	60.12	4,990	20	Saratov ..	316	949	0.2
Kazan ..	485	618	1	Sebastopol ..	800	375	0.25
Kharkov ..	477	628.5	4	Smolensk ..	330	909	0.2
Kharkov-Narkompotschtel ..	1,681	178.5	15	Smolensk ..	566	530	2
Kiev ..	775	387	1.2	Stalina ..	740	405.4	1.2
Kursk ..	575	521.8	1	Stavropol ..	545	550	1.2
Krasnodar ..	458.7	655	1	Sverdlovsk ..	316	949	0.5
Krementchug ..	1,100	272.7	1.2	Taschkend ..	526	920	2
Leningrad ..	1,000	300	10	Tiflis ..	1,075	279.1	4
Maschatschkala ..	443	677	1	Tomsk ..	316	949	0.15
Minsk ..	500	600	1.2	Tula ..	316	949	0.2
Minsk ..	946	316.9	4	Tver ..	695	431.6	1.2
Moscow ..	1,432.6	209.4	40	Ulianovsk ..	316	949	0.2
Moscow ..	825	363.5	25	Veliki-Usjug ..	508	590	1.2
Moscow ..	450	666.7	0.3	Vladivostock ..	480	625	1.5
Naltchik ..	820	365.9	1.2	Vologda ..	875	343	1.2
Nicolaiev ..	301	997	1.2	Voronjesh ..	403	744	1.2



Ready to brave the elements—in bear-skin coat and fur cap, as worn north of Leningrad during the winter months

keeping with the ruling communistic ideas, and it is only right that all good citizens, down to the very poorest classes, should be given opportunities to enjoy its benefits."

Radio possibly may prove an important factor in bringing Russia back into the lap of civilisation.

READERS WHO WANT TO PICK UP FOREIGN STATIONS WILL FIND THE LIST OF WAVELENGTHS ON PAGE 312 A GREAT HELP

Curing Threshold Howl

How to Overcome An Annoying Fault

THRESHOLD howling, oscillation point motor-boating, call it what you will, is more than annoying. It is the DX-reception man's *bête noir*.

It is, of course, that howl or series of clicks occurring exactly at the oscillation point, which utterly prevents signal reception at that most critical and sensitive tuning adjustment. Hence the term "threshold" howl.

Leaky-grid Sets

Its particular haunt is in leaky-grid detector sets, with a transformer immediately following the detector stage, and also in ultra-short wave sets of almost any type. What is particularly annoying is that it generally occurs in receivers which demand the best use of reaction for sensitive working, and the presence of the threshold L.F. oscillation prevents one from working anywhere near the oscillation point.

The cure is generally fairly easy to effect. In very many cases too much

H.T. voltage will be found the root of the trouble, while if a mains eliminator is used it is possible that failure of the chokes and resistances to pass enough current for the whole set requirements can set up the L.F. howl.

Another remedy is to raise the grid-leak value. For instance, threshold howling is rather prone to manifest itself in a detector stage having a 30,000-ohm impedance valve of the "HL" type, a .0003-microfarad grid capacity and a 2-megohm leak, the whole followed by a generously-wound general-purpose 3 or 4 to 1 L.F. transformer.

High-tension Voltage

The voltage will be about 60-100, and with the foregoing conditions it is quite possible that H.T. changes over quite a wide range effect no cure without diminishing strength.

Alteration of the leak value to 3 to 5 megohms, however, will almost certainly remove the threshold instability.

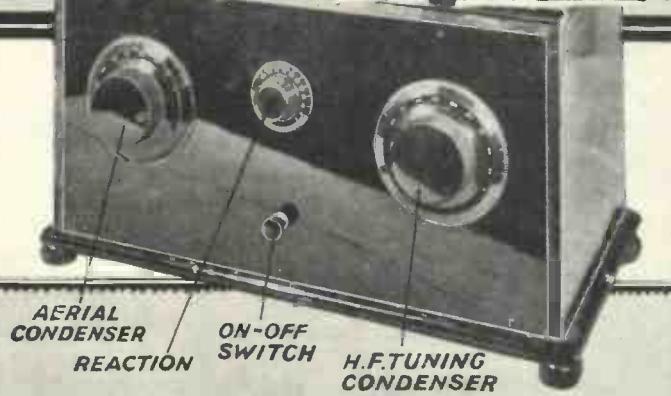
K. U.

THE TWINFLEX

*A Powerful
Two-valver*

A
TWO-VALVER
GIVING
THREE-VALVE
RESULTS
★

UTILISES A
MODERN REFLEX
CIRCUIT WITHOUT
CRYSTAL
DETECTOR



HIGH
SELECTIVITY,
GREAT PUNCH
AND ABSOLUTE
STABILITY
★

EQUIVALENT TO
NEUTRALISED
H.F. DETECTOR
AND L.F.
★

IN publishing details of an up-to-date reflex circuit here we are not attempting to standardise this type of receiver; but we believe that many readers of the WIRELESS MAGAZINE will be interested in the latest type of dual-amplification circuit, which, in this case, is based on extended experiments carried out by J. H. Reyner, B.Sc., A.M.I.E.E., at the Furzehill Laboratories.

The results obtained are remarkably good, and the circuit is absolutely stable. Results are far above the average for a two-valver; in fact, the performance compares very favourably with that obtained from three valves—but the tuning is much more selective, a very great advantage in these days.

Those in close proximity to a broadcasting station who want an alternative programme from a reasonably powerful transmitter will be able to receive the latter without interference from the local, unless conditions are extremely bad.

Two Valves Only Used

Two valves only are employed, but they are so arranged as to be practically equivalent to a set with (a) a stage of neutralised high-frequency amplification, (b) leaky-grid detector, and (c) transformer-coupled low-frequency amplification.

Actually, the processes (a) and (c) are both carried out by the same valve. The performance of the

Twinflex Two is not quite as good as that of an efficient three-valver, but on the other hand the set has considerably more "punch" than most sets with only two valves.

To prevent interaction and to ensure the maximum amount of stability, binocular-type astatic coils are used. These are practically fieldless and there is no need to utilise any

For aerial tuning, a split-secondary high-frequency transformer is used. It will be seen from the circuit diagram, reproduced below, that the primary of this transformer acts as a semi-aperiodic tuning coil. Both halves of the split secondary are tuned by a single .0005-microfarad variable condenser.

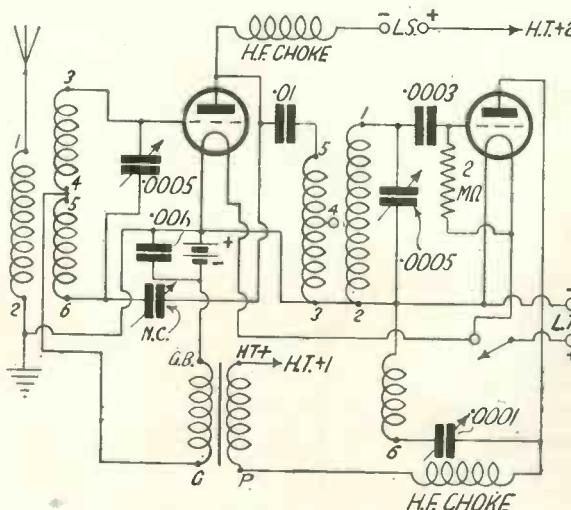
The portion of the winding between terminals Nos. 5 and 6 comprises a neutralising winding and in conjunction with the neutralising condenser connected between the anode of the first valve and terminal No. 6 enables the high-frequency amplifier to be balanced in the ordinary way.

Grid Coupling

Amplified impulses in the anode circuit of the first valve are prevented from passing direct into the high-tension battery circuit by means of a high-frequency choke, and are led to the grid circuit of the detector valve through a .01-microfarad fixed condenser.

The grid circuit of this valve is tuned in the ordinary way by means of a coil and condenser. Actually, a split-primary transformer is used, the secondary being tuned by another .0005-microfarad variable condenser.

After amplification by the high-frequency valve and the tuned circuits, the signal impulses are rectified by the detector valve. This is arranged on the leaky-grid principle in order to give the maximum

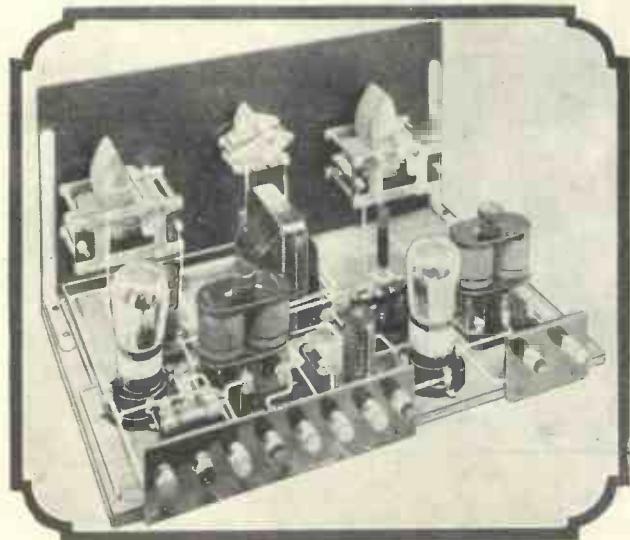


This is the circuit employed for the Twinflex

form of metallic screening in the set.

Another advantage of using astatic coils is that direct pick-up from the local transmitter is reduced to a minimum and, consequently, little interference is experienced—a point of importance to Londoners, for instance, who desire to get one of the Daventry stations as an alternative programme.

The Twinflex (Continued)



This photograph shows clearly the arrangement of the Twinflex, a modern reflex two-valver

sensitivity. High-frequency currents in the anode circuit of the detector are blocked by a choke. Reaction is obtained by means of an extra winding on the split-primary transformer and a .0001-microfarad variable condenser.

If the Twinflex were not a reflex circuit, the loud-speaker would normally be inserted in the anode circuit of the detector in series with the choke, but actually the primary of a low-frequency transformer is connected in this position.

Power Valve Used in the First Stage

The secondary winding of this transformer is connected between the grid and filament of the first valve, which now acts as a low-frequency amplifier. A power valve is, therefore, used for the first stage and this is supplied with grid bias. A by-pass condenser

of .001-microfarad is placed across the biasing battery.

It will be noticed, then, that the loud-speaker is connected in the plate circuit of the first valve, in series with the high-frequency choke, which offers no impedance to the low-frequency (rectified) impulses.

Ensuring Good Quality of Reproduction

Good quality of reproduction is ensured by using a power valve in the first stage, but it will be understood that a valve of this type will not give a very great high-frequency amplification. If possible, the constructor should try several valves in this position, in order to get the best balance between signal strength and quality.

As regards operation, there is nothing complicated about the control of the Twinflex, as a glance at the photograph in the heading will reveal.

There are only four knobs. The two large dials are for aerial (left) and high-frequency (right) tuning, the smaller knob between these being that of the reaction

COMPONENTS REQUIRED for the TWINFLEX

- 1—Ebonite panel, 16 in. by 8 in. (Parfait, Becol, or Radion).
- 2—.0005-microfarad variable condensers (Cyldon, Ormond, or Jackson).
- 1—.001-microfarad reaction condenser (Cyldon Bébé, Ormond, or Dubilier).
- 1—On-off switch (Huntley, Lotus, or Lissen).
- 2—6-pin coil bases (Lewcos, Cason, or Lissen).
- 2—Antimicrophonic valve holders (Lotus, W.B., or Benjamin).
- 1—Neutralising condenser (Peto-Scott, Bulgin, or Gambrell).
- 2—High-frequency chokes (Wearite, Omnora, or Peto-Scott).
- 1—.01-microfarad fixed condenser (T.C.C., Dubilier, or Trix).
- 1—.001-microfarad fixed condenser (T.C.C., Dubilier, or Trix).
- 1—.0003-microfarad fixed condenser (T.C.C., type SP).
- 1—2-megohm grid leak (Mullard, Ediswan, or Dubilier).
- 1—Low-frequency transformer (Lissen Super, B.T.H., or British General).
- 2—Terminal strips, 3 in. by 2 in. and 8 in. by 2 in. (Parfait, Becol, or Radion).
- 10—Terminals, marked: —Aerial, Earth, L.S.+, L.S.—, H.T.+1, H.T.+2, G.B.+, G.B.—, L.T.+, L.T.— (Belling-Lee or Eelex).
- 1—Cabinet, with 10 in. baseboard (Caxton).
- Stiff wire for connecting (Glazite).
- 2—Binocular split-secondary coils (Lewcos).
- 2—Binocular split-primary coils (Lewcos).

condenser. Immediately beneath this is the knob of the push-pull filament switch.

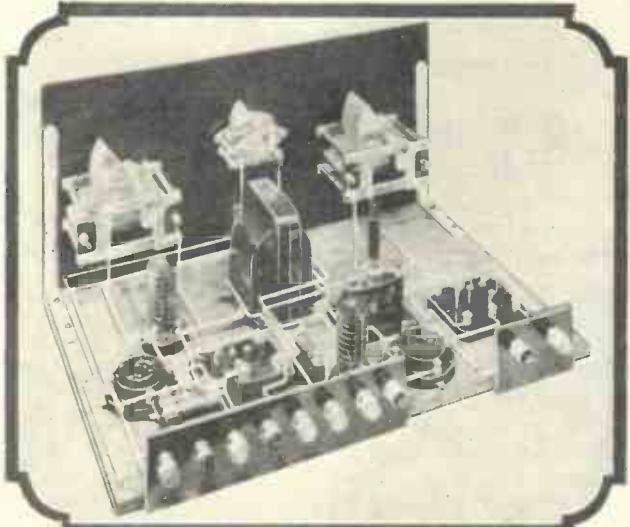
From this description, it will be seen that the Twinflex employs a circuit that is quite out of the ordinary. Many amateurs will want to try it for themselves; and we shall welcome any comments they have to make on it. It has a high degree of selectivity.

The average enthusiast will already have in his possession a large number of the parts necessary for the construction of the set.

Full-size Blueprint to Save Time and Trouble

A great deal of time will be saved and trouble avoided if use is made of a full-size blueprint. This can be obtained for half-price (that is, 6d., post free), if the coupon on page iii of the cover is used by May 31. Ask for No. W.M.138 and address your inquiry to Blueprint Dept., WIRELESS MAGAZINE, 58/61 Fetter Lane, E.C.4.

No difficulty will be experienced in the construction of the set if full use is made of the blueprint (or the



Another view of the Twinflex, a remarkably selective receiver

A Modern Two-valve Reflex Receiver

reduced reproduction that appears on page 344), and the photographs. All the important parts are indicated by name in the photograph below.

As tuning is so critical, some constructors may think it worth while to provide slow-motion dials for the two main tuning condensers.

It is most desirable, for the sake of quality, that a

THE REFLEX CIRCUITS THAT WERE SO POPULAR THREE OR FOUR YEARS AGO MOSTLY MADE USE OF CRYSTAL DETECTORS WHICH NEEDED CONSTANT ADJUSTMENT. THERE IS NO TROUBLE OF THIS KIND WITH THE NEW TWINFLEX, WHICH UTILISES AN EFFICIENT DETECTOR VALVE

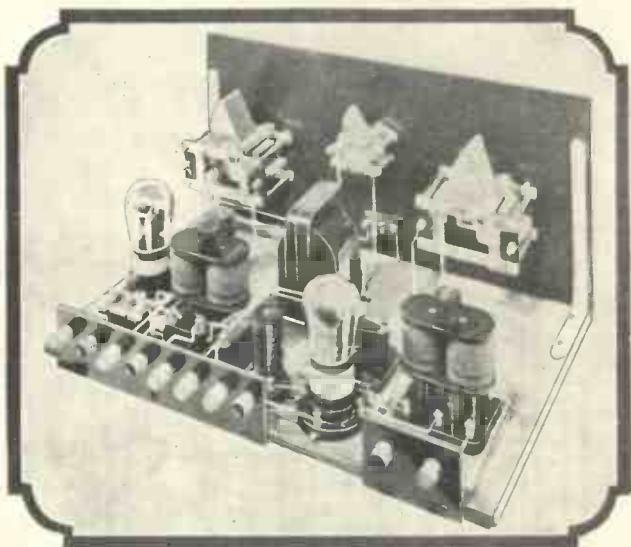
really good low-frequency transformer be used. We emphasise this point, for the Lissen Super transformer utilised in the original WIRELESS MAGAZINE set should not be confused with the much cheaper, yet perhaps better known, model made by the same firm; the former ranks with the highest class of instrument.

Wiring up in Sequence Indicated on Blueprint

No more need be said about the construction of the set except a few words about wiring up. On the blueprint every wire is numbered; and wiring should be carried out in the sequence indicated by the numbering.

It has already been mentioned that a split-secondary transformer is used for aerial tuning and a split-secondary for high-frequency tuning. The short-wave coils required for these respective positions are the Lewcos BSS4 and BSP5; for the long waves, BSS15 and BSP20.

It should be noted that the coils specified here are of the



Binocular (astatic) coils are used in the Twinflex

binocular (astatic) type, but those who already have them may care to try the SST4 and SPT5 (for short waves), and the SST15 and SPT20 (for the long waves). Short waves are between 250 and 550 metres, and long waves between 1,000 and 2,000.

Any power valve can be used in the first stage; the impedance may be between 2,500 and 6,000 ohms. The lower the impedance the better will be the quality. We have had good results with an Ediswan PV625X in this position.

For the detector stage a valve with an impedance between 15,000 and 30,000 ohms will be suitable. For instance, an Osram HL610 (30,000 ohms) and a Mullard PM5X (14,700 ohms) both give good results.

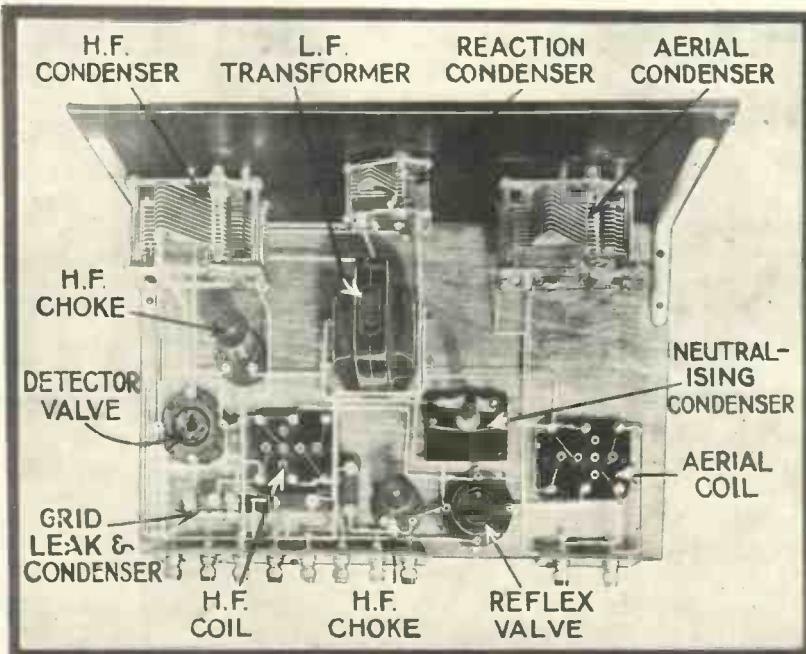
Results on Short Aerial

Tested at a distance 12 miles north of London, this station and Daventry Experimental were obtained at excellent loud-speaker strength on a 20-ft. aerial. Moreover, the quality is quite up to the standard expected from a modern receiver and fine quality of reproduction was obtained on a Mullard type H loud-speaker.

In this case the high-tension supply was obtained from a Gecophone A.C. unit and, so long as the detector anode voltage was not increased beyond about 60, no trouble was experienced with "motor-boating," although no stoppers are provided.

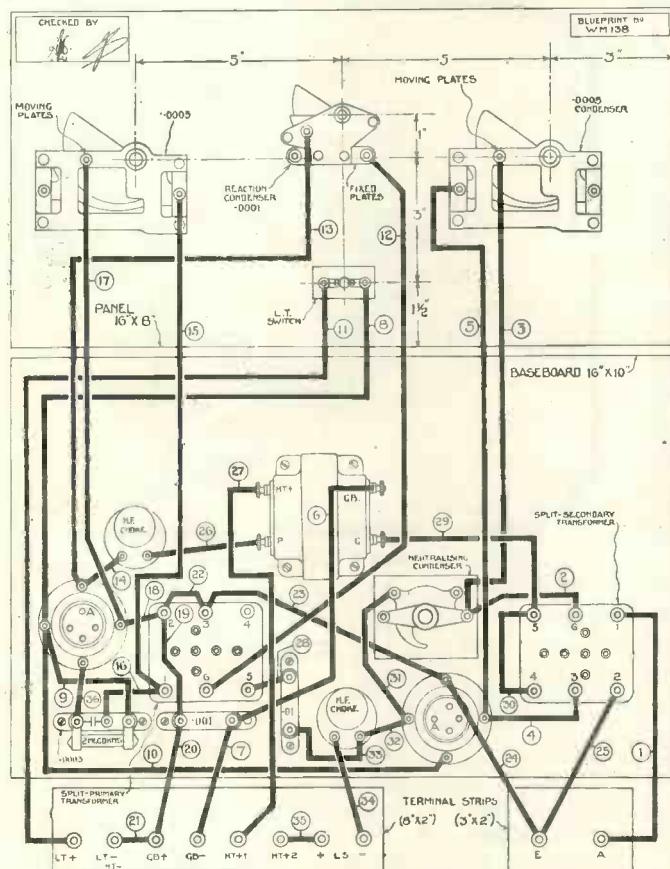
Stability a great feature

A great feature of the Twinflex, regarded purely as a reflex circuit, is its stability. Those who had experience with the old type of dual-amplification circuit so popular four



This plan view shows the arrangement of all the parts of the Twinflex

The Twinflex (Continued)



This layout and wiring diagram of the Twinflex can be obtained for half-price (that is, 6d., post free), if the coupon on page iii of the cover is used by May 31. Ask for No. W.M.138

or five years ago will be astonished at the improvement modern methods have brought about.

The receiver is especially suitable for those who want plenty of "punch"—combined with good quality of reproduction—from their local station and one or other of the Daventry transmitters.

Normally, to get the best results, an 120-volt high-tension battery will be needed, the full voltage being applied to H.T.+2. From 60 to 90 volts should be tapped off for H.T.+1. The bias recommended by the makers should be applied to the G.B. terminals.

Note should be made of the fact that H.T.— is connected to the L.T.— terminal.

How to Operate the Twinflex for Best Results

As soon as all the external connections have been made, and the necessary valves and coils inserted in their respective holders, the set is ready for use.

Put the vanes of the reaction condenser out of mesh and pull out the knob of the filament switch. Now adjust both the main tuning dials to approximately the same reading and advance the reaction control until the slight rustling or hissing sound is heard from the loudspeaker which indicates that the circuit is on the verge

of oscillation and in its most sensitive condition for receiving.

Turn the knobs of the main condensers simultaneously until a signal is picked up, when the reaction should be readjusted for the best results.

Neutralising the Receiver to obtain Stability

Neutralisation cannot be carried out in the ordinary way by switching off the filament of the high-frequency valve as this triode is also acting as a low-frequency amplifier.

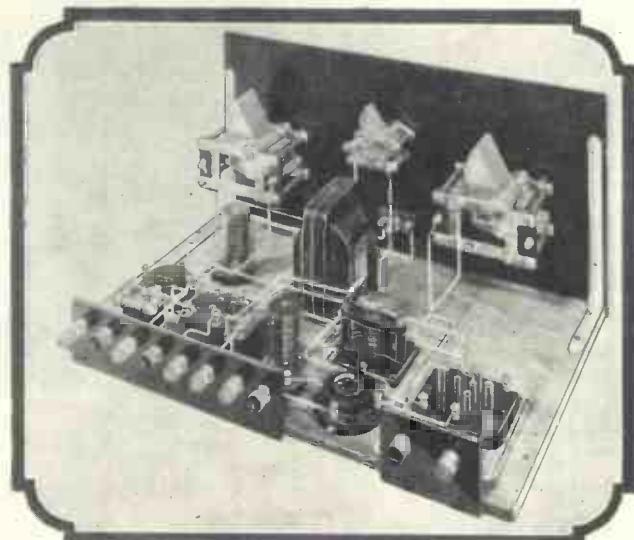
Having tuned-in a station, it is best to adjust the neutralising condenser on the baseboard until

**BECAUSE OF ITS HIGH SELECTIVITY
THE TWINFLEX IS ESPECIALLY
SUITABLE FOR THOSE WHO
EXPERIENCE INTERFERENCE FROM
THE LOCAL STATION. THE USE OF
FIELDLESS COILS OBIATES DIRECT
PICK-UP AND ALSO ENSURES
GREAT STABILITY OF OPERATION**

the best signals are obtained. In some cases oscillation will occur when both aerial and high-frequency circuits are tuned to the same wavelength, although the reaction condenser is at its minimum condition; the neutralising condenser should then be adjusted so that this self-oscillation ceases and the set is quite stable.

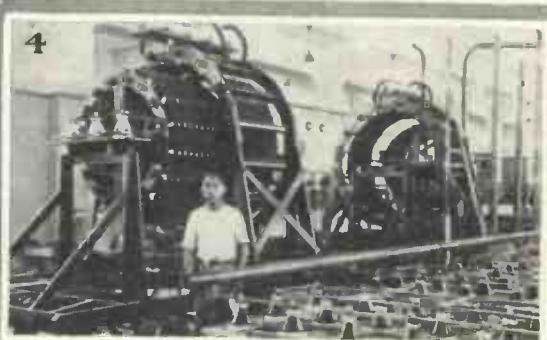
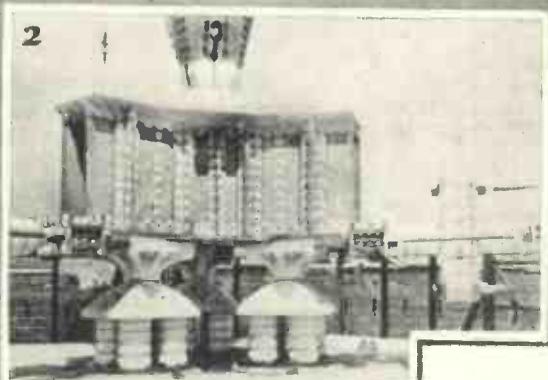
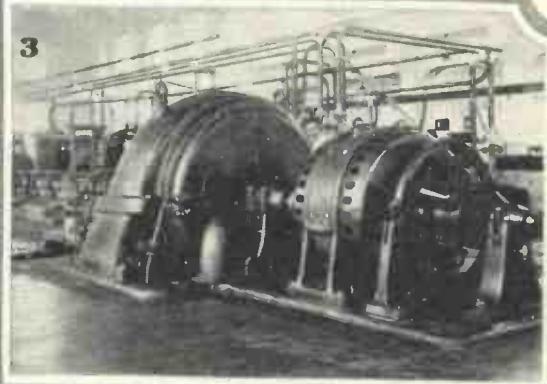
Components of excellent quality are used

We are certain that all those who build it will find the Twinflex one of the best two-valvers that has passed through their hands. All the components used in the original WIRELESS MAGAZINE are of excellent quality.

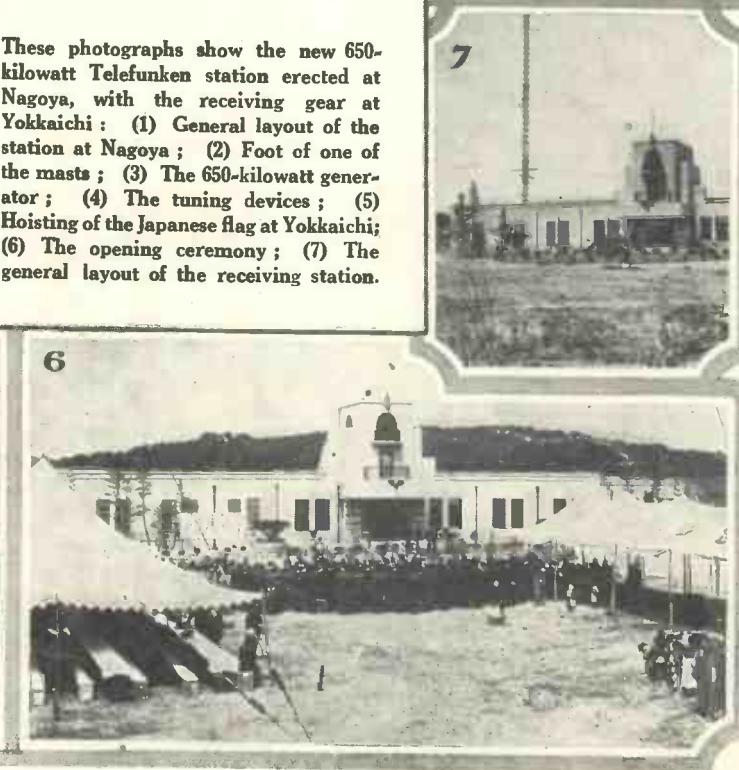


Another photograph of the Twinflex; unlike old reflex circuits it does not make use of a crystal detector

JAPAN HAS THE MOST POWERFUL STATION



These photographs show the new 650-kilowatt Telefunken station erected at Nagoya, with the receiving gear at Yokkaichi : (1) General layout of the station at Nagoya ; (2) Foot of one of the masts ; (3) The 650-kilowatt generator ; (4) The tuning devices ; (5) Hoisting of the Japanese flag at Yokkaichi ; (6) The opening ceremony ; (7) The general layout of the receiving station.



How I Should Design a Portable. By W. JAMES

PORABLE or self-contained receivers are very popular just now. Numbers of manufacturers are issuing them and most wireless dealers stock several types from which customers may choose.

Their popularity appears to be due principally to the fact that they are complete in themselves rather than to their portability. For whilst it must be admitted that the average self-contained receiver can be carried without undue effort for short distances, there are not many which could be properly classed as "portable."

Heavy Batteries

This is not very surprising when one remembers that, in addition to the receiver itself, there are the batteries, loud-speaker and frame aerial included within the containing case. The batteries in particular are relatively heavy and they cannot be reduced in size beyond a certain point, depending upon the current taken from them and the number of hours of service expected.

A most important consideration that has to be continually borne in mind by the designer of a portable receiver is, therefore, the current consumption, for it is this which will determine maintenance costs as well as the reliability of the set to provide results of uniform excellence.

Effecting Economies

The current consumption is determined, besides other things, by the number and types of valves used; a skilful designer will effect economies without materially altering the performance as expressed in terms of receiving range and quality of reproduction.



A portable receiver must be as compactly arranged as possible. The size of the frame aerial to be included within the container is therefore limited, from which it follows that as the strength of the signals collected is dependent to an extent upon the size of the frame aerial, considerable magnification must be provided in order to make certain of obtaining adequate volume.

We are glad to announce that since writing this article W. JAMES has decided to design a portable receiver for the benefit of WIRELESS MAGAZINE readers. The general design will be on the lines of the famous Chummy Four described last year, but the new set will incorporate a number of improvements and will cover both wavelength bands.

The necessary amount of magnification cannot be obtained without employing a number of valves. It is usually considered that four is the minimum, although five valves or more are often used.

Each valve has to be supplied with current from an accumulator for heating the filaments and from a high-tension battery for the anode circuits. Any economy in the number of valves that can be effected by careful design is therefore worth while, but it is impossible to employ less

than a certain minimum number if acceptable results are to be obtained.

As in all receivers, the amount of the volume to be obtained without distortion from a strong station is dependent upon the size of the output valve, the type of loud-speaker used and the high-tension supply. Even if we restrict ourselves to a two-volt power valve and high-tension of 120 volts we shall be able to obtain signals of acceptable strength. The volume will not be great, but it will be sufficient for many domestic purposes and should be adequate for users listening in an average-sized room.

Consumption of Last Stage

This last stage, when properly biased, will pass a high-tension current of approximately 6 milliamperes, and there is no method of reducing this without introducing distortion. It is, of course, quite practicable to use a push-pull output stage and so to bias the pair of valves that the normal steady current is 1 milliampere or less.

But I doubt whether the average user would be prepared to employ the two valves, especially when an output circuit in the form of a choke or transformer is practically essential.

Magnification and Detection

We have, therefore, to begin with a load of 6 milliamperes upon the high-tension battery, and the problem is so to arrange the amplifying and detector valves that adequate magnification and good detection with the minimum of anode current are obtained.

Let us assume the receiver to have four valves as indicated in Fig. 1 (Figs. 2 and 3 show alternative high-

frequency circuits). The first, being of the shielded-grid type, has to be supplied with high-tension for the anode circuit and also for the shielding grid. This valve is marked V_1 in the diagram. Next to the high-frequency amplifying valve is the detector valve V_2 , which is coupled to the first low-frequency amplifying valve V_3 . This last valve is in turn connected to the power valve, which we are assuming is passing a high-tension current of 6 milliamperes.

Reducing Current Consumption

A normal shielded-grid valve will pass a total current from the high-tension battery of about 4 milliamperes when the voltage is 120 for the anode and 60 to 80 for the screen, with zero grid bias. This may be reduced to about $1\frac{1}{2}$ milliamperes by employing a grid bias of negative 1.5 volts (one dry cell) so that here

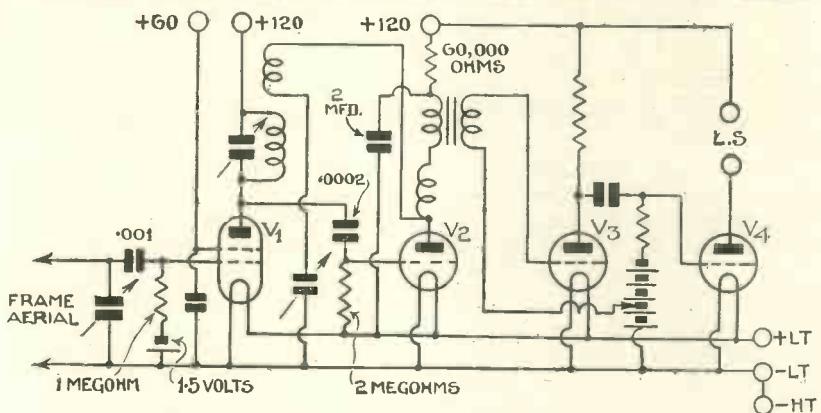


Fig. 1.—Four-valve circuit suitable for portable set

economy is of importance grid bias should be used.

The circuit shows one method of applying grid bias to the first valve of a portable receiver.

We now pass to the detector valve,

ance of 20,000 to 25,000 ohms under the usual conditions of zero grid bias and 100 volts high-tension, and the anode current would be approximately 3 milliamperes.

With a high-tension of 60 volts, which is ample for detection, and with the grid-leak joined to positive low-tension the anode current would be about 1 millampere. If, therefore, we connect a transformer to this valve and employ a resistance to reduce the voltage from 120 to 60 we shall have an economical detector stage without having sacrificed the performance in any way.

Adequate Filtering

The resistance will, of course, be connected as indicated in the diagram and when used with a 2-microfarad fixed condenser will provide adequate filtering. A resistance of 60,000 ohms, will be suitable, as when 1 millampere is flowing through it the voltage drop across it is 60 which leaves 60 volts for the valve.

The first low-frequency amplifying valve must of necessity be of such a type that a grid bias of at least

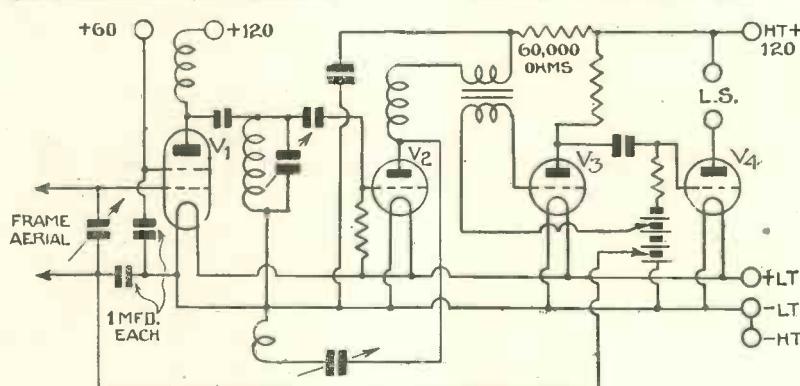


Fig. 2.—Alternative high-frequency circuit

considerable economy may be effected.

The anode impedance of the valve will be a little higher when the grid bias is used, but with normal high-frequency circuits there will be no difference in the amount of the amplification. In fact, the selectivity and the magnification may actually be materially improved by the employment of this grid bias.

When Economy Is Important

I expect the reader is now wondering why suitable grid bias is not always used and the answer, so far as I am able to give it from enquiries that have been made, is that the circuit is a little more straightforward when the grid bias is not provided. It is admitted by everyone that grid bias is a desirable thing and when it is remembered what a considerable saving in high-tension current is effected by using it, I feel that when

which we will assume is adjusted to operate with a grid condenser and leak. This detector valve will be of the moderate-impedance type; a suitable one would have a magnification factor of about 20 for an imped-

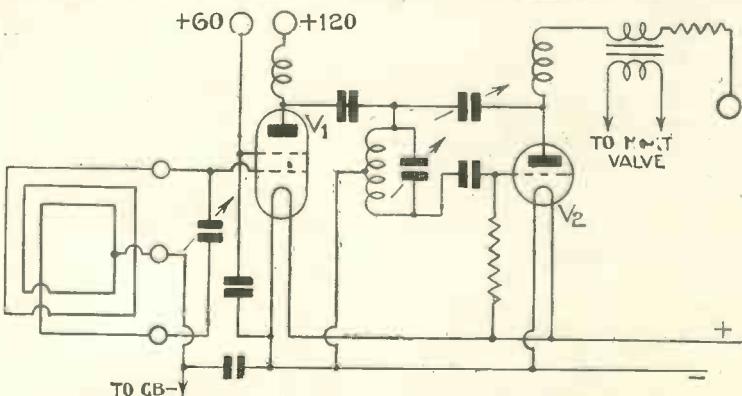


Fig. 3.—Another method of connecting the high-frequency circuit

How I Should Design A Portable (Continued)

negative 1.5 volts may be used without distortion. The actual grid bias that will have to be employed is dependent to a certain extent upon the amount of amplification provided by the third stage. We are using a grid bias of 9 volts on the last stage, with the result that the grid bias for the third stage must be at least a little greater than 9 volts divided by the amplification obtained from the third stage.

Coupling for Third Stage

It is hardly necessary to employ two transformer-coupled stages excepting in special circumstances and we will, therefore, use a resistance-coupled third stage. With an anode resistance of from 50,000 to 100,000 ohms and a valve of the same type as used for detection we shall obtain a magnification of 12 to 16, from which it follows that a grid bias of negative 1.5 volts

for the third valve will be sufficient.

The anode current flowing through this valve will amount to rather less than 1 milliampere, which is a satisfactorily low value.

Our four-valve receiver therefore passes a total of 9.5 milliamperes, which is just within the economical capacity of a standard type high-tension battery. It should be noted that each valve has been adjusted to operate correctly, and provided the last valve is not overloaded the remaining valves will be working well within their limits.

The addition of a further high-frequency amplifying valve would add 1.5 milliamperes to the high-tension current, which then becomes 11 milliamperes and may be considered rather more than the ordinary dry battery should be called upon to deliver.

It is quite possible for the high-

tension current of a poorly arranged four-valve receiver to amount to 15 milliamperes at least. A current of this amount will quickly discharge a battery of the type used in portable receivers and I have indicated how the current may be limited to a reasonable amount without affecting the quality or the performance.

Unusual Combination

The combination of a transformer-coupled detector stage followed by a resistance-coupled low-frequency amplifier may be considered rather unusual, but it seems to me to have advantages when the receiver is to be compactly arranged.

I have found the arrangement when employed in this type of set to be more stable and more economical than the more conventional resistance and transformer-coupled amplifier.

The Inevitable Radio—in the U.S.A.

DURING a tour of the United States of America the outstanding fact that faced one all the time was the ubiquitous radio. It could not be avoided anywhere—not even in one's bedroom at some hotels, for there were earphones.

In crossing the Atlantic one was constantly reminded of the linking-up power of wireless. Each passenger was given a card which contained the terms for sending wireless messages anywhere. The third day out a wireless message came to me from England direct. On the notice-board on deck was the daily reminder that our ship was in constant touch with eight other ships, the names of which were given.

No Stretch of Imagination

It was no stretch of the imagination to think of each of these eight ships in constant touch with eight other ships, until the whole oceans and continents were linked up in a cobweb of radio designs.

Every morning there was awaiting us at our breakfast table the *Radio Bulletin*, which contained news gathered by the ship's radio from the four corners of the earth.

On the fast American express

trains was the unavoidable radio. Telegrams came and went all day long. The wireless operator on one train informed me that during one day the previous week fifty-six telegrams had passed through his hands, most of which were received for passengers. This wireless on trains is a great boon to busy business people, as it helps to facilitate appointments in particular.

It has another purpose. There are many hoboes—knights of the open road—who still travel via "side-door Pullmans," and who are frequently put off trains on which they are stealing rides. In the past these riders have been able to conceal themselves from the eyes of the train crew.

Now the passing train can send a radio message to the train on which the poacher is riding freely and thus make his capture easy.

For this, among other reasons, the American Railway Association is asking for a wavelength in the short-wave field. Train wireless engineers claim that as the service range will only be five miles there will be no interference with others. What a boon radio is, however, between the conductor and engine driver on a

long train, especially when the train is freight of a hundred or so cars.

There is hardly a big hotel in America that has not a wireless set in every room where guests are expected to assemble. Looking over one of Seattle's biggest hotels, I was agreeably surprised to find a £50 set in the kitchen with the cooks.

In Chicago the police have a radio set for traffic regulation purposes. It consists of a horn, batteries, microphone, and sectional poles to support the horn. No pedestrian or driver can miss the official voice which says "Go" or "Stop" as required.

Radio to Give Instructions

In a few years it will be usual for bosses of street gangs to be using radio to give instructions. That way lies the tendency of the inevitability of radio.

In theatres one can never escape radio. There is hardly a church without its permanent microphone as part of the church furniture and fixtures. One parson told me that he and his friends were regarding the microphone as as necessary an instrument as the organ or the pulpit.

E. B. R.

Decorate Your Linen Loud-speaker!

Some Useful Hints

THE "W.M." Linen-diaphragm Loud-speaker has caused a great deal of comment in at least my circle of amateur wireless friends; as a matter of fact, loud-speakers have been the only topic discussed of late, and the "fors" and "againsts" have been most amusing to listen to.

I, along with others of my friends, have built the "W.M." loud-speaker, whilst others I know have built the one described in a contemporary journal, where all the faults of our efforts seem to be made most obvious.

Still, one must judge by the result obtained.

Disadvantage of Size

The big failing regarded by most people is, I find, the size of the loud-speaker. "Look at the size of it!" they say. Further, "Who wants a great white piece of linen hung on the wall?"

This is where I have scored on my friends, and I wish to pass on how I found it possible for anybody to make quite an ornament of the loud-speaker at a very small cost and without either technical or artistic skill.

The following operations were carried out after treating with collodion and previous to joining the diaphragms:—

The first thing is to get rid of the white linen appearance; obviously an awkward operation if one anticipates doing this by means of a brush.

Spraying the Diaphragm

The method I adopted was simply to spray the diaphragm with the desired colour, the materials used being rather unorthodox, but they served the purpose very well.

An ordinary Altas throat spray and a bottle of Luton hat dye (both obtainable from any chemist) did the trick.

The apparatus produced a fine spray and the hat dye was quick drying and without any gloss, the



whole operation taking but a few minutes.

The colour was sprayed in such a manner as to produce a variegated effect, darker in the middle and round the outsides.

The colour I used was golden brown, which gave the diaphragm a nice light brown colour with the appearance of parchment. This in itself was sufficient to give the loud-speaker a more finished appearance.

I continued the operation further, however, and purchased a Dean's "Home Stencil Book," and stencilled

The Modern Empire Mother

*With loving care she trained her children well,
And when they left her, travelling far and wide,
Her praises they were ever wont to tell,
Because their "little mother" was their pride :
And she, she gloried in their strength and power,
Although at times her pride was fraught with pain;
For they were far, oft in a lonely hour
She longed to hear their voices once again.*

*Her wish is fully realised to-day,
For over every land and every sea
Wireless now holds its glad triumphant sway
And, linking all in wondrous unity,
It brings her scattered children's voices clear
Home to the waiting Empire Mother's ear !*

LESLIE M. OYLER.

A Reader's Appreciation

three designs and a border on the diaphragm, the result being a loud-speaker neither unsightly nor ugly in appearance, but an ornament to the room in which it is hung.

The photograph can give only a poor idea of the really artistic appearance of the loud-speaker.

Best Hung from Picture Rail

For those who may not have tried it I say the loud-speaker is best hung from the picture rail across the corner of a room, being tilted so as to face slightly down at an angle into the centre of the room.

If hung in this manner the back of the loud-speaker is not visible.

Perhaps a word regarding the performance of the "W.M." Linen-diaphragm Loud-speaker would not be out of place here.

I have built only to the specifications laid out in the WIRELESS MAGAZINE (September, 1928), and have had all kinds of loud-speakers in my time, ranging from £1 to £7 7s.; and, to put it in a few words, the "W.M." Linen-diaphragm Loud-speaker suits me best of all.

I possess a certain amount of musical knowledge, and have sat down especially to analyse the performance of this new loud-speaker, and find it perfectly balanced on speech and all kinds of music.

To hear such instruments as the bass fiddle and drums come through is a pleasure I have often listened for in vain in other types of loud-speakers.

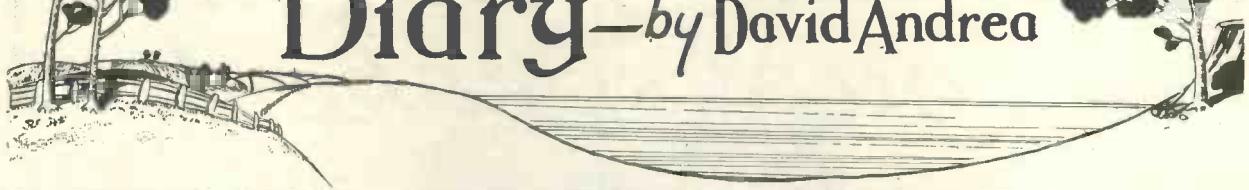
Handling Great Volume

The volume the loud-speaker is capable of taking without overloading is astounding, and I find it possible to put all the energy of a powerful five-valve set through it without any signs of distress.

The Technical Staff of the WIRELESS MAGAZINE, in my opinion, are to be congratulated on the design.

BM/BDRA.

A Countryman's Diary—by David Andrea



YESTERDAY I fetched my batteries from town. One wonders what the town radio fan would think of wireless in this remote part! He is near-by all the necessary sources and can in a few moments get anything he needs in case of emergency.

He can get his batteries charged in twenty-four hours when they run down; he can get a new high-tension battery at the corner of the next street, he can get valves or any gadget likewise without much trouble or inconvenience.

Charging from the Mains

The more fortunate townsman fan has a supply of electricity in his house, so that he can, if he chooses, charge his set from the main.

Out here, it is all so different. The town is five miles away and the batteries have to be taken there. As very few fans keep an extra supply of valves and gadgets in the country, it means a run to town every time something goes wrong.

Yesterday, I fetched my batteries. For a whole week, they had been under charge and so I was denied all the week's programme. Now, I find that my valves are gone and as no one from this neighbourhood is going to town to-night, I shall have to bide my time until to-morrow before I can get my new valves.

Perhaps some day when there is a national scheme of light and power, we shall have power from the main. Until then we must envy our more fortunate town radio cousins.

This sets one thinking about the differences between us and the townspeople enthusiasts. They have their advantages, but so have we. There's the fiend of oscillation! Very seldom does he come out here. There are no super-sets for miles. We are very few fans. There is plenty of room for us to work and plenty of room for us to breathe in the air. When we do oscillate, we cause very little trouble

to others and seldom do we trouble the townsmen with our squeaks and howls. Of course, they seldom disturb the ether for us, on the other hand.

The country gives us advantages never experienced by the town fan. Oftentimes, I hear my friends of the town say that they fail to get so-and-so station even on four valves. They try all means by all wiles, but they utterly fail.

Out here, on three valves, I can get every station on the B.B.C. chain. I can also get many of the foreign stations with a clarity and ease that baffles my friends when they come out for a tea or supper in the summer months. The ether like the land is less crammed in the country than in the gardens that are full of aerials.

Since the advent of radio, I feel myself much nearer the town cousin. I get the news that matters as soon as he does. Until a few years ago, I was regarded as a duffer. I only got one newspaper a week and that paper contained all the news. Of course, it was stale, but then there were no newsagents this way.

We depended more on the postman for news than anyone else. He is a countryman and the news he brought was of no value to us, unless it contained something about markets. The news the postman and the newspaper did not bring us, we received on market day every Saturday and that was merely news of the markets.

A Great Change

Now all that is changed. We get the news bulletins and the latest items of interest immediately they are known. We get market information which is quite up to date and national. We get lectures and talks about agriculture and kindred subjects.

We have suddenly come to live in a very real world. It is so much bigger than the world of ten years ago. What our farmer ancestors would have

thought of our ways we can only imagine. Whatever difference radio has made to the towns, it is sure that it has made the country something strange and exceedingly new.

This morning I met John Williams, the blacksmith, and, being one of the keen radio fans of our village, he asked me how I had enjoyed the service from that London church last night. Of course, John is no scholar, although he can make as good a horseshoe as any in the country, but he is a real old type kind of Methodist. I replied that I had thoroughly enjoyed the programme.

"It's a fine thing this wireless has done for us," he replied. "It's given us a big world. When I was a boy we had to listen to the local preachers who knew little more than ourselves and take their word for everything. But now, we are hearing them and the big preachers from all over the kingdom."

Intellectual Growth

John's a good sort. And radio has made such a difference to his home and life. That man has grown intellectually by leaps and bounds since five years ago, when he had his set installed. He gets as near the loud-speaker as he can as soon as he's finished in the evening, and there he thinks, and takes it all in. The next day, he argues and discusses matters that even surprise the parson in our parish.

The few radio fans we have here are keen. They discuss the radio programme of last week and next, as they used to discuss the sermon and the service at Church. They know all about the singers, talkers, and actors. They follow every series they possibly can and the series of talks on music seems to suit them down to the ground, finding a very responsive chord in their hearts.

They say that we countrymen are conservative and slow. Maybe it is true. One wonders how many

townspeople still use the primitive and inexpensive crystal set? Lots of countrymen do.

I was down at market a couple of days ago, and over our cup of tea some of us farmers talked about our wireless sets. I was the only one among them who had a valve set, although I have also a crystal which I have discarded for some years. They came from the country about twenty miles from our village and they said that the results they get are wonderful, although they are ten miles from the broadcasting station.

Extra Travelling

They are not going to move on with the times either, and for reasons that seemed good. A valve set would mean such a lot of extra travelling to and from town, and the expense would be so much out of proportion to the increased results, that they are fans of the cats' whiskers.

In their neighbourhood, there are seven wireless fans and they all have crystals. A town friend of mine who lives five miles from a broadcasting station says that as far as he knows there are no more than a dozen crystal enthusiasts in the whole place, although the population is nearly 80,000.

When I have an afternoon to spare I shall accept their invitation to see what their results are. They asserted that no better results could be got than what they receive.

Obviously, if the crystal suits some country places and brings good reception, there will be no other adequate reason for a change, for most of the latest gadgets mean increased power, and power means batteries or a main. So there we are. We live in the country.

Crystal Advance

The thought just occurs to me, as I fill in these lines in my radio diary; Do the big radio companies give all the attention they can to the development and exploitation of the crystal as a means of reception? Compared with the valve, there has not been much advancement in the crystal set. One wonders to what extent the crystal could be improved? Remote farmers and rural enthusiasts would be grateful for any further advance in the science of the crystal.

E. B. R.

**AN EXCLUSIVE ARTICLE
ON RURAL CONDITIONS
IN RUSSIA WILL BE
FOUND ON PAGE 337**

How the Law Acts When Your Aerial Collapses!

DURING the winter gales probably hundreds of aerials collapsed in different parts of the country. In our street six or seven collapsed and one fell on a neighbour's glass house, smashing it into pieces. The result is that the neighbour is bringing an action for damages against the owner of the aerial.

What is the law on this matter? Is the aerial's owner responsible when it does damage to someone's person or property?

The law in this matter is the same as the law in similar cases. If a

is responsible for any injury done by property.

An aerial is evidently a dangerous thing in a gale, for however well fitted it may be, it may fall and damage others' property. Indeed, it may break a passer-by's leg or even kill him. No excuse is adequate as far as the radio owner is concerned. He is liable in law to pay for the damage incurred.

If the aerial falls during a gale, however, there is a complication in law. The owner may plead that it was an "Act of God." But here the

GERMANY'S BROADCAST CHIEF



Herr Knöpfe, who controls German broadcasting, working at his desk

garden fence falls and injures a passing pedestrian, the owner of the fence is liable to be sued for damages, and when damages are concerned they may be heavy or not according to interpretation.

A falling slate which kills a man who is passing along a street can bring the owner of the house into court, again for damages. The law insists that we should look after our property. It must be safe and sound. It must cause no annoyance to our neighbours. It must cause no harm to others. The owner of the property

prosecutor may plead that the aerial was in a rotten condition and might have fallen at any moment without a storm or wind.

Rotten Wood

There are other exceptions, but, in the main, the radio owner is responsible for any damage caused by his falling aerial. There is one lesson we can learn, and that is that we should see that our aerials are in the best and safest condition possible at all times. Rotten wood aerials are only inviting trouble.

E. B. R.

Speeding News by Air - G-AAAAN - by KENNETH ULLYETT and Radio, Too!

This photograph shows Geraldine, the Daily Mail's news-gathering aeroplane in flight

WRITING this article is not so easy a job as it could be, for while I am struggling to put pen to paper, *Geraldine*, the *Daily Mail's* private aeroplane, is carrying me several thousands of feet above the neighbourhood of Croydon !

Very Accommodating!

Geraldine is a giant in her way, for she carries a saloon capable of accommodating seven people, a photographic dark-room, a motorcycle, and last, but not least, a wireless set. She is used for getting news and news photographs for the *Mail* as quickly as possible from the news source to the heart of the newspaper, and radio plays such a large part in this that I arranged, for the benefit of WIRELESS MAGAZINE readers, to accompany Capt. Wilson (who is in charge of the aeroplane side of the *Mail*), on a news trip. So here we are *en route*, and happy with a convoy of "hot" news photographs wanted quickly.

I must not say much about this present trip, and in any case that from which Capt. Wilson has just come back was more thrilling.

A special boat had arrived at Marseilles from Australia, with photographs of the Test Match, and it was essential to get them into the *Mail* without an unnecessary hour's delay. So *Geraldine* sped from Croydon, over Lympne and Folkestone, across the Channel (guided by wireless all the way), and thence to a

brief stop at Le Bourget, near Paris. Re-fuelled, the trip continued over Dijon and on to Lyons (where snow was encountered, despite the Riviera advertisements!), the photographs were picked up from the waiting liner and rushed back non-stop to Le Bourget. Each aerodrome was advised of arrival by wireless, and special arrangements were made for the final stop at Le Bourget.

The radio apparatus is installed in the saloon of the 'plane, and is operated by flexible Bowden wire controls from the pilot's cockpit. Seeing that the outfit for both receiving and transmitting is really comprehensive it is quite a surprise to find that both sets are operated by only four controls which look like the levers on an ordinary motor-bicycle handle-bar.

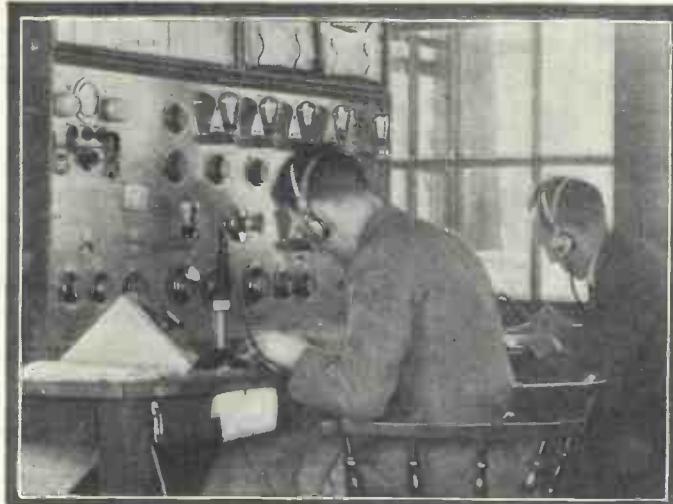
Technically, the transmitter is choke-controlled, with one stage of L.F. amplification, and with two oscillators (MT5's) in parallel. The microphone is incorporated in the pilot's helmet, and H.T. power is derived from a wind-driven generator on *Geraldine's* chassis.

The receiver has two H.F. and two L.F. stages, and is more or less pre-set in tuning range to the conventional aircraft 900-metre band. One of the "mo-bike" controls in the cockpit adjusts a reaction condenser for

boosting up signals when the strength is weak. The aerial is, of course, a length of wire simply hung out from the 'plane while in flight.

A Sickening Sensation!

The transmitter is working at the back of me now while I write, and the fact that we are circling round within sight of the direction-finding tower of Croydon automatically writes *finis* to this epistle! It is a sickening sensation to see the ground rising to meet you!



Receiving messages from aeroplanes in the wireless room at Croydon Aerodrome

On landing, the photographer jumped into a taxi, covered the distance to Paris in 35 minutes (a more hectic journey, in a Paris taxi, than the whole 'plane trip) and telegraphed the pictures simultaneously to London and Manchester!

Now the radio side is vital to this success. *Geraldine* has a 150-watt transmitter and a five-valve receiver installed, and with this gear the pilot keeps in touch with landing grounds, gets his bearings and can obtain advance weather reports.



Designed by J. SIEGER, of the "Wireless Magazine" Technical Staff

In our previous issue (pages 246-251) we described in detail the construction of a powerful set called the Dominions Four, which incorporates two screened-grid valve high-frequency stages, a detector, and a single stage of low-frequency amplification; it makes use of dual-range coils that cover both broadcast wavebands.

Here it is our purpose to show how the Dominions Four can, by the addition of a simple one-valve adapter, be converted into a "Five" that is actually a short-wave super-het.

This scheme is one that will appeal particularly to overseas readers. They can make a powerful four-valver for the reception of distant "locals," and then add one valve to get world-wide broadcasts on wavelengths from 15 to 100 metres.

Astounding Results

As was mentioned in the original article, when used in the latter way the Dominions "Five" is capable of achieving really extraordinary results and is probably the most powerful short-wave receiver that has yet been produced in this country by any technical journal.

Some idea of the results obtained with the Dominions Four and "Five"

will be gathered from a glance at the test report reproduced on page 355.

The principle underlying the operation of the short-wave super-het is simple and satisfactory. As will be seen from the circuit diagram, the one-valve unit comprises a simple oscillating detector circuit. During

long-wave transmission would be.

Actually, the main receiver is adjusted for reception on 1,100 metres and then left as it is. This wavelength is chosen because, in the south of England at any rate, it is the one point on the higher waveband which is free from interference.

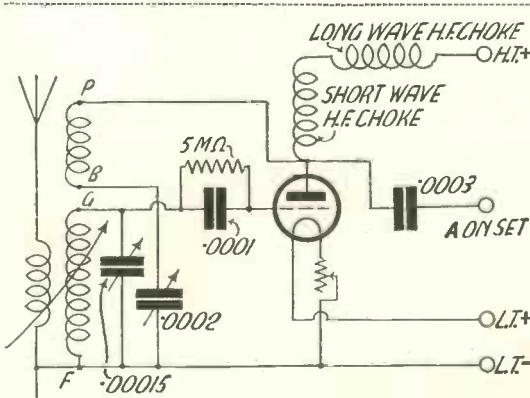
Direct Pick-up

If Daventry's wavelength were used, for instance, it is most probable that that station would be picked up direct on the main receiver without any aerial connection, so sensitive are its two screened-grid stages.

When used abroad, however, it may be found best to employ some other wavelength, but the operator will have no difficulty in choosing some point on the upper waveband that is free from disturbance in his own particular district.

In spite of its size, when used as a short-wave receiver, the Dominions "Five" is a one-knob set, for the adjustment of the main receiver is constant.

The circuit diagram reveals that the aerial circuit includes a semi-aperiodic winding, which is coupled to a secondary tuned by a .00015-microfarad variable condenser provided with an efficient slow-motion control.

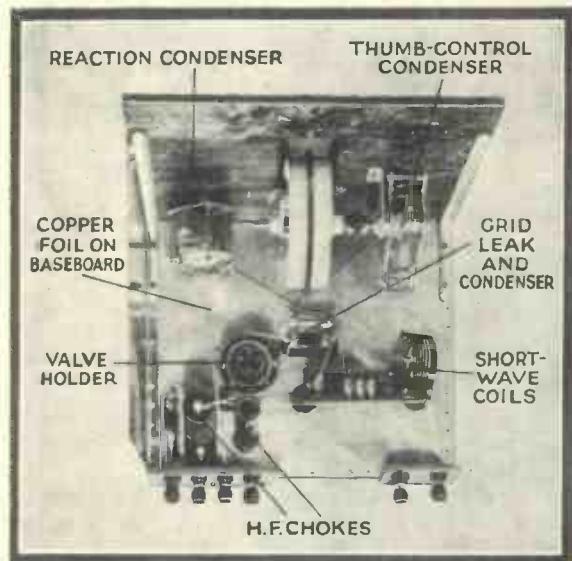


Circuit of the Short-wave Adapter for the Dominions Four, which was fully described last month

reception, this part of the circuit is kept in a mild state of oscillation, a procedure which results in a beat note being produced as each short-wave transmission is tuned in.

This beat note is passed on to the main receiver, when it is amplified and reproduced in exactly the same way as an ordinary

The Dominions Four (*Continued*)



This plan view clearly shows the arrangement of the parts in the Short-wave Adaptor

Note should be made that for short-wave reception the grid condenser and leak have valves of .0001-microfarad and 5 megohms respectively. So that the valve can be adjusted critically for the best performance a rheostat is included in its filament circuit; this is also used as an on-off switch.

Reaction is obtained in the ordinary way, by means of an extra winding in the anode circuit of the valve, and the amount of feedback is controlled by a .0002-microfarad variable condenser. It will be observed that stability is ensured by the fact that one side of each condenser is at earth potential.

High-frequency Chokes

It is, of course, necessary to employ a high-frequency choke in the anode circuit, also. Although a good make of "universal" choke (that is one suitable for use on all wavelengths) is employed, it was found that the unit would not oscillate on wavelengths lower than about 20 or 30 metres unless a special short-wave choke was placed in series.

That, then, is the final arrangement adopted, and the circuit will oscillate freely on wavelengths as low as

from the high-tension voltage applied to the valve in the adaptor unit.

So much for purely theoretical considerations; let us now discuss some constructional points. In order to ensure good results it is imperative to use components of good quality and, as far as possible, the constructor should use the same parts as employed in the original WIRELESS MAGAZINE receiver, which was designed by J. Sieger. The parts actually used are mentioned first in the brackets in each case in

the list that appears on page 355.

about 15 metres.

There have been many arguments amongst members of the WIRELESS MAGAZINE Technical Staff as to why the circuit will oscillate on low wavelengths only with the additional inductance of the short-wave choke in series with the long-wave model. However, in practice, the scheme works well, and that is all that need concern us in this article.

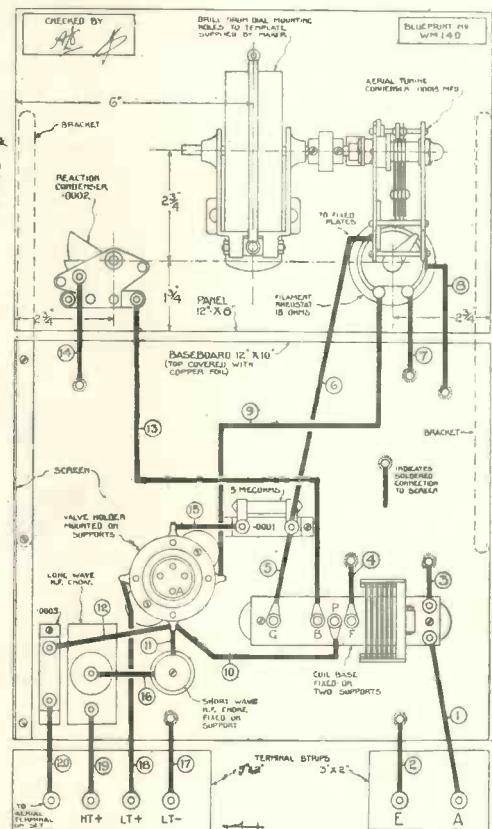
The .0003-micro-farad fixed condenser in the anode circuit of the valve insulates the main set

been taken against losses. Both the coil base, the valve holder, and the short-wave choke are mounted well away from the baseboard (to avoid "capacity-to-earth" losses), and the set is further protected by a copper or aluminium screen.

Use of American Short-wave Coils

There are two reasons why coils of American manufacture are used (it is our policy to support British firms as much as possible). In the first place they have been developed after considerable short-wave experience in the congested ether of the United States and secondly, they will probably be more easily obtainable by overseas readers who desire to build the set than would equivalent coils of British manufacture.

All the constructional details will be found clearly indicated on the full-size blueprint, which is available for half-price (that is 6d., post free).



This layout and wiring diagram of the Short-wave Super-het Adaptor can be obtained for half-price (that is, 6d., post free), if the coupon on page iii is used by May 31. Ask for No. WM140

Converting It Into A Short-wave Super-het

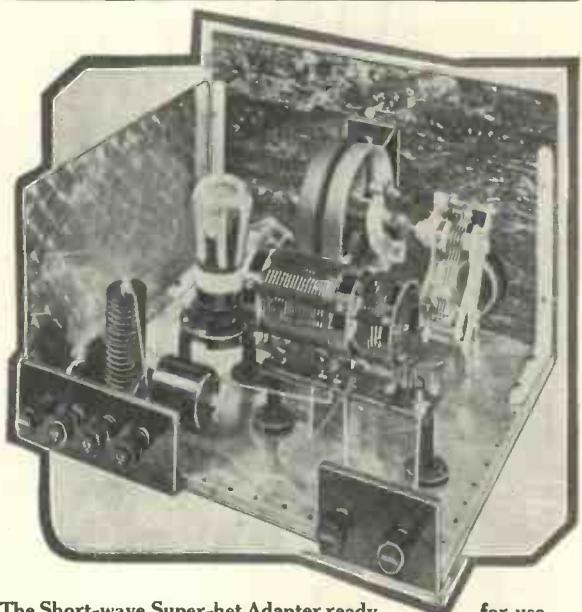
COMPONENTS REQUIRED FOR THE ADAPTER

- 1—Ebonite panel, 12 in. by 8 in. (Becol, Parfait or Radion).
- 1—.0015-microfarad variable condenser (Igranic Lokvane, Cyldon, or Ormond).
- 1—Vernier drum control (Igranic).
- 1—15-ohm panel rheostat (Finston, Lissen or Peerless).
- 1—.0002-microfarad reaction condenser (Cyldon, Ormond, or Lissen).
- 1—Set short-wave coils with base (Rothermel Aero).
- 1—Antimicrophonic valve holder (Lotus, W.B., or Benjamin).
- 5—Supports for coil base, valve holder, and H.F. choke (Bulgin).
- 1—High-frequency choke (Lewcos, Wearite, or Peto-Scott).
- 1—Short-wave high-frequency choke (Igranic).
- 1—.0003-microfarad fixed condenser (Dubilier, T.C.C., or Trix).
- 1—.0001-microfarad fixed condenser (Dubilier, T.C.C., or Trix).
- 1—5-megohm grid leak (Dubilier, Mullard, or Graham-Parish).
- 2—Terminal strips, 5 in. by 2 in. and 3 in. by 2 in. (Becol, Parfait, or Radion).
- 6—Terminals, marked:—Aerial (2), Earth, H.T. +, L.T. +, L.T.—(Belling-Lee or Easitick).
- 1—Copper screen (Parex, Ready Radio, or Raymond).
- 1—Cabinet, with 10-in. baseboard (Pickett).

As regards a valve and coils for the set, any good detector valve can be used. Normally, a valve with an impedance between 15,000 and 30,000 ohms will be suitable; a list of British valves, in order of impedance, will be found on pages 308 and 310.

Three Coils

Three coils are supplied in the set supplied by the distributors, and these together cover a wave range of approximately 15 to

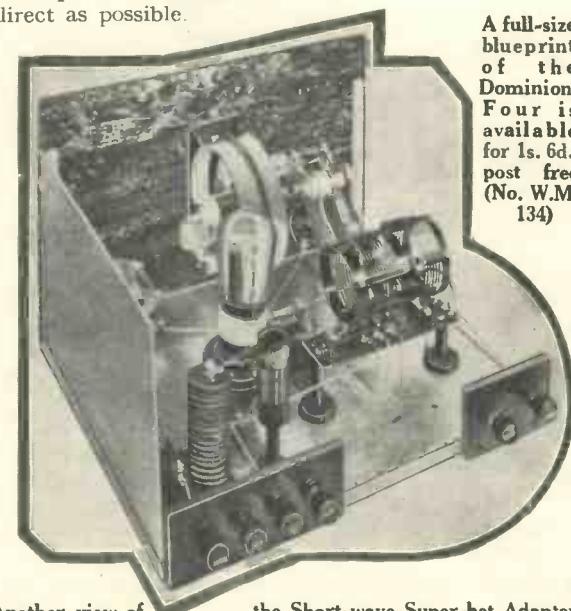


The Short-wave Super-het Adapter ready for use

if the coupon on page iii of the cover is used by May 31. Ask for No. W.M.140; and address your inquiry to Blueprint Dept., WIRELESS MAGAZINE, 58/61 Fetter Lane, E.C.4.

Wiring up

Wiring-up should be carried out in the numerical order indicated on the blueprint, and all the leads should be kept as short and direct as possible.



Another view of

Stations Heard on the Loud-Speaker

MEDIUM WAVES	LONG WAVES
Hamar	Prague
Budapest	Paris (Petit Parisien)
Toulouse	Gleiwitz
Vienna	Breslau
Brussels	Aberdeen
Milan	Paris (Radio Vitus)
5GB	Belfast
Langenberg	Bournemouth
Paris (Ecole Sup.)	Koenigsberg
Rome	Munster
Madrid	Barcelona
Frankfurt	Cologne
Grenoble (France)	Horby (Sweden)
Katowice (Poland)	Cassel
Hamburg	Nürnberg
Stuttgart	Bordeaux
London	Cork
	Flensburg
SHORT WAVES	Hilversum (Holland)
	Huizen (Holland)
	Radio Paris
	Berlin
	(Königswusterhausen)
	Daventry 5XX
	Eiffel Tower
	Motala
	Pittsburgh
	5SW, Chelmsford
	2XAD, Schenectady

(All the above are telephony stations: the main set was adjusted to 30 degrees of the tuning dial for short-wave reception and middle size of S.W. coil used.)

A full-size blueprint of the Dominions Four is available for 1s. 6d., post free (No. W.M. 134)

100 metres. A set and connect the aerial lead itself to the unit.

Keep the reaction condenser in the unit at its minimum setting, and adjust the reaction control on the main receiver until it is just oscillating. Now turn the knob of the reaction condenser on the adapter unit; as the vanes come into mesh slowly a point will be found where the main set ceases to oscillate. Turn the knob for another 10 or 15 degrees; the setting will then be practically constant for any wavelength.

Receiving Short-wave Station

To receive short-wave stations, tune the main condenser on the adapter unit and utilise the reaction control on the main set. It may be desirable to make an adjustment to the aerial condenser on the main set when a station is received.

**Summer Work**

HERE we are back again to the period of summer time and the long, light evenings. What a difference there is between the present



Summer Work

time and the time when that cold spell was upon us! The difference is as marked with regard to wireless as it is with regard to the weather.

How many of the distant broadcasting stations have you lost since the beginning of the month? How many have you lost since summer time came into force? The drop in signal strength of some of the nearer broadcasting stations has been quite noticeable already this year, and I am sure that before the summer is out even the Daventrys and the local station will show signs of wireless "summer madness."

Fortunately, however, it is going to be easier this year than any previous year to counteract summer deterioration in wireless reception, and I am inclined to think that summer work in wireless this year is going to prove as attractive as any winter work we have carried out.

What more attractive work could there be than work with a portable set in summer? I have already made three new portable sets this year and I have purchased one of the very latest complete commercial models. You can see I mean to enjoy my wireless summer.

Apart from portable work, it is now possible to carry out most interesting work on adding a summer auxiliary

unit to one's ordinary stay-at-home receiver. If you decide to do any summer work of this kind, let me strongly recommend to you the Signal Booster, described in the March number of our WIRELESS MAGAZINE.

◆◆◆ Complaints ◆◆◆

There seem to be some very serious complaints up and down the country that interference to our British broadcasting stations has increased since the Brussels wavelength plan came into being on January 13.

For example, it is reported from Lancashire that reception of 5XX and 5GB is now interfered with in that county in a manner quite unknown when the old wavelengths were in use. Another complaint coming from the north is that Newcastle is now badly interfered with by Nurnberg. I am not surprised at this. Nurnberg is a surprisingly powerful signal in many parts of the country, and its wavelength is only four metres below that of Newcastle.

The general opinion in the north is that the establishment of the northern regional station will put an end to these and other troubles, and there is growing resentment in the north over the delay in the choice of a suitable site for the new station. Where is the northern regional station going to be built and when?

After many weeks of careful checking of the European wavelengths, the opinion of the B.B.C. engineers at

Keston is that the European ether is more settled under the Brussels scheme than it was previously. This may be true as far as south-east England is concerned, but it is certainly not true for the whole country.

How are you progressing in your part of the country under the new wavelengths? Any complaints?

◆◆◆ British Values ◆◆◆

In the March number of *Radio News*, the American wireless periodical, there appeared a letter from a wireless dealer in Hong-Kong, in which a comparison was made between American and British wireless apparatus.

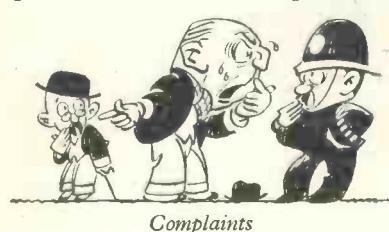
I read this letter with great interest, and I was particularly pleased to read that, in the writer's unbiased opinion, British valves are very much superior to American valves. The writer made



A comparison was made

several interesting comparisons in his letter. He said that if in a circuit designed for the American 201A valve a British DEL610 was substituted, the amplification obtained was very noticeably increased.

From the figures given by this wireless dealer in the Far East, it appears that our British valves, in general, show better amplification factors than the corresponding American valves. He quotes British general-purpose valves as having amplification factors of 15 against the 8 of the American general-purpose valves.



Complaints

He points out that while the American 240 type of valve has an amplification factor of 30 for an impedance of 150,000 ohms, the British DEH610 has an amplification factor of 40 for an impedance of only 60,000 ohms. He also considers our British screened-grid valves superior to the American prototypes.

You know our British valves are really good. Those of us who never use any other than British valves have no means of judging how good they are when compared with other valves. Hence it is very pleasant reading indeed to read that where British and American valves have been tried side by side our British valves have shown a marked superiority.

Summer Programmes

Have you any good ideas for our summer broadcast programmes? If you have, it is time you sent those ideas along to the Ideas Department of the B.B.C., for I expect by this



Summer Programmes

time a good deal of consideration has already been given to the building up of appropriate programmes for the season of fine weather and holidays.

What I should like to see most of all this summer is an increase of the time devoted to running commentaries on sport, especially cricket. I particularly hope the Bisley broadcast will be repeated and that other outdoor broadcasts of similar type will be added.

There seems to be something very fascinating in listening to an outdoor broadcast out-of-doors in summer. Studio broadcasts seem to retain a little of winter's dullness when one listens to them with the loud-speaker in the garden.

Many people advocate the abolition of all talks during the summer months. Personally, I think that is rather a drastic suggestion. I well remember sitting in my garden last summer on several occasions thoroughly enjoying a broadcast talk. Can you remember anything of the kind? If so, what was the talk about, and who was the speaker?

Talks on holidays always interest me, and I don't see why such talks should not be given quite frequently in the early summer. I do not mean mere talks *on* holiday resorts. I mean talks *from* holiday resorts. Why should not the B.B.C. send someone along the south coast in May or June, say, to tell us through 2LO what the south coast holiday resorts are looking like this year and what special attractions they are offering?

Why not send a second broadcast traveller along the east coast to give us similar information through 5XX? A third broadcast traveller might do the Lancashire and Welsh coasts and speak through Manchester, and so on.

By the way, what special kind of broadcast music do you like for the summer months?

Who ?

What is the most interesting question with regard to television at the present time? I am inclined to think it is this. Will the problem of television be ultimately solved by one of the world's best-known television inventors, or will it be solved by some scientific "dark horse" of whom we have heard nothing at all to date?

It is very wonderful how the world's television inventors go on working patiently day in, day out, on what must be one of the most difficult problems scientific man has ever attempted. Don't you admire the courage and persistence of these pioneers of a new science?

Television experimenters seem to be attacking the problem of television in one of two ways. Either they are trying to transmit the moving image direct, or they are trying to accomplish the same purpose *via* the medium of a film, similar to that used in the cinema camera and projector.

From all accounts, television is still in a crude state. The received pictures are small and are lacking in detail. There is also a very restricted choice of subject since the objects to be televised must be placed very near to the scanning disc of the transmitter.

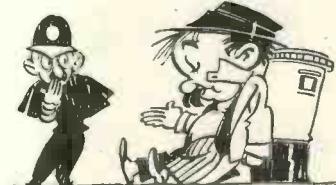


Who ?

Here in England, the latest development has been the use of 2LO and Marconi House for simultaneous television and speech transmissions on different wavelengths. This may sound a little like progress, but I think most of us for the time being will look upon the purchase of television receiving apparatus as the wireless equivalent of buying a pig in a poke.

More About Television

Speaking about television reminds me of a discussion I had with George



A Leaning at the moment

on the subject a couple of nights ago. George has a leaning at the moment towards the system of film transmission as exemplified by the American inventor C. F. Jenkins, and the Hungarian inventor D. von Mihaly. Probably you will have seen that both of these inventors claim to be able to produce cheap television receivers which will prove commercial propositions.

"I do not see how these television receivers can become really attractive at present, George," I remarked, "the subjects that can be televised are so very limited. You saw the list of subjects televised by Mihaly in his last demonstration, didn't you?"

"Perhaps I did, but I do not remember the exact details," said George.

"The first subject was a curious one, the dignified movements of an elephant."

"By jumbo, that's a big enough subject, but I doubt its dignity."

"The second subject was a lady trying on a hat."

"A fitting subject."

"I thought you would say that, George. The third subject was that of a man drinking a glass of beer."

"Real beer?"

"I suppose so, George."

"Very unfair on the announcer."

"Why, George?"

"Obviously, any announcer would have preferred to go out and have one. Publicity is all very well in moderation."

That's the worst of George.

Under My Aerial (Continued)

Unusual Sounds

Are you ever inclined to criticise our British broadcast programmes on the grounds of sameness and monotony? Foreign critics do sometimes pass severe criticisms of such a nature on our programmes and they



Unusual Sounds

sometimes point out that our programme-builders make no attempt to broadcast unusual and novel sounds, as do the programme-builders of other countries.

What is your opinion on the subject of broadcasting unusual sounds? Do you see anything wonderful in broadcasting the noises picked up by a microphone on the bed of the ocean or in an aeroplane flying amongst the clouds? Would you be entertained by hearing the sounds of human nerve currents or the heartbeats of a hospital patient from your loud-speaker?

Would you thrill to the strange noises of an operation in a surgeon's operating theatre or to the bangs of exploding atoms in the laboratory of a scientist?

I have been reading an account of the broadcasting in Austria of the noises made by growing plants. Whilst such an account makes good reading, I am not left with a desire to hear similar noises broadcast in England. Perhaps that may be because I am unscientific enough to feel that the whole thing may be a delusion.

George is no more in favour of the broadcasting of unusual noises than I am.

"When it comes to the broadcasting of the sounds of goldfish swimming in a bowl, as was done in New York recently," said George, "things must be pretty well at their last gasp."

Portability

One of the chief charms about a portable set is that you can carry it about with you on your business

journeys or your holiday jaunts and so obtain comparable results between reception in various parts of the country.

My latest portable set is a mere three-valver, detector valve followed by two transformer-coupled low-frequency amplifying valves. The frame aerial measures a beggarly 18 in. by 12 in. Recently, within the space of a week, I was able to carry out tests with this portable set in London and in the Midlands.

In London, my observations were made five miles out in the populous south-eastern district. The great feature of my reception there was the strength of the local station, 2LO.

I came to the conclusion that I was getting very little less strength from my portable set than most people get with an ordinary three-valve set working on an outdoor aerial. Of course, 5GB and 5XX were good, but my reception of 2LO put everything else in the shade.

LOOK OUT NEXT MONTH FOR DETAILS OF A FOUR-VALVE PORTABLE SET BY W. JAMES

When I tested my portable set in a country district in the Midlands, I obtained vastly different results. The best feature of my reception there was the number of stations I could pick up easily. The two Daventrys seventy miles away, were excellent, in fact, one could not have wished for better reception for a room of ordinary size. Manchester, forty miles away, was also good.



Portability

Altogether, my bag of stations in the Midlands was six in daylight, and nineteen after dark. Of the continental stations, Toulouse, Turin, and Nurnberg were the best.

I need hardly say that my tests were carried out with the loud-speaker built into the portable set. It is so long since I have used my

headphones that I am afraid they must have become almost useless with neglect.

More Mysteries

Why is it that they get all those intriguing wireless mysteries over in



More Mysteries

America, and we are denied our fair share of such things over here? I am thoroughly fascinated by the accounts of these mysteries, and I do wish some of you would write to me and tell me of similar happenings within your experience.

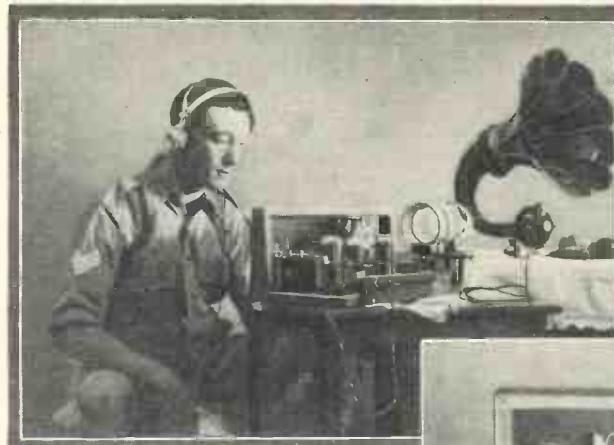
One evening last December, two Americans who were staying in a New York hotel were astounded to hear the music of a piano come from a steam radiator in their bedroom. Why has the same kind of curious phenomenon never been heard in this country?

Of course, New York possesses a greater number of powerful broadcasting stations than any one of our cities, but surely something of the same kind of thing must have happened in the immediate vicinity of one of our big broadcasting stations.

Nearness to a powerful broadcasting station is not essential, however, for one of these mysterious affairs to happen. I have just read an account of how the famous KDKA station at Pittsburg was heard 250 miles away on a large heating boiler. Strange, you know.

Another extraordinary story which was recorded in many of the American papers last December was that of the Santa Barbara (California) housewife who suddenly heard the voice of an announcer and music from a pan of beans simmering on an electric stove. On stirring the beans vigorously, this busy lady heard a whole chorus burst into a hunting song, followed by a crooning plantation melody.

I am sure that some of you must have heard, or heard of, similar mysteries here in Britain. Do write to me about them.—HALYARD.

**POLE-TO-POLE SHORT-WAVER**

IT is gratifying for us to receive letters such as the following, regarding the Pole-to-pole Short-waver (WIRELESS MAGAZINE, November, 1928), from readers in far distant places—India in this case:

Herewith enclosed two snaps of the Pole-to-pole Short-waver; one near view, the other of myself and complete set.

We are situated at Quetta among the Sulliman Mountains, Baluchistan. I wish to bring to your notice that this is anything from an ideal spot for reception, owing to the surrounding mountains.

However, 5SW and numerous other short-wave stations supply the local lads, who are far away from home, with a little entertainment.

Previous to this I have experimented with various other circuits, but your Pole-to-pole circuit has given me by far the best reception.

I should be glad to receive from other readers also their comments on this set in general.

TOUCHSTONE FOUR

THOSE who have built it will not be surprised to know that W. James's Touchstone (WIRELESS MAGAZINE, November, 1928) is the most popular set ever described in these pages. Here is a letter from an Earl's Court reader;

I have recently built a Touchstone receiver and am delighted with it. I get at least a couple of dozen stations with it, though I have only an indoor aerial round the sitting-room and a gas pipe for earth.

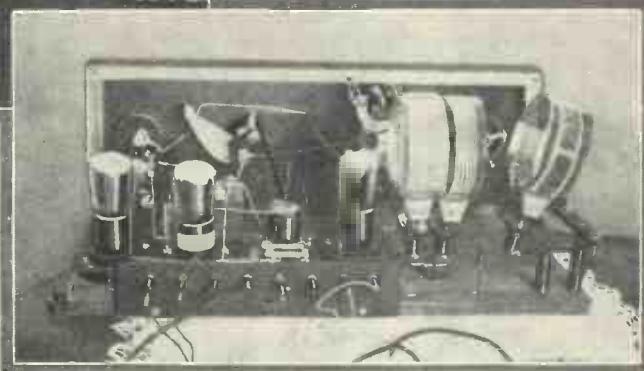
As regards the "detached" aerial connection I find the strength just as great with no aerial at all!

Presumably I have suitable valves, but I think it would be useful to all who build this magnificent set if you would suggest suitable valves for each position, as was done in the case of the first only.

My valves are last year's, namely, (1) Ediswan ES5, (2) Ediswan RC610, (3) Marconi DE5, and (4) Osram DEL610.

Personally, I should also like to incorporate an L.F. choke to precede the loud-speaker, but am not quite sure how this should be done.

I might mention that at the dealer's I was told that this set was about the only one about which some complaint



had not been made. I am not surprised; it is my fifteenth, and none of the previous fourteen has come near it. Excellent! And congratulations!

WE hope that the following letter from a Chichester reader will not be taken as an official recommendation to substitute cheap components in a set in place of high-class parts! However, his remarks are worth publishing:

Some little while ago I made the Touchstone, using all specified parts. I then recommended the set to several of my friends, but all of them turned it down because, they said, it was too expensive and their own sets were quite good enough.

Just for experiment I decided to build the set with absolute junk. I used cardboard formers for the coils, which incidentally I wound with solid wire instead of Litz. I bought two small condensers (capable of being ganged) and used a 3s. slow-motion dial.

The neutralising condenser was home made in about half an hour, consisting of two metal discs suitably mounted with a piece of ruby mica glued to the bottom disc to prevent shorting of the H.T. across the fine winding of the H.F. transformer.

A cheap make of grid leak was used instead of the 200,000-ohm wire-wound resistance. The L.F. transformer used cost 6s., and has been in use for the past twelve months.

To cut a long story short, the whole set cost just under 50s., exclusive of valves, batteries, and loud-speaker.

Now as to results. The original model, made with specified parts, is, to my mind, the best four-valver ever designed, and I for one shall never want a better set.

The cheaper replica, although quite as selective and nearly as powerful, is not of such good tonal quality. I have logged thirty-eight stations on this set

Our Sets!

Useful Opinions from Some Readers

These interesting photographs show the Pole-to-pole Short-waver in use by a reader in Quetta (India), who reports on its performance in the first letter on this page

at good loud-speaker strength. Local and some of the foreign stations will boom through loud enough for a dance hall.

I wonder if Mr. James will be designing a portable shortly. If he does, I hope it will be for long and short waves and without screened-grid or pentode.

[*A new four-vale all-wave portable designed by W. James will be published in the next issue of the WIRELESS MAGAZINE.—EDITOR.]*

EMPIRE FIVE

HERE is a further report on the Empire Five (WIRELESS MAGAZINE, October, 1928), this time from a Dorchester reader who uses an indoor aerial:

I have never yet noticed any reports as to the performance of the Empire Five in the WIRELESS MAGAZINE; so, thinking you and others may be interested, I enclose my log. All stations were received on an indoor aerial—simply a piece of Electron wire 60 ft. long tied to the stone walls inside my house.

Budapest	Glasgow	Naples
Vienna	Plymouth	Gleiwitz
Brussels	Hamburg	Cardiff
Milan	Toulouse	Breslau
5GB	Manchester	Aberdeen
Langenberg	Stuttgart	Belfast
Paris	Leipzig	Paris (Vitus)
Rome	London	Paris (Petit Parisian)
Stockholm	Barcelona	
Katowice	Goteborg	Swansea
Madrid	Prague	Bournemouth
Frankfurt	Copenhagen	Cork
Brunn	Huizen	Newcastle
Dublin	Cadiz	Munich
		and a few others unidentified.

Do you not feel very satisfied with this log? I also made up the Key-to-the-ether Two—a very fine set indeed. You may use this letter as you wish.

Readers' Opinions of Our Sets (Continued)

FIVE-POUNDER FOUR

THIRTY-EIGHT stations in half an hour after completing the construction is the record of an Eastleigh reader with the Five-pounder Four (WIRELESS MAGAZINE, August, 1928) :

Just a brief note to congratulate you on the £5 Four. Well, I have just made the set, but I added a Watmel autochoke in the first stage of L.F. I finished making the set to-night at 9 p.m., and by 9.30 p.m. thirty-eight stations were tuned in and the dial readings taken down.

I must say it's a wonderful set, and I must congratulate you and your staff for such a nice set. Hoping this will be a little encouragement to you all.

ALADDIN THREE

ALADDIN reader who built the Aladdin Three (WIRELESS MAGAZINE, September, 1928), seems to have had difficulty in obtaining a screened-grid valve, but when he did get one the set gave fine results :

May I express the great pleasure your magazine gives me, by its lucid descriptions of "up-to-the-minute" sets. After three years as a wireless operator in France, Belgium and Germany during 1916-19, I took a long rest from wireless activities, but in August I began to read your journal and built the Aladdin Three in your September number.

This I built not strictly to specification as for the aerial coil I put two single coil holders and use either a centre-tapped or two coils as fancy and selectivity influence me. I made the screening box and base screen, from sheet aluminium, and completed the set in good form, though I am using a .001-microfarad variable and .001-microfarad fixed in series instead of a .0005-microfarad condenser in the anode circuit.

This I did as I bought a .001-microfarad condenser in a mass of second-hand material and it has worked so well that I shall not change it, as of course the two in series equal a .0005.

Then a difficulty arose. The screened-grid valve ordered did not arrive and has not yet arrived as the makers are so full up with orders that they cannot deliver; this after two months' wait.

Anyhow, I managed to get a Mullard S.G., so with a Cossor detector valve and Stentor 2 I began operations, using an aerial 20 ft. long with 20 ft. lead in, earth lead, 6 ft.

I may mention that later I centred-tapped Lewcos RAR coils to see if it made any difference—I believe it sharpened the tuning of the anode circuit a little.

At any rate I can get, all at good loud-speaker strength, Hilversum, Stamboul, Soro, Motala (varying in strength), 5XX, Kalundburg, Königswusterhausen, Radio Paris and Huizen on the long waves—a bag of nine there.

Then on the short waves I have heard an extraordinary number of

stations, some of course not strong, and some through too much interference for useful listening, but on any nights I can get at least ten at real good strength, often many more.

Last evening in 30 minutes I tuned in fourteen different stations on dance and orchestral music, passing singers by as not in the test at the moment, though earlier I had enjoyed some fine singing from the Continent.

Altogether I think the Aladdin Three so good that I see no need to change yet—I may change eventually to get wave-change switching, but it will need to be a good set to make me do it.

I have a Mullard PM22 (pentode), yet I rarely use it so satisfactory is the set as a whole.

However on Friday last I was listening to Budapest at about 9.30 p.m. and changed to pentode to try the effect. The result was very pleasing and a great surprise to listeners who wondered how three valves could do so much.

I am using a choke-output filter, that is choke and 2-microfarad condenser, as I do not wish to spoil my loud-speaker.

Needless to say I take AMATEUR WIRELESS as well. I wish you every success; yours are really the only papers that cater regularly for the man like myself who has invested in S.G. and pentode valves.

The new Mullard and Cossor valves are certainly very good—makes me smile when I remember that I was at Farnborough in 1916 on a special valve course—"some" sets in those days !

CHUMMY FOUR

THE following letter regarding the Chummy Four (WIRELESS MAGAZINE, June, 1928) from a reader living twenty miles from Frankfurt is of especial interest in view of the fact that W. James is preparing a modified and improved form of this famous set for publication in the next issue :

Having read in the February issue of the WIRELESS MAGAZINE a letter from a Liverpool reader, I feel I ought, in the interests of this magazine and the reputation of the Chummy Four, to once again write to give you the result of tests of this set both in England and on the Rhine.

After construction, the first test gave me similar results to those of this reader, and I decided that either the frame or coil had not been properly wound, and as I was about to leave home for a week in Bournemouth I consulted a friend as to what I might try if these were not the cause of the trouble, and he considered it was feed-back which I should test for.

Arriving at Bournemouth, the results were 6BM on the loud-speaker and 5GB on the phones only, except with an outdoor aerial, when I tuned in 2LO, 5GB, Langenberg, and Budapest on the loud-speaker, while below Bournemouth's wavelength I was unable to tune, as this station was too close.

Aerial and coil rewound, same results; so I decided that on my return home (35 miles from London and 80 miles from 5GB) I would do as my friend had said and change over the secondary of the transformer. I was rewarded by tuning-in to 5GB, 2LO, Langenberg, Frankfurt, Hamburg, Toulouse, Stuttgart, Cologne, and Nürnberg in less than an hour; but there was insufficient reaction on the stations above 400 metres, so I wound on another 10 turns reaction.

With these improvements I was able to tune in all B.C.C. stations of 1 kilowatt and up, Dublin and Cork, and the majority of European stations of 3 kilowatts within 800 miles.

Let me add here that my friend is a reader of the WIRELESS MAGAZINE and said he was forced to build a Chummy during the winter and I ought to be proud of mine.

After two months' use the H.T. was tested and found to be 80 volts, so, using the external terminals, I used 120 once more, with the result out here, on the Rhine, I am able at any time after dark to tune-in Manchester, Cardiff, and Barcelona EAJ1 on the loud-speaker at good strength, and able to hear the announcers plainly at 8 ft. to 10 ft. away.

I only mention these, and I want to say that I am about 20 miles from Frankfurt, and as Manchester is nearest your Liverpool reader it will give him an idea as to the range and what stations I am likely to get here.

The changing of the wavelengths has upset things a little, but in a day or two I hope to have settled down once again to listen to programmes instead of searching around for the old ones.

P.S.—Manchester was on for half an hour to-night, and atmospherics are severe here to-night. Components are original set.

EVERYDAY THREE

FROM Nottingham comes a report of the Everyday Three (WIRELESS MAGAZINE, February, 1928), which gave reception of twenty-four foreign stations in one evening :

I have built the Everyday Three described in "W.M." Using coils made by myself, and barring those the very best of components, including AF5 and AF3 transformers, pentone PM22, and accumulator, H.T., eighteen foreign stations were received at full loud-speaker strength after dark, using coils Nos. 60 and 45 respectively.

On the high wavelengths six stations were received at full loud-speaker strength, using coils Nos. 175 and 125 respectively, making a total of twenty-four stations not including any English stations, as they were not broadcasting.

Full-size blueprints of any of the sets mentioned in the above letters are available at the prices indicated elsewhere in this issue

Wireless
Magazine

Gramo-Radio Section

A SPECIAL SUPPLEMENT FOR THOSE INTERESTED IN
THE ELECTRICAL REPRODUCTION OF GRAMOPHONE
RECORDS—THE FIRST OF ITS KIND TO BE PUBLISHED

Is Your Turntable True?

QUITE a deal of faulty gramo-radio reproduction is due more to faults on the gramo side than on the radio side! For example, one frequent source of bad reproduction, and one which is fairly easy to detect because it varies at each revolution of the turntable is due to slight eccentricity in the mounting of the turntable itself. This causes swinging of the arm supporting the pick-up, with the result that the needle runs more on one side of the sound groove than on the other.

Eccentricity of Centre Holes

As a matter of fact with some of the cheaper makes of record there is far more eccentricity in the position of the centre holes of the discs themselves than in the turntable mount-

ing. This can quite easily be corrected by making a proper test of the record, watching it closely while it revolves and seeing in which direction the "wobble" takes place.

It is then quite easy slightly to enlarge the centre hole with a penknife and to scratch near the hole a small arrow showing in which direction the record should be pushed against the spindle of the turntable in order to correct for lack of truth.

In the case of cheap motor equipment it is possible that the turntable itself may be out of centre, and this can really only be corrected by making a new centre mounting of the turntable. If one values record life and good results this is well worth while.

MICHAEL MERLAIN.

Noisy Electric Drives

ALTHOUGH it is ever so much better to drive the turntable of a gramo-radio outfit electrically than to use a spring motor with its accompanying organ-grinder-like handle, there are one or two snags which you may find crop up with electric drives.

Commutator Sparking

The most likely is that you may be troubled with noise collected by the pick-up and caused by a minute sparking at the commutator. Admittedly with good-quality motors this is a rare fault, because usually the commutator has an ample area and very wide carbon brushes bear easily on the surface, and there is not much chance of sparking.

Nevertheless, pick-ups, particularly of the magnetic type (which most of them are), are sensitive things, and even minute current variations can cause trouble if subsequently boosted by two or three stages of L.F. amplification!

The easiest way to get over all troubles of this kind is to shunt a fairly large fixed condenser across the brushes. This should be capable of standing the full working voltage of the motor (which may be fairly high as most gramophone motors are driven straight from the mains) and should preferably have mica insulation.

Earthed Mains

Usually one mains lead is earthed, but where extraneous electrical interference is produced by a motor, and it is found that neither wire is earthed, a second condenser from one brush to earth will often cut out crackles and L.F. ripples.

C. WYNNE.

Speed Traps for Records

SO few people take great care about running each record at its proper speed that if you are a gramo-radio enthusiast it really is worth your while to be unconventional in this respect!

Always go closely by the speed figures given on each record label. You will find that the average tempo (particularly for dance records and similar syncopation) is 78. Some records, and particularly solo items, are speeded at 80 and it is rare to find any rated faster than this.

Governor Controls

With most gramo-radio outfits it is rather hopeless to go by the speed indications on the governor control, that is unless you have previously checked the readings and found them to be "Orl Korrect." Make a point

of periodically checking the tempo; you can, of course, do this simply by sticking a speck of paper at one point on the turntable and counting the average of the number of revolutions made over several minutes.

Do not, of course, let the turntable run without load while making this test, but have a record playing so that the weight with which the pick-up bears on the record can slow it down by just the same degree which it does in normal work.

Preferably, for this test use an "all-talking" record without any rhythm, because if you are at all musically-minded you will find the rhythm of a musical recording upsetting your counting.

JOHN RANKIN.



IT is not a great step from building a wireless set to building a gramophone and, with a kit of parts for the latter that is now available, many radio enthusiasts will, no doubt, take advantage of the benefits of the brother instrument.

The WIRELESS MAGAZINE Technical Staff have just had a pleasant three or four hours' change from radio work in assembling the gramophone illustrated above, from a kit of parts supplied by the Alestrian Gramophone Co.

Adequate Packing of the Parts

We were particularly pleased with the way in which the kit was packed; every part was stowed away in a strong cardboard box most ingeniously.

No less pleasing than the method of packing is the care that has been given to the compilation of the instructions sent out with each kit.

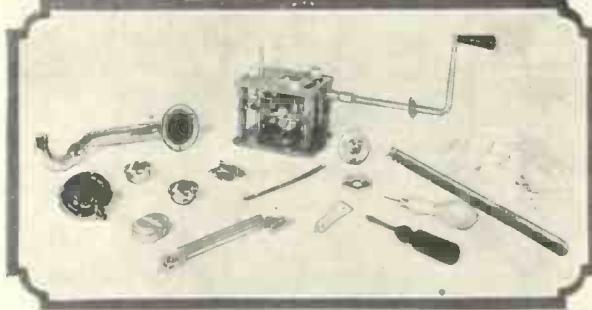


Fig. 1 (top of page)—
Appearance of the
complete gramophone
assembled
with the Alestrian
kit

Fig. 2 (above)—The
“mechanical” units
of the kit laid out

Fig. 3 (right)—The
remainder of the
kit, including the
turntable

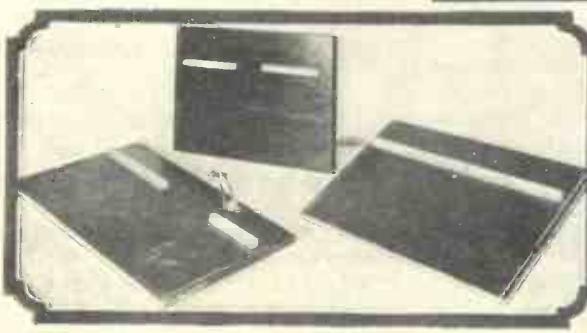
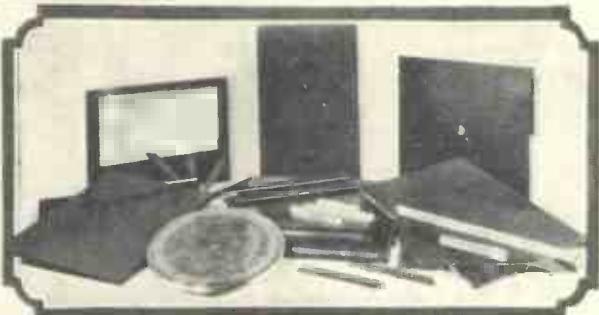
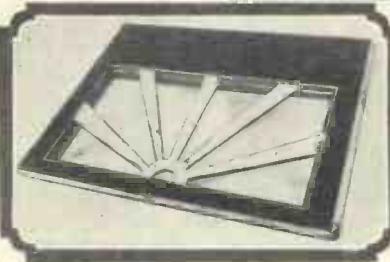


Fig. 4 (above)—
Showing how the
fretted front is
assembled ready
for the fixing of the
cloth back

Fig. 5 (left)—How
the sides are
prepared for
assembly. Full
instructions are
given with the kit,
which includes a
blueprint



pages of explanation, in which each operation is detailed explicitly.

Allowing time for the various parts fixed by adhesive to stick, the whole assembly can be completed in an evening.

Wood Already Polished

Everything necessary for the construction is included in the kit, even down to a piece of cloth to back up the fretted front. In fact, nothing has been overlooked. All the woodwork that shows is polished already, and all holes are drilled.

Here is a list of the parts included in the kit:—

Motor, winding crank with escutcheon and ebonite bush, speed regulating arm, speed indicator, brake, horn, tonearm, sound-box, lid stay, hinge, two needle cups and plate, screwdriver, one envelope (containing four rubber feet, two hinges, and two cloth wads), bradawl, tube of adhesive, box of needles, ten envelopes containing screws, four pieces of moulding, five wood fillets, turntable, piece of cloth, ornamental fret, lid, motor platform, tonearm platform, sides, back, and front of cabinet, and baseboard.

There are twelve operations in the

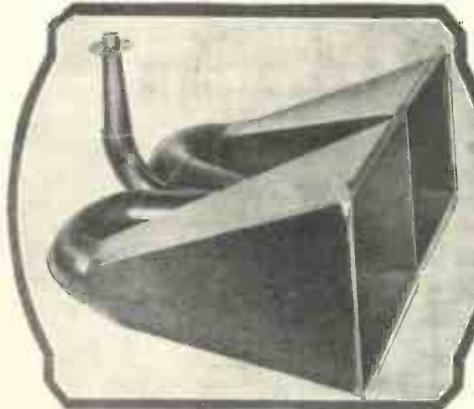
assembly, of which diagrams and full details are given. The special WIRELESS MAGAZINE photographs reproduced here would be an additional help to the constructor.

Order of Assembly

These are the operations in the order in which they are carried out : (1) preparation of the front of the cabinet, (2) preparation of the main cabinet, (3) mounting the motor, (4) assembly of the cabinet, (5) setting the speed indicator, (6) mounting the horn, (7) mounting the tonearm, (8) fitting the horn into the cabinet, (9) fitting the motor platform, (10) fixing the escutcheon, (11) fitting the lid, and (12) final fitting of needle cups, tonearm, etc.

Finish

When assembled, the Alestrian gramophone reveals itself as a large cabinet model that is attractive in appearance. The finish of the cabinet-work is



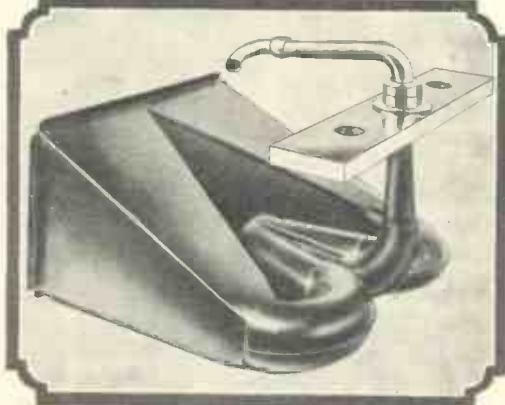
obtained from the double horn is almost too great on some dance records.

We believe that these details will interest a large number of our readers who, although keenly interested in radio, have not troubled to find out what a good modern gramophone will achieve.

The addition of a gramophone to their wireless gear will give them the advantage of three methods of music reproduction : (1) reception of broadcast music, (2) gramophone reproduction of records, and (3). reproduction of records through the low-frequency stages of their receivers.

It is, of course, a simple matter to change over the sound-box supplied with the gramophone for the electro-magnetic pick-up which is needed for electrical reproduction.

Amongst the pick-ups that can be recommended for general use are the B.T.H., Brown



excellent; some constructors may prefer a more decorative piece of cloth to place behind the fretted front than the plain brown piece supplied, but that is a minor point that presents no difficulty.

Double-spring Motor

The motor included in the kit is of the double-spring type, and is made by the well-known firm of Garrard.

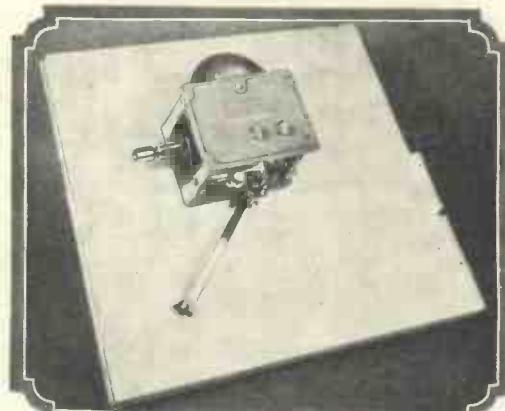
As far as results go, the performance of the Alestrian home-assembled gramophone is good. The tone is good and the volume

Fig. 6 (right).—How the motor appears when bolted in position. It is a double-spring model

Fig. 7 (below).—The double horn

Fig. 8 (left, below).—Mounting of tonearm and tonearm platform

Fig. 9 (right, below).—Horn and tonearm platform fixed in the cabinet



Celestion Woodroffe, Igranic, Marconiphone, and R.I. and Varley. Frequency-output curves of a number of these have been given in these pages recently.

A few hints on the care of a gramophone are given at the end of the instructions sent out with the Alestrian kit, and as they will be of interest to many WIRELESS MAGAZINE readers we give some of them here :

Use a new needle for each record. Remove the old needle from the sound-box as soon as a record is finished; otherwise it may scratch the lid if the latter is closed with the sound-box in its upward position.

When starting a record, allow the motor to gather speed before lowering the sound-box on to the record. At the end of the record lift the sound-box before applying the brake.

Storing the Instrument

If the instrument is being put aside for any length of time, release the brake and allow the motor to run down.

If, for any reason, it is desired to inspect the motor do not forget to remove the winding crank before unscrewing and lifting the platform.

Never place records face to face. They should always have paper or cardboard between them.



The Best Dance Records

HOW completely "fed up" one becomes with the tone quality and the style of ONE band, after dancing to it for even only the first hour!

Wireless people who have taken up gramo-radio need never tire of their dance music.

The differences of tone quality, of playing style, of selection, and of arrangement provided by the enormous number of dance units recording to-day gives them an opportunity to make up programme after programme with every number entirely different in effect.

Splendid Bands

And what splendid bands one may select from—who could afford to pay even one of them for a small dance?—and yet the record disc puts it in our power to turn on a dozen of them one after the other.

I detest sameness in dance records, and I have been to the pains to select from the many that have passed through my hands recently no less than nineteen sets, each set offering to one's musical sense an entire relief from every other set in the series.

In bands having the ordinary make-up I should put Sam Lanin at the head of the American group, with the band he leads when recording for Parlophone.

Best Fox-trots

I think his best FOX-TROT is *Yankee Rose* (R3325), with *The Man I Love* (R3527) and *Sa-lu-ta* (R3348) to follow. For a DRAG he has *The Varsity Drag* (R175), and for WALTZES, *I Love No One but You* (R3487) and *Together* (R104). Vincent Lopez, whose work is on the Brunswick list, is also most musi-

By H. T. BARNETT,
M.I.E.E.

cianly. His tone quality is quite different from Lanin's and the vocal work has a good character of its own, so be sure to select a record from this second group : *Little Log Cabin of Dreams* (3794), *Some Day You'll say O.K.* (3633), and *I'm on My Way Home* (3368). These are all FOX-TROTS.

Of English (?) recordings I favour those having enormously sweet, full tone with magnificent bass quality. Those who have not yet heard Jack Hylton's (H.M.V.) will get a surprise when they try the FOX-TROTS, *Underneath the Blue* (B5539) and *Roll away Clouds* (B5546).

Good half-crown English recordings are Ronnie Munro's *D'ye Love Me?* (E5648), FOX-TROT; it contains a surprise in the voice part. Those who like the refrain, sung by a delightful English voice, which sounds like John Thorn's, should get *Firefly* or *My Inspiration is You*, FOX-TROTS (Winner, 2s. each).

Very beautiful ORIENTAL-style records are *The Sphinx* (E5819) and *Burma Girl* (E5985), both half-crown Parlophone FOX-TROTS; also *Lady of Havana*, FOX-TROT (3739) and *Japansy*, WALTZ, both Brunswicks.

VIOLIN AND PIANO. A splendid WALTZ is *Dreamer of Dreams* (Guardsman, 1734, 2s. 6d.).

MARIMBA BANDS. *Hawaiian Memories* (Brunswick, 2831, 3s.) and *Hawaiian Ripples* (Beltona, 2s. 6d.) are both pretty WALTZES.

WALTZES differing largely in style are *Mavourneen* (Winner, 4827, 2s.), *Ramona* (Parlophone, E6063, 2s. 6d.), and *Was it a Dream?* (H.M.V., B5486, 3s.).

TANGOS, though rarely used, are

very beautiful music. Parlophone have the best I have yet heard. Recorded in Buenos Aires, they were *Areca Corejón* (R209) and *Caida del Cielo* (R210), 3s. each. There is also a TANGO BLUES, *Enchantment* (R3529, 3s.).

PIANO FOX-TROTS. The best of the bunch is the wonderful pair, *Dainty Miss and Polly* (Electron, O209, 3s.).

Xylophone Records

XYLOPHONE. Teddy Brown, Electron, leads with the FOX-TROT, *The Doll Dance* (O187) and the SLOW FOX-TROT, *I Fell Head over Ears in Love* (O2393), 3s. each. Brunswick have a slightly different combination in *March of the Marionettes*, FOX-TROT (3s.). 3755 is the number.

BANJO work of good quality is noticeable in the FOX-TROTS, *Dolores* (3813) and *Hey! Hey! Hazel* (3780), Brunswicks, and *The Rag Doll* (H.M.V., B5528).

THE CINEMA ORGAN is used in combination with a band in *Spanish Rose*, WALTZ (H.M.V.), and *I Thank the Moon*, FOX-TROT (Broadcast, 1s. 3d.).

Drums and Bugles

DRUMS and BUGLES are exceedingly good in the PATROL, *Clonk-er-ty-clonk* (Electron, 6219), and in the FOX-TROT, *Toy Town Artillery* (Broadcast, 1s. 3d.).

ARRANGEMENTS of an amusing character are the double *Sonatique* with *Operatique* (Electron, O168), and in *Chopinata* (Brunswick, 186).

HOT SOLOS, magnificently recorded: *Boss of the Stumps* (Clarinet) (R168), *Some Day, Sweetheart* (Clarinet), FOX-TROT (R3351), *Bluin the Blues* (Clarinet) (R3329), and *Frick Fingering* (Trumpet) (R3423), all Parlophone.

Whatever you want to know about gramo-radio, consult the "Wireless Magazine" Technical Staff. For many months they have kept abreast of this latest development and can reply to any query that may be raised in connection with it.

If your pick-up does not give the results you think it should—if your amplifier is not quite distortionless—in fact, if you are in trouble of any sort, the Technical Staff can put you on the right track.

So that the staff is not absolutely overwhelmed with

queries (and to avoid the trouble of answering any of a frivolous nature, which results from a free service) a nominal fee of 1s. is charged for every two questions asked.

Write your query or queries (not more than two can be answered for each reader) on one side of a sheet of paper and send it, together with a stamped addressed envelope, a postal order for 1s. and the coupon from page iii of the cover, to Gramo-Radio Queries, "Wireless Magazine," 58/61 Fetter Lane, E.C.4.

PLANNING *Your* AERIAL

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

A WELL-PLANNED aerial is usually a good aerial. An aerial rushed up in a hurry, without plan or forethought, might be a good aerial. Even with the best of luck, however, a hurriedly-erected aerial would never give the good results the well-planned aerial would give.

Learning A Useful Lesson

Planning out an aerial properly not only pays from the point of view of results, but it gives a better insight into the principles underlying the use of an aerial system. From a consideration as to why we should do one thing and not another, we learn much that we should otherwise have missed.

In addition, the planning out of a really good aerial still remains one of the most interesting of wireless tasks, even to the oldest hand at the game.

The first thing to do in planning out an aerial is to measure up the proposed site. If a measuring tape is not available, an improvised tape can quickly be made from a length of string, knots being tied on the string to mark every tenth foot, say. The first ten feet of the string might conveniently have knots to mark each foot.

Example of Aerial Planning

Perhaps the method of planning out an aerial is best understood from an actual example. Suppose that we

have made a survey of the proposed site with our improvised measuring tape and that we have drawn up a plan as shown in Fig. 1.

Clearly, there are two alternatives in this case. Either the aerial can be taken to window z of the room on the road side of the house, or the aerial can be taken to window xy of the room on the garden side of the house.

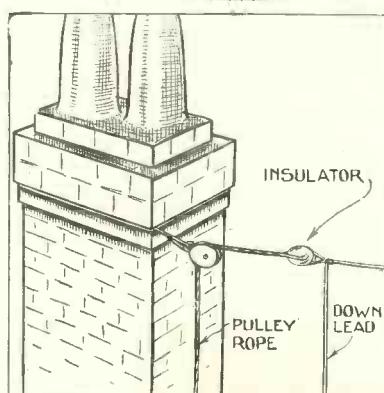
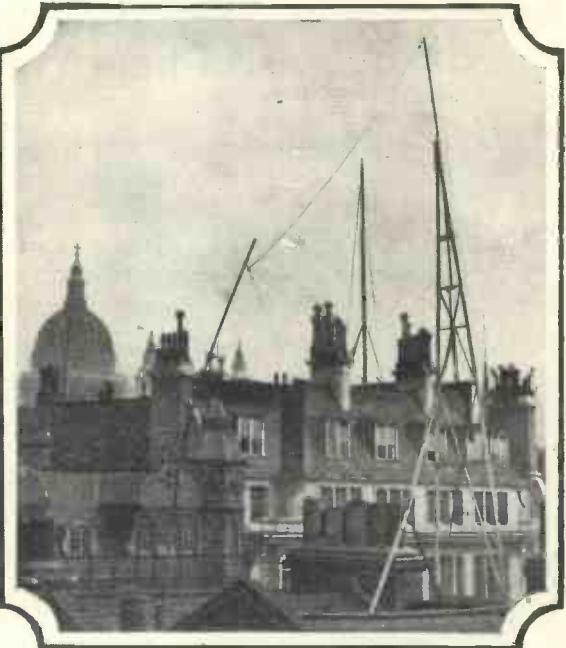


Fig. 2.—Down-lead end of aerial attached to chimney

Two objections might be raised against the first alternative : (1) the



An aerial (in the shadow of St. Paul's) that was not particularly well planned!

aerial would be badly screened by the house; and (2) the noise of traffic on the road might spoil the pleasure of listening with a loud-speaker.

Clearing A Tree

Let us take it, then, that a decision is made to run the aerial from the end of the garden to window xy. At the end of the garden a mast will be required. Suppose that there is a tree, 20 ft. high, at a point in the garden corresponding to T on our plan. The best position for the aerial mast would obviously be A.

The next thing to do is to determine the position of the lead-in. Now the best position for the wireless set in the room under consideration might well be in the corner between the fireplace and the window xy. That being so, we should choose the side x of the window xy for the point of entry of the aerial down-lead.

Arranging the Down-lead

Our plan tells us that the distance from A to x is 80 ft., a very good length indeed for a single-wire aerial. Since we are allowed 100 ft. of aerial wire all told, our down-lead must measure anything up to 20 ft. Now the point of entry of our lead-in would be at the top of the window frame of window xy, and this point of entry would, therefore, be some 10 ft. above ground level. Hence our aerial can be slung at a height of 30 ft. above the ground. Our

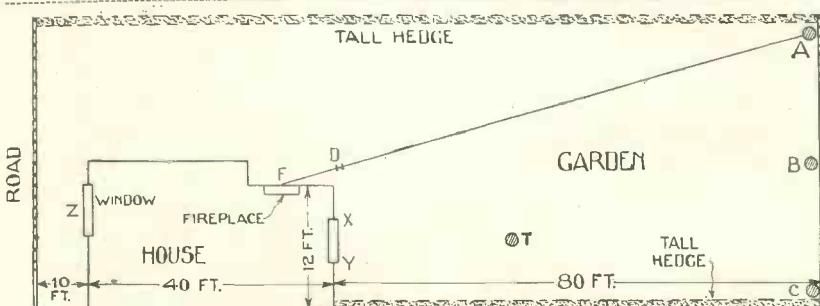


Fig. 1.—Plan of house and garden

Planning Your Aerial (Continued)

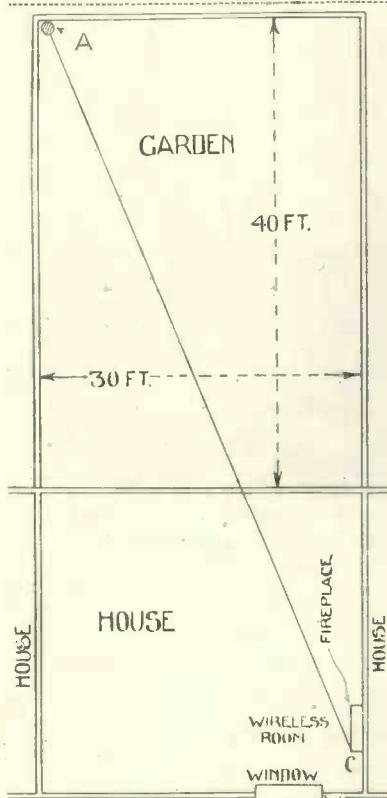


Fig. 3.—Plan of house and garden

down-lead would then be 20 ft. long.

Let us suppose that we have obtained a mast some 36 ft. long, and that we have placed it at A in such a way that the aerial pulley at the top of the mast is 30 ft. above the ground. We have now to consider the means of support of the down-lead end of our aerial.

Turning to our plan in Fig. 1, we realise that above the fireplace in the room chosen for the wireless set, there is a chimney and that this chimney is not very far out of the line AX of our aerial.

Height of Chimney Stack

The house we are dealing with is a two-storey house. We make a quick calculation, height of room on ground floor 10 ft., height of bedroom above 9 ft., height of chimney above lower edge of roof 6 ft., total 25 ft.

Shall we attach a mast to the side of the chimney in order to gain the extra 5 ft. to make 30 ft., or shall we remain content with a height of 25 ft. at the house end of the aerial?

Let us suppose that we remain content with the 25 ft. The attach-

ment of the aerial to the chimney may be similar to that shown in Fig. 2.

We return to a consideration of our plan in Fig. 1. From A, the position of our mast, we draw a line to F, the centre of the fireplace. This is the line of our aerial. Along this line from A we measure AD to scale, representing 80 ft. From our plan we see that a down-lead from D will clear the house easily.

Another Good Example

Let us consider another example of aerial planning. This time the house is one of a number built in a row. By means of an improvised measuring tape, a plan of the house and garden is drawn as in Fig. 3. The measurements required for the drawing of this plan are made inside the house, in the rooms and in the hall or corridor.

Suppose that the wireless set is to be placed in the room indicated, and that the lead-in must be taken to window w. The length of the garden being only 40 ft. would perhaps cause us to think that the aerial would be a short one. If, however, we run the aerial from the corner A of the garden to the farther side of the chimney c, our plan tells us we shall get a run of no less than 68 ft. for our aerial.

Measurements taken inside the rooms of the house and in the false roof would enable us to draw up the elevation as shown in Fig. 4. Such an elevation is of great use in the

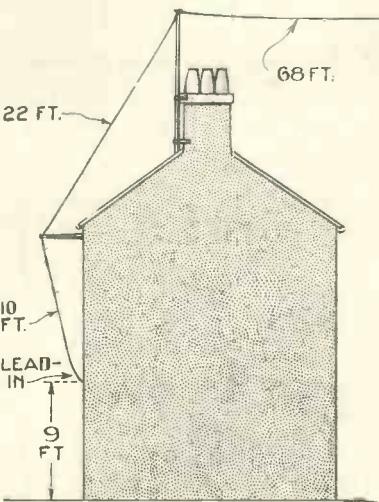


Fig. 4.—Elevation of house

planning of the down-lead of the aerial. A mast attached to the chimney, and a right-angle bracket attached to the side of the house, as indicated, give us a down-lead in two sections, one section being 22 ft. in length, and the other 10 ft. These two sections, with the horizontal top of 68 ft., give us an aerial of 100 ft.

The two typical examples given of aerial planning may serve to show that the first and best thing to do in erecting any aerial is to plan out that aerial properly by means of plans and elevation drawn from measurements made on the actual site of the aerial.

BROADCAST VOICES

IT seems to me that quite an amusing game for a party would be a ballot on that all-important subject: "Who has the best broadcast voice?" Well, ready-made answers are nice things to have for games like these. Who *has* the best broadcast voice?

Perhaps the B.B.C. post bag would be some guide; and then, again, perhaps it wouldn't, for generally speaking, only the cranks trouble to "write to the B.B.C. about it."

Good Broadcasters

Of those whose names come instantly to mind as good broadcasters, we have "G. B. S." Sir Oliver Lodge, most of the announcers (particularly the £90,000 Man, as the daily papers called him recently), Miss Lillian Braithwaite, Miss Enid Stamp-Taylor, and Lady Askwith. And A. J. Alan, of course!

Listeners may care to add to the list; but on trying to extend it for myself I find more feminine than masculine speakers coming to mind. And this despite the fact that to most of us the broadcast male voice is preferable. Does this signify that one day (in the very distant future, I hope!) we may have women announcers?

QUEUE.

AN IDEAL SET FOR THE BEGINNER IS THE "AT-HOME THREE," WHICH IS FULLY DESCRIBED ELSEWHERE IN THIS ISSUE. YOU CAN SAFELY RECOMMEND IT TO YOUR FRIENDS!

The Music Listener

I HAVE been reading through some of the more technical articles in a recent issue of the WIRELESS MAGAZINE, and have been appalled at the completeness of my ignorance of technical matters connected with wireless transmission.

The first article which caught my glance was one which undertook to tell me all I ought to know about transformer inductance. I can guess what inductance means, but I have not the slightest idea what a transformer is (or does) because I know nothing about wireless.

Rather Out of My Depth

So that, when I am told that it is preferable to use a transformer having a lower primary inductance together with a higher step-up, the whole combination giving a more uniform curve owing to the relative values of various constants, I feel that I should not like to begin to contradict the writer of the article.

The Editor of this magazine was very quick to appreciate the position of such a man as myself in a matter of this kind when I had some amount of conversation with him a few weeks ago.

It occurred to both of us then that there must be hundreds of readers of the WIRELESS MAGAZINE who are well able to build a loud-speaker, and yet who are not so well able to understand the technical terms which are bound to be used by the announcers every time movements of good and serious music are broadcast.

And so we conceived the idea of dealing with the problems of artistic technique alongside with those referring to the mechanical part of wireless transmission. I therefore propose to try to interest WIRELESS MAGAZINE readers in a technique not necessarily their own.

Technical Terms Explained

As I could easily write all I know about mechanical wireless technique on the back of a visiting card, I will crave the reader's indulgence if I regard him in a manner similar to that in which, on my own admission, I can only expect him to regard me, and I will introduce him to technical terms in music as though he knows next to nothing about the art.

The type of technical term which must be something of an enigma to any but the initiated in music is most likely to be that which is applied to the various forms which music of the better kind assumes. Programmes constantly refer to such types as the Sonata, the Symphony, the String Quartet, and the Concerto.

I have thought that I could scarcely do better than explain these first of all, and deal with such terms

This is the first of a series of informative articles designed to assist listeners to appreciate the better type of broadcast music, by C. Whitaker-Wilson.

This month the terms *Sonata*, *Symphony*, *Concerto* and *String Quartets* are explained

as *Adagio*, *Andante*, *Allegro*, and the like in a subsequent article.

What is a Sonata? The word comes from the Italian *sonare*, to sound, an etymology which does not give away much information. Originally it was "something to play," as opposed to the Cantata, which, of course, was "something to sing."

History of Little Value

It would be useless for me to begin by tracing the history of the development of the Sonata, even though the story would prove to be interesting.

If I am to make myself clearly understood I had better begin by assuming the Sonata to be what it is, and has been for the last century.

It is, then, a composition in two, three, or four sections, called *movements*, written either for a single instrument or for a combination of instruments. The commonest, one supposes, must be the Sonatas for the piano, for most composers have written them; but there are Sonatas for the organ, for violin with piano, for 'cello with piano.

Indeed, it does not matter in the least for what the Sonata be written

so long as certain clearly defined rules are regarded seriously.

The various sections or movements are generally known by Italian names such as *Allegro*, *Andante*, etc., which are really and truly indications as to the speed and general style of those movements.

But the chief thing about a Sonata is the distinctive atmosphere which Sonata-form produces. A theme—that is to say, a musical sentence of a definite length—is given out first of all, being, of course, in a definite key. Without being in the least technical it must be obvious to anyone that the key *must* be definite, and that, for a while at least, some reasonable level of tonality must be kept up.

The First Subject

This theme is called the first subject, a natural name for it. It may be of some length, but, even if it is, one can rarely mistake the entry of the second subject. For one thing, the key has changed, and the new theme is always a great contrast to its predecessor.

The second subject—so often the charm of the work—continues for a while until a sort of half-way house is reached, called the double bar; the composer has completed his main statements.

It does not strain the imagination of anyone to conclude that something must be done with these two themes; it is hardly enough to content oneself with stating them.

So the composer proceeds to develop them like a photograph, rocking them this way and that until the images stand out clearly. The simile is not a perfect one because the images (the themes) are twisted about into delightfully artistic shapes, but the development of a movement in Sonata-form is a distinct process of elaboration, and the analogy can stand for the moment.

Recapitulation

Atlast the third, the recapitulation, section is entered upon. The composer must sum up all that he has said. He does it by repeating the first subject and altering any connecting links between it and the second in such a way as to give both themes in the original key.

The Music Listener (*Continued*)

So that, no matter wherever the themes may have led him, he stabilises the finish of the movement, and the whole thing ends in the key in which it began.

A Sonata, therefore, is a composition for a musical instrument which deals with themes and their systematic development.

The best way of describing a Symphony is to call it a Sonata for the orchestra. The same forms are used as in the various movements of a Sonata, but the work often assumes greater proportions owing to its having been written for so many instruments.

How Symphonies are "Scored"

I hope at a later date to give some account of how Symphonies and other works are "scored" for an orchestra.

The word Concerto has a somewhat disturbing etymology; *certare* in Latin means to *strive*, which seems to suggest that all is not well with this type of composition. But it is far from being so in reality. A Concerto differs from a Symphony in one outstanding feature.

Whereas a Symphony is a composition written for full orchestra, a Concerto is written for a solo instrument and *accompanied* by an orchestra, which is not the same thing. There are piano Concertos, organ Concertos, Concertos for violin, 'cello, clarinet, flute—in fact, it does not signify; each and all of them are

written for a soloist to play under a conductor and with a band.

Concertos are well worth listening to, as a rule; if I may make a suggestion, it would be that the reader looks through the programmes for them each week, especially for those written for instruments with which he himself is not particularly familiar.

There is no surer way of learning to distinguish the various instruments than by hearing them stand out against the general tone of the orchestra, and such a procedure will result in a greater enjoyment of orchestral music.

One constantly hears the term String Quartet; what exactly does it mean? The word suggests four instruments, of course, but what are the instruments? Taking the highest first, we have the violin, which has a range from the G below middle C on the piano to a considerable height. Compared to a hymn sung by four people the first violin acts as the soprano.

The alto part is taken by another violin; there is no difference whatever between the two instruments; it is merely that one plays a lower part than the other.

The tenor part is taken by the viola, an instrument a little larger than a violin, but played much in the same way. It is tuned a fifth lower—that is to say, its lowest note is tenor C, the C below middle C on the piano.

The fourth and bass part is represented by the 'cello, which is tuned an octave lower than the viola, is played in a different position, and has much thicker strings.

The term String Quartet is not only used for this combination of instruments, but also for compositions written for them. Thus, one can play *in* a String Quartet or can *write* a String Quartet.

These quartets sometimes become quintets by the addition of the double bass, which is one of the most valuable, as well as one of the largest, instruments used in modern orchestras.

Its Lowest Note

Its lowest note is the lowest E on the piano and the instrument itself stands much in the same relation to an orchestra as the pedals do to an organ.

String Quartets—I now mean the compositions—are often of three and four movements, some of which may be in the Sonata-form described above. So that it will be seen that Sonata-form is very important in music.

Composers who have become famous as writers of Sonatas, Concertos, Symphonies and String Quartets and who are heard most frequently upon the wireless are: Haydn, Mozart, Beethoven, Schumann, Mendelssohn, Brahms, Tchaikovski, Saint-Saëns, Dvorak, Grieg, Elgar, and Strauss.

The Horse-power of a Kilowatt

YOU know that the power of a broadcasting station is invariably given in kilowatts. I wonder, though, if you have any idea what a kilowatt actually is. I hadn't until I asked my mathematical friend.

An American Proposal

What made me approach my friend of the calculations on this subject was the proposal recently made in America that the world's broadcasting stations should be rated in horse-power and not in kilowatts as at present.

My mathematical friend explained to me that a kilowatt was approximately equal to one and a third horse-power. Hence it is an easy matter to

change from kilowatts to the better-known unit, the horse-power.

I have been working out the horse-power of some of our broadcasting stations, and it is most interesting to compare the figures obtained with horse-power figures for motor engines, of which we all have some slight knowledge.

The two Daventrys work to a horse-power of thirty-three and a third. Budapest, Zeesen, Lahti, and several other Continental stations develop a horse-power of twenty-six or twenty-seven. It helps considerably to think of these figures as being comparable with the horse-power figures of the largest and most powerful motor-cars of to-day.

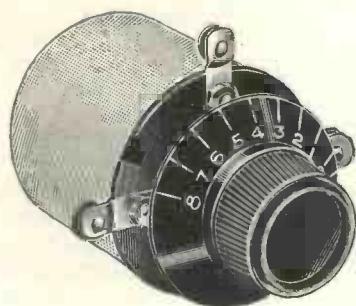
Horse-power figures of other stations well known to you are: Langenberg, 20; Hilversum, nearly 7; German stations of medium power, 5½ horse-power.

Our Own Main Stations

Our own main broadcasting stations are rated at one and a third horse-power, except London, which is rated at twice that figure. I suppose we could compare London with certain types of motor-cycle engine. The relay stations develop a horse-power of very nearly one-fifth. Perhaps you can think of some machine which works with similar horse-power.

AERIAL.

IGRANIC RESISTANCES



Wire-wound Variable Resistance

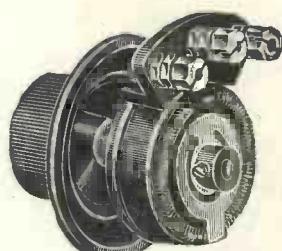
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Positive 8-point switch with 2 inch knob and dial. 50,000 ohms. 15/- 250,000 ohms. 17/6.



Wire-wound Resistor

Shielded to prevent interaction. Silent in operation and constant in value. 20,000 to 250,000 ohms. From 2/9 to 7/6 each. Holder for above, 1/6.



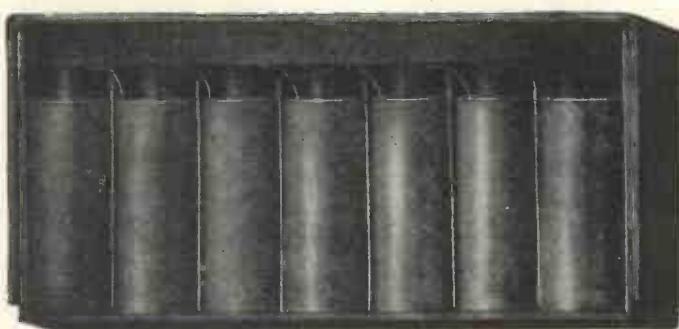
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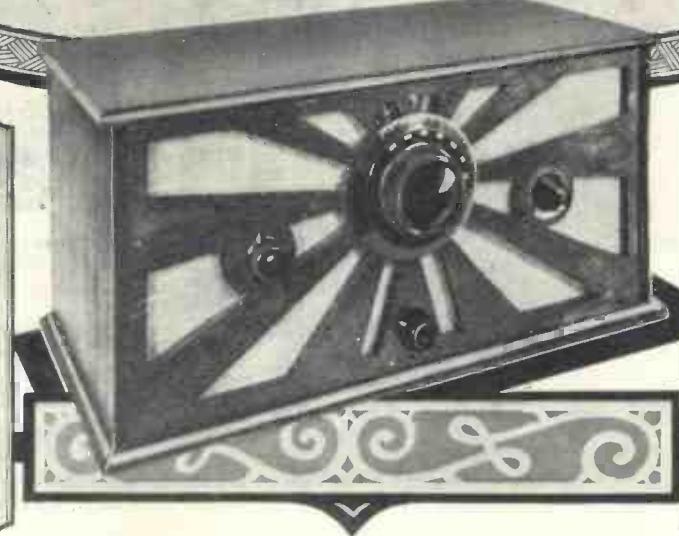
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The AT-HOME THREE

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HERE is a set that is just the thing for all-round family use! It has self-contained batteries, is cheap to build and maintain, gives good reception on a loud-speaker, covers both wavebands without coil-changing, and is attractive in appearance.

No Need for Soldering

Moreover, anybody can build it without difficulty, for the full-size blueprint, which is available for 6d., post free, shows the position, size, and shape of every wire and its correct order of assembly. There is no need for any soldering.

The circuit used is one of the most popular for a three-valver; it comprises a leaky-grid detector valve and two stages of resistance-capacity-coupled low-frequency amplification. Experience has proved that this combination gives both excellent volume and quality.

An advantage of this type of circuit is that it needs few controls, as a glance at the photograph of the front of the

set will reveal. There are only four knobs, and of these only two need be manipulated in order to receive different stations.

Although a cabinet of conventional shape has been utilised, the front of the set is of original design. There is no ebonite panel, as with the particular arrangement used a very high degree of insulation is not necessary. In fact, it would be a waste of money to provide an ebonite panel for a set of this type.

The cabinet is obtained as a "kit"; that is to say, all the pieces are correctly cut and squared up, but they are not assembled. The wood for the front fret must be obtained separately, but the base-board is included with the kit.

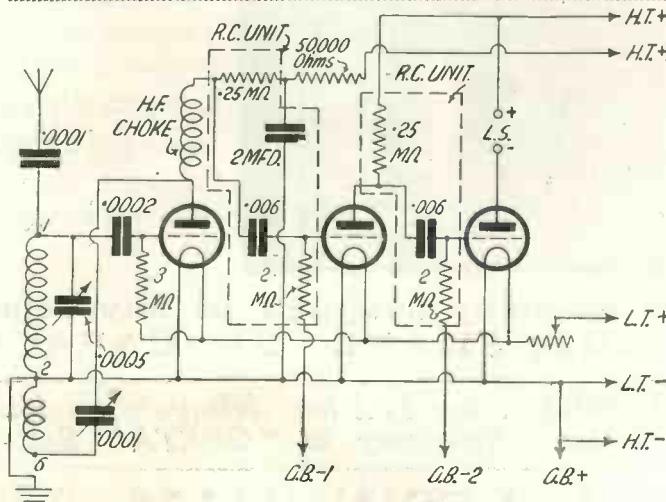
Cabinet Considerations

The constructor of the At-home Three (unless he has the cabinet specially built) has therefore to nail the case together for himself, cut out the fretted front from the panel provided, and stain and polish the finished product—if he thinks it necessary.

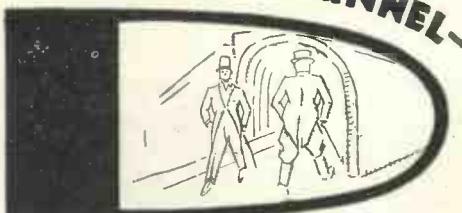
Of course, it is not essential to cut out the fretted front as the WIRELESS MAGAZINE Technical Staff have done; the constructor can design his own fret or just a plain panel of wood can be used.

There is no doubt, though, that the fretted front, backed up with a decorative piece of tinsel fabric or coloured silk, has an original appearance that will be attractive.

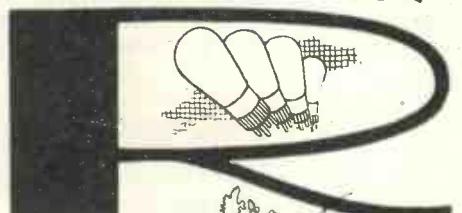
(Continued on page 372)



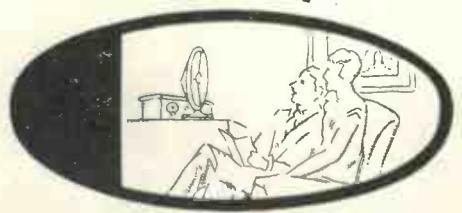
Circuit of the At-home Three ; it consists of a detector valve, followed by two resistance-capacity coupled amplifying stages

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FOUR VOLTS

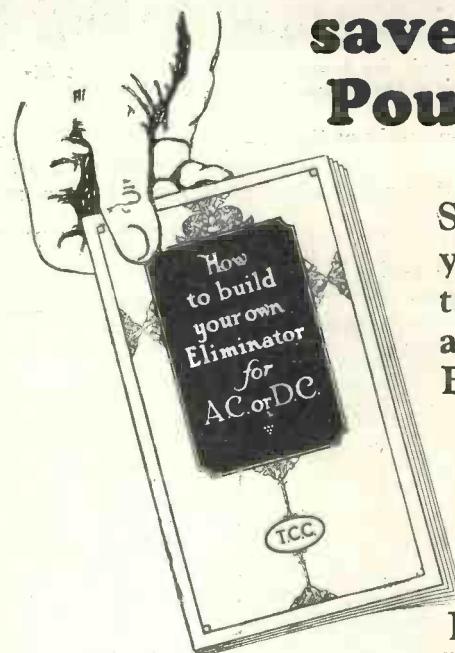
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R.O.C., .07 amp.	5/6	
Super-Power, .1 amp.	7/6	
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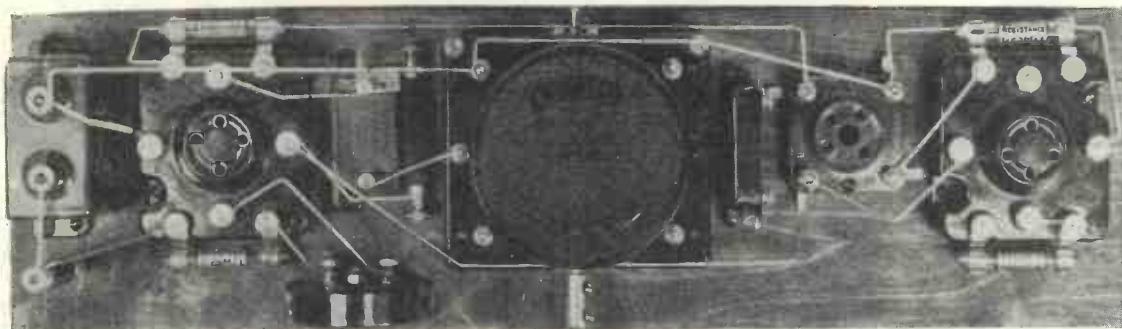
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The At-home Three (Continued)



This view shows all the baseboard components of the At-home Three assembled and wired

Full-size blueprint available for 6d. post free

tive to the womenfolk of the family, advantages of a transportable set (as far as use in the home is concerned) at a much reduced price.

We expect that many wives who read the WIRELESS MAGAZINE will insist on their husbands building the At-home Three for this reason alone! And on technical grounds they would be quite safe, too.

Enclosed Batteries

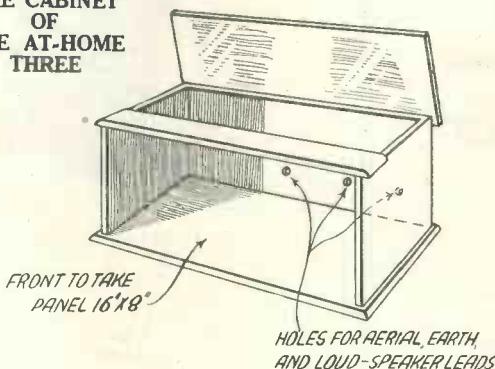
Although the main construction follows standard practice—that is, the majority of the components are mounted on a baseboard and the remainder with knobs that have to be turned are on the panel—the layout has been made especially compact so that there is also room in the cabinet for a large 2-volt accumulator, an 18-volt grid-bias battery and two 60-volt

Another photograph of the baseboard assembly of the At-home Three

high-tension batteries.

It will thus be seen that the At-home Three gives most of the

DETAILS OF THE CABINET OF THE AT-HOME THREE



The only external accessories are an aerial and earth, and a loud-speaker.

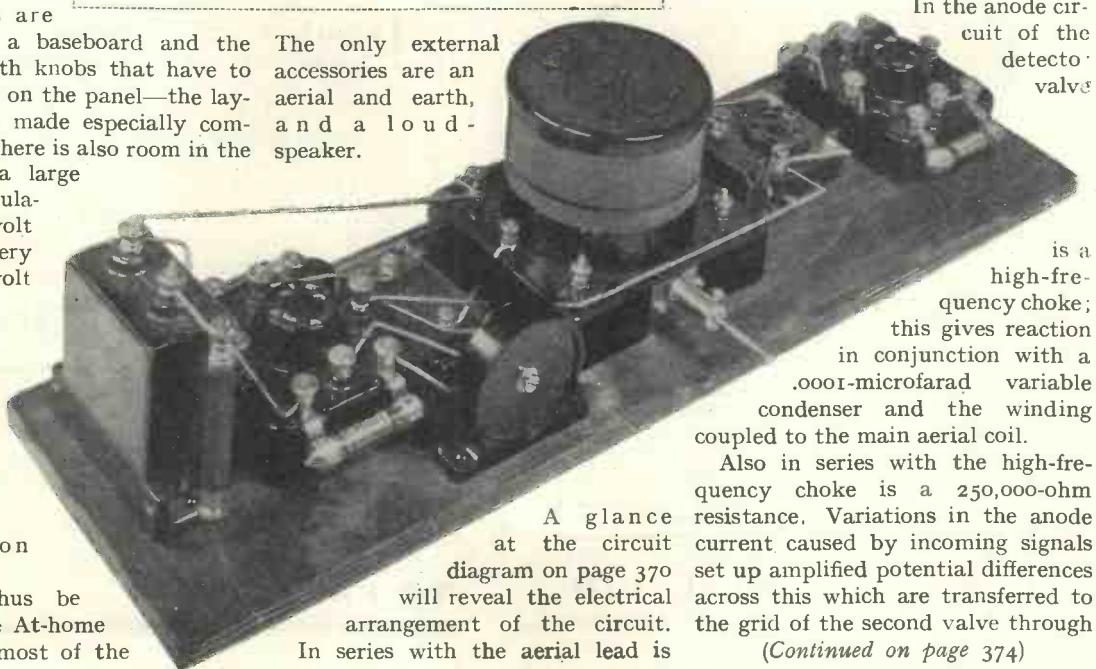
.0001-microfarad fixed condenser; this helps to give the set selectivity and ensures that on the low waveband the coil will tune down to the lowest wavelength commonly in use.

There is then a coil tuned by a .0005-microfarad variable condenser; only one coil is shown, but there are actually two (controlled by a switch at the base of the coil) for reception on either the upper or lower broadcast band.

Leaky-grid Rectification

Leaky-grid rectification is obtained by the use of a .0002-microfarad fixed condenser and a 3-megohm grid leak associated with the detector valve. Note that the end of the grid leak is connected to low-tension positive to get the most efficient results.

In the anode circuit of the detector valve



A glance at the circuit diagram on page 370 will reveal the electrical arrangement of the circuit. In series with the aerial lead is

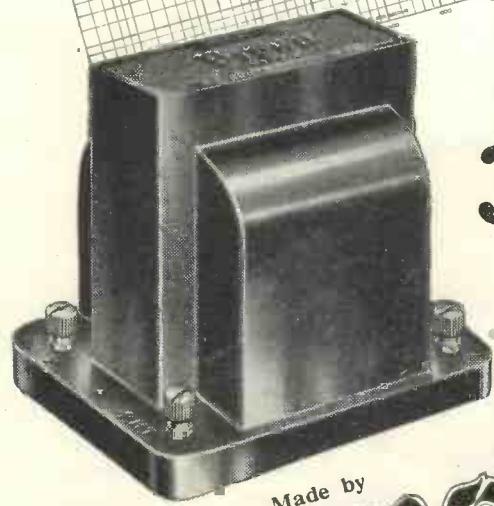
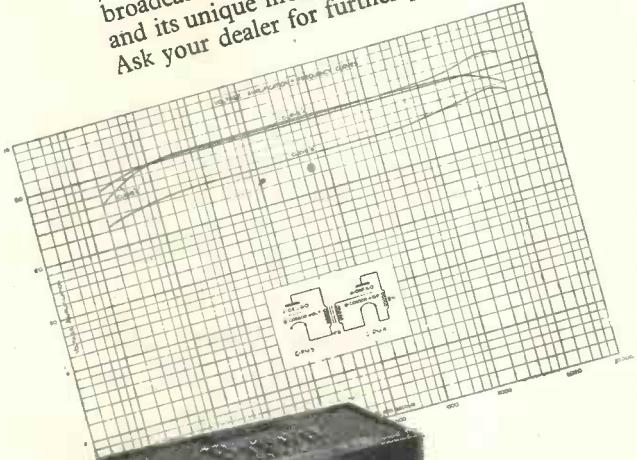
is a high-frequency choke; this gives reaction in conjunction with a .0001-microfarad variable condenser and the winding coupled to the main aerial coil.

Also in series with the high-frequency choke is a 250,000-ohm resistance. Variations in the anode current caused by incoming signals set up amplified potential differences across this which are transferred to the grid of the second valve through

(Continued on page 374)

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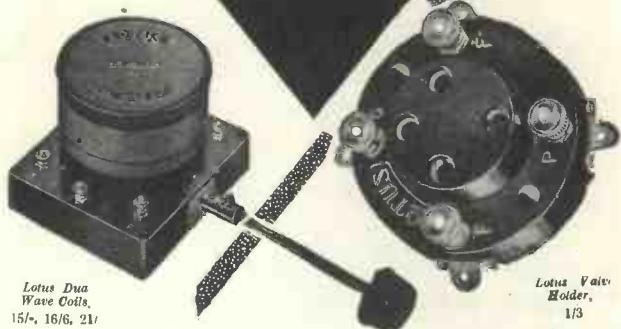
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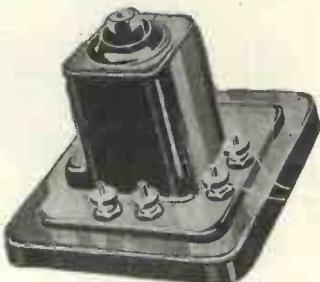
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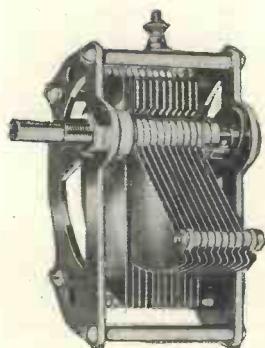
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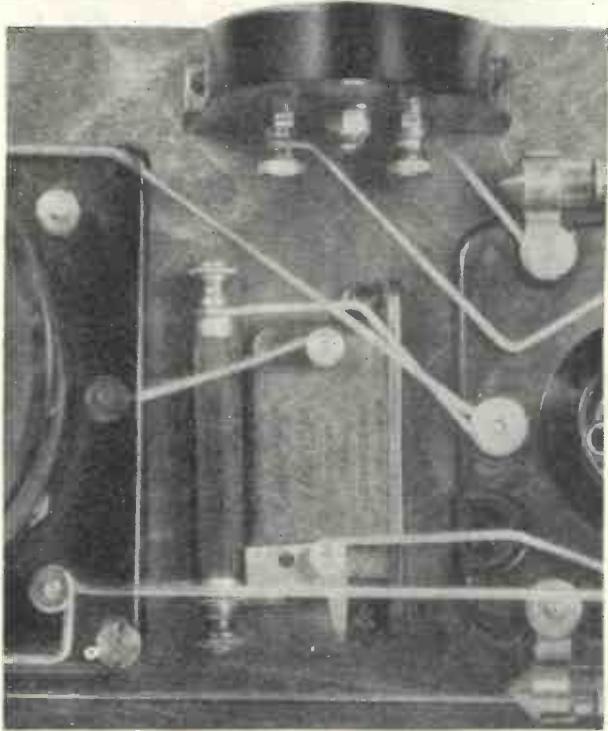
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The At-home Three (Continued)



Note that there is a clip on only one end of the grid condenser of the At-home Three. In other words, there is no connection between the top end of the grid leak and the top end of the grid condenser.

a .006-microfarad coupling condenser.

Actually, this condenser is to insulate the grid from the high voltage applied to the anode of the preceding valve, but it also has some effect on the quality of reproduction.

For instance, if it were very small in value it would tend to cut off some of the lower frequencies and the reproduction of the bass notes would be inferior. The values used are adequate for good quality.

Stabilising Resistance

It will be observed that, besides the high-frequency choke and the 250,000-ohm resistance already referred to, there is also

Here is another view of the baseboard components of the At-home Three

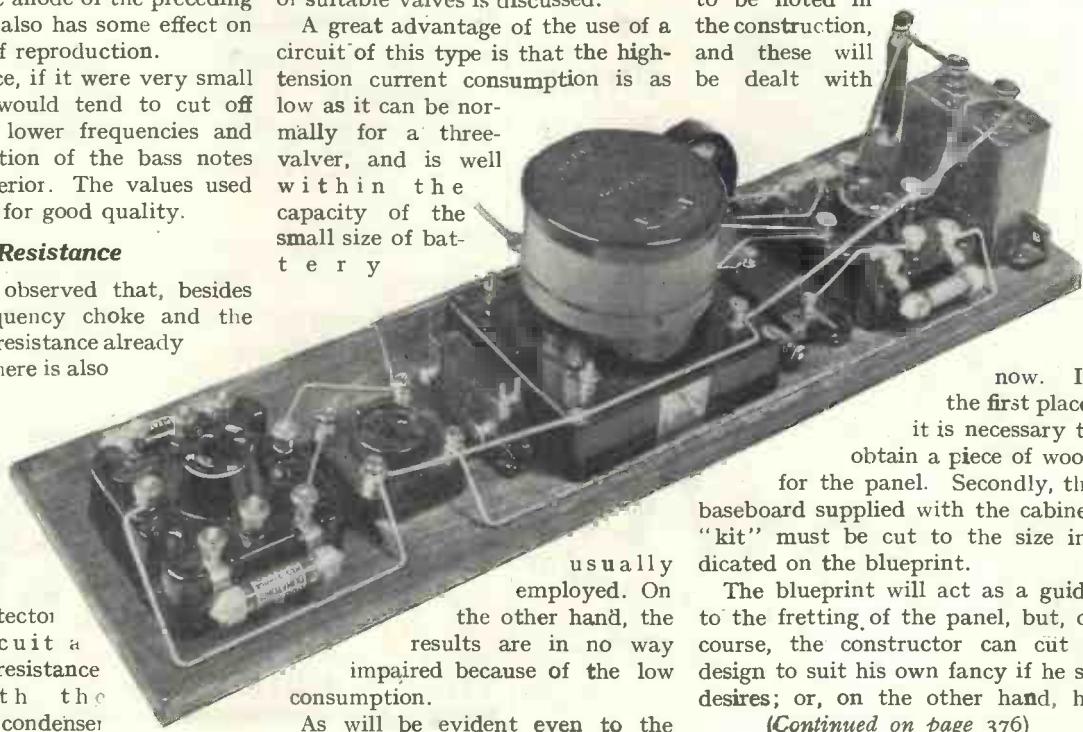
in the detector anode circuit a 50,000-ohm resistance. This, with the 2-microfarad condenser

connected to low-tension negative, obviates any tendency to instability or the low-frequency oscillation familiarly known as "motor-boating." Another advantage of this device is that the high-tension battery can be used for much longer than would be the case were it omitted, without any troublesome noises occurring.

The second valve is coupled to the third valve in a similar way, the same value of coupling condenser being used as before.

A smaller value of anode resistance is sometimes useful for a reason that will be mentioned when the question of suitable valves is discussed.

A great advantage of the use of a circuit of this type is that the high-tension current consumption is as low as it can be normally for a three-valver, and is well within the capacity of the small size of battery.



usually employed. On the other hand, the results are in no way impaired because of the low consumption.

As will be evident even to the

beginner, the At-home Three presents no constructional difficulties. On the full-size blueprint that is obtainable for half-price (that is, 6d., post free) up to May 31 every connecting lead is shown full size and shape. Moreover, the order of assembly is clearly indicated.

How to Get a Blueprint

To get a blueprint at half-price send the coupon on page iii of the cover to Blueprint Dept., WIRELESS MAGAZINE, 58/61 Fetter Lane, E.C.4, and ask for No. W.M.141.

It will be observed that in the list of components on page 380 every component is priced. The price, however, applies only to the particular part made by the manufacturer noted first in the brackets; these are the parts that were used in the original WIRELESS MAGAZINE design and allowed for in the layout.

Although the cost of the complete set is comparatively low, no attempt has been made to build the At-home Three down to a price by using inferior components. Every part in the set is of good quality, made by a manufacturer of repute.

Constructional Points

There are one or two special points to be noted in the construction, and these will be dealt with

now.

In the first place, it is necessary to obtain a piece of wood for the panel. Secondly, the baseboard supplied with the cabinet "kit" must be cut to the size indicated on the blueprint.

The blueprint will act as a guide to the fretting of the panel, but, of course, the constructor can cut a design to suit his own fancy if he so desires; or, on the other hand, he

(Continued on page 376)

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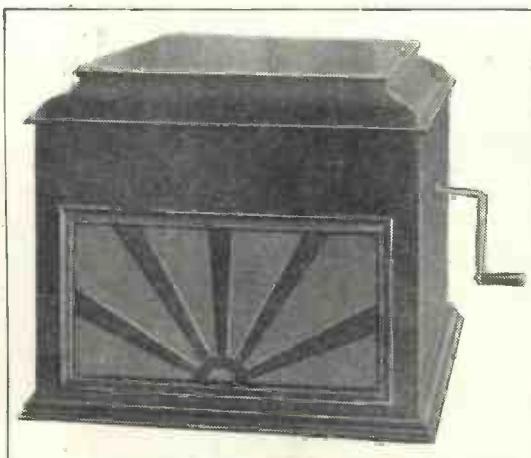
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The At-home Three (Continued)



A back view of the completed At-home Three with the valves in position

can use a solid panel without any fancy cuts. As soon as the front has been cut and polished, however, the backing cloth should be stuck in position before any of the components are mounted.

First mount all the baseboard components, as indicated by the photographs and the layout. Note that the metal connecting clip at one end of the grid condenser is removed; a separate photograph shows this in detail. (See page 374.)

No Trouble in Wiring

When all the baseboard parts have been firmly fixed into position, wiring up can be started (that is, before the front panel is touched). Refer to the blueprint and cut off a length of wire for No. 1 connection; fix this in position (there is no need for any soldering) and cross through that number with a pencil. Proceed with connection No. 2, and so on until all the baseboard components have been wired.

Mounting Panel Components

Next screw the remainder of the parts to the front panel, and then fix the latter to the baseboard by means of a few screws along the front edge of the latter.

The rest of the wiring can then be finished as previously explained. Note that there are no cross connections to other wires; every lead goes from one terminal to another.

By using the At-home Three you can get a complete loud-speaker installation for £11—not a lot to pay for all the entertainment you will get

When all the connections have been made the At-home Three is ready for use as soon as suitable valves have been inserted in the holders and the batteries connected up. It is also necessary, of course, to connect externally an aerial, earth, and loud-speaker. The leads from these are passed through holes made in the back of the cabinet, as indicated in the diagram of the latter on page 372.

Suitable Valves to Use

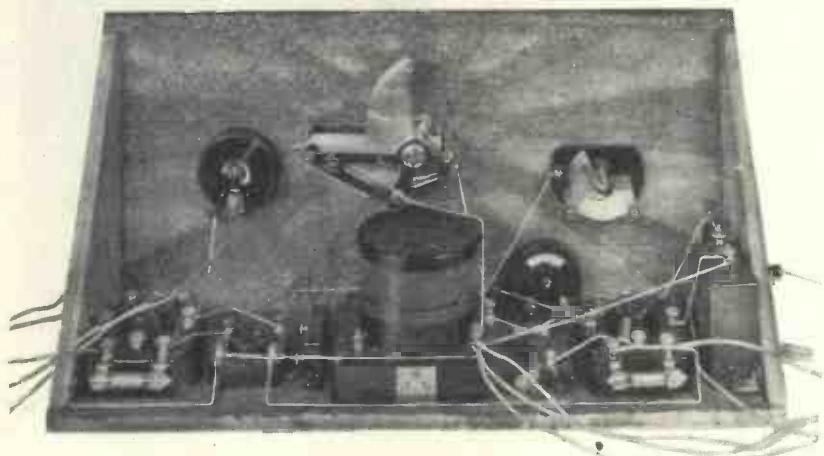
The first valve—that is, the detector—should be of the R.C. (resistance coupling) type and should have an impedance between one-half and one-third that of the anode resistance associated with it. As the resistance in this case is 250,000 ohms, the valve impedance can be between 120,000 and 80,000 ohms.

Two-volt valves must be used unless an external battery is employed, as there is room only for a 2-volt cell in the cabinet itself. A complete list of various makes of valves *in order of impedance* will be found on page 308 of this issue.

Second Stage Valve

The same reasoning regarding impedance applies to the second valve, which is also resistance-capacity coupled to the last valve; therefore a valve of the same order of impedance as the detector can be employed.

(Continued on page 378)



Another view of the At-home Three completely assembled

WRITE AND TELL US WHAT RESULTS YOU GET WITH THE AT-HOME THREE WHEN YOU HAVE BUILT IT!

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CLAROSTAT

Here's the NEW 1929 MODEL "CLAROSTAT" now triple nickel-plated and fitted with improved terminals.



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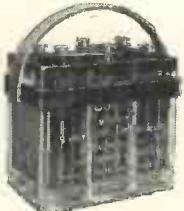
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* Specified for the "Wireless Magazine" "AT HOME THREE" described in this issue

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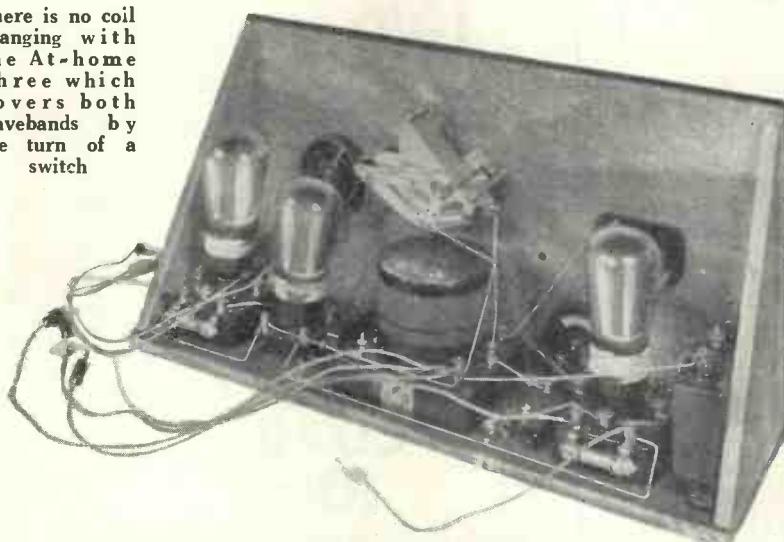
TUDOR ACCUMULATOR CO., LTD., 2 NORFOLK STREET,
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Speedy replies result from mentioning "Wireless Magazine"

The At-home Three (Continued)

There is no coil changing with the At-home Three which covers both wavebands by the turn of a switch



This view also shows the At-home Three complete with valves

For the sake of quality in the reception of signals from powerful nearby stations it might be preferable to use an anode resistance of 100,000 ohms (in place of 250,000 ohms) with a valve impedance between 60,000 and 30,000 ohms; that is, a valve of the H.F. type.

An Extra Part

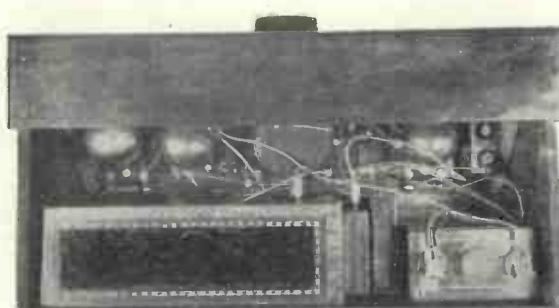
The makers of the resistance-coupling units used in the original set do not, however, supply resistances of this value. Any constructor who desires (for the sake of exceptional quality from the local station when this is within a few miles) to use a 100,000-ohm resistance in the second stage will therefore have to get one from a different source.

Impedance of the Power Valve

It is desirable that the power valve should have a low impedance for, within limits, the lower the impedance, the better will be the quality of reproduction. Actually, any value between about 6,000 ohms and 2,500 ohms will be suitable. Constructors should realise, however, that the lower the impedance of the valve, the more current will be drained from the high-tension battery.

Having chosen and obtained the necessary valves, the batteries (detailed in the list of components)

should be placed in the cabinet as indicated by the photograph below. Looking from the front opening of



Here is the At-home Three all complete in cabinet with the necessary batteries

the cabinet, place the 2-volt accumulator on the left and the two 60-volt high-tension batteries (one

above the other) on the right; the two 9-volt grid-bias batteries are placed on end between the accumulator and the high-tension batteries.

Battery Connections

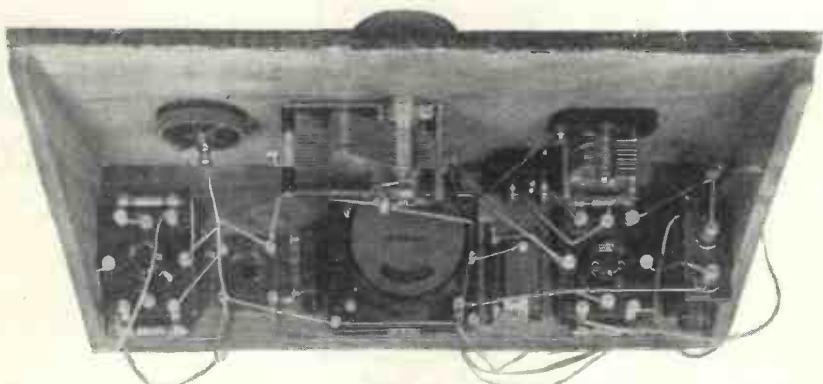
It should be noted here that the negative end of one high-tension battery must be connected to the positive end of the other battery by a short lead, the remaining positive and negative ends (actually on separate batteries) being considered as the terminal points of the whole supply. The two grid-bias batteries must be connected in the same way.

The set should then be slid partly into the case, towards the batteries, and the necessary connections made. To H.T.+1 apply about 90 volts and to H.T.+2 the full voltage available. The grid bias applied to G.B.-1 should be about $1\frac{1}{2}$ to 6 volts and to G.B.-2 anything from 6 to 18 volts, depending upon the actual power valve used. Valve makers always specify the actual values that give the best results.

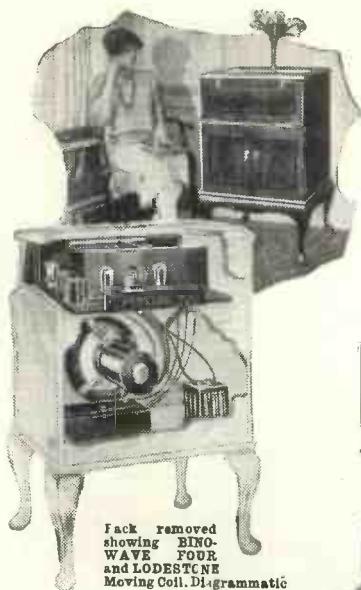
Operating the Set

To operate the set turn the right-hand knob; this turns on the filament current. Next adjust the left-hand knob until a slight rustling or hissing sound is heard from the loud-speaker; this "live" sound indicates that the set is on the verge of oscillation and in its most sensitive condition for reception. On no

(Continued on page 380)



When the baseboard components are wired the panel is placed in position and the remainder of the parts connected up



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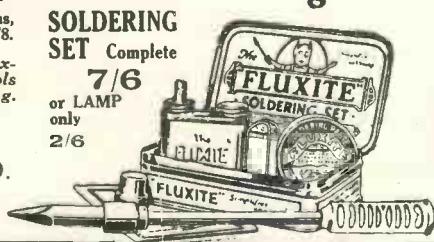
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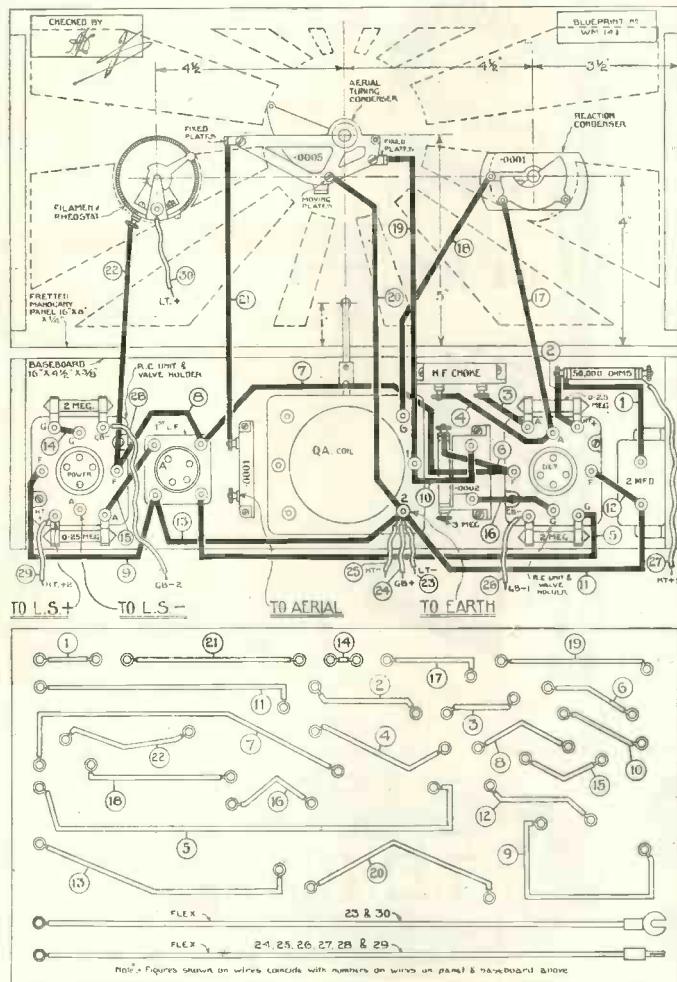
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The At-home Three (Continued)



COMPONENTS REQUIRED FOR THE AT-HOME THREE

- 1—Cabinet with baseboard (Hobbies, No. 6) ...
- 1—Wood panel, 16 in. by 8 in. by $\frac{1}{4}$ in. ...
- 1—Piece of tinsel, same size ...
- 1—.0005-microfarad variable condenser, with 4 in. dial (Jackson Bros., Lissen, or Lotus) ...
- 1—.0001-microfarad reaction condenser (Petosco, Lissen, or Dubilier) ...
- 1—15-ohm panel rheostat (Lissen, Peerless, or Igranic) ...
- 1—Dial indicator (Bulgin or Belling-Lee) ...
- 1—Antimicrophonic valve holder (Formo, Lotus, or Marconiphone) ...
- 2—Combined resistance-capacity coupling units and valve holders, with .25-megohm anode resistances and 2-megohm grid leaks (Dubilier)
- 1—2-microfarad fixed condenser (T.C.C., Mullard, or Lissen) ...
- 1—High-frequency choke (Burndep, Lissen, or Wearite) ...
- 1—50,000-ohm resistance (Graham-Farish, Trix, or Cosmos) ...
- 1—.0002-microfarad fixed condenser (Graham-Farish, T.C.C., or Mullard) ...
- 1—3-megohm grid leak (Graham-Farish, Lissen, or Mullard) ...
- 1—Dual-range coil (Lotus QA) ...

s.	d.		s.	d.	
9	6	1—.0001-microfarad fixed condenser (Graham-Farish, T.C.C., or Mullard) ...	1	0	
1	6	10—Wander plugs, 5 red and 5 black (Lectro Linx) ...	1	8	
0	6	2—Spade tags, red and black (Lectro Linx) ...	0	4	
11	6	Stiff wire for connecting (Glazite) ...	0	9	
4	6	Rubber-covered flex (3 yds.) ...	0	6	
2	6	2—9-volt grid-bias batteries (Ever-Ready, type 625) ...	1	6	
9	2	2—60-volt high-tension batteries (Ever-ready, type Pop. 2) ...	19	0	
1	3	1—2-volt 30-ampere-hour accumulator (Tudor type CLH7) ...	13	6	
17	0	Sundries (screws, etc.) ...	2	6	
3	10				£5 16 9
3	6				
2	3				
1	0				
2	0				
15	0				

ACCESSORIES

- 1—Lightning polishing outfit (Hobbies) ...
- 1—Horn loud-speaker (Brown type HQ) ...
- 2—2-volt R.C. type valves (Mullard, Cossor, or Marconi) ...
- 1—2-volt power valve (Mullard, Cossor, or Marconi) ...

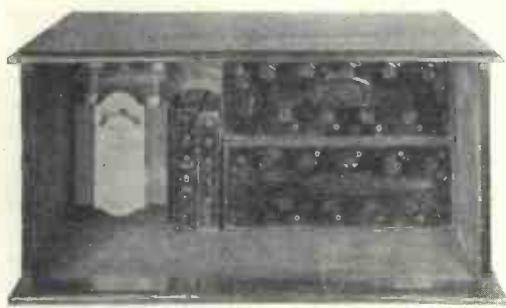
£5 1 0

Complete installation for £11 0 0

account turn the knob so far that a howl results.

Stations can be tuned in by adjusting the centre knob; this controls the variable tuning condenser, which alters the wavelength to which the set is tuned. When a station is heard the left-hand knob should be readjusted for the best results.

The position of the small knob immediately underneath the main tuning dial decides on which



This photograph shows how the batteries are placed in position before the set itself is positioned

waveband reception is carried out. For the long waves (that is, between 1,000 and 2,000 metres) turn the knob to the left; for the short waves (between about 250 and 550 metres) turn the knob to the right.

It may also be desirable to readjust the grid-bias and high-tension voltages applied to the valves in order to get the very best results.

This layout and wiring diagram of the At-home Three can be obtained as a full-size blueprint—showing the shapes and sizes of all the connecting wires—for half-price (that is, 6d., post free) if the coupon on page iii of the cover is used by May 31. Connect up the leads in numerical order. Ask for No. WM 141.

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This eagerly awaited product incorporates several unique advantages. High-voltage and low-voltage plugs are a different size—a safety device which prevents any possibility of valves being burnt out. The whole product is beautifully finished and insulated throughout. Made by the makers of the famous Belling-Lee terminals. Price 9d. (Panel portion 3d. each; flex portion 6d. each). Ask for the new Belling-Lee Wander Plug—the first insulated Wander Plug on the market to be engraved. Choice of 14 engravings.

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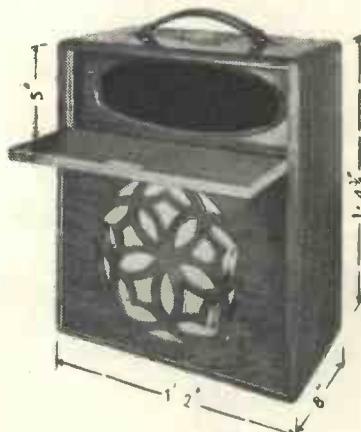
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Janet Eccles



APRIL, being the Easter month, has seen a somewhat lighter texture in programme material, but the outstanding features have been the orchestral and concerto music. Easter Monday heard the popular Black Dyke Band, which has probably broadcast more often than any other provincial band.

The main programme, however, from 2LO consisted of music from the Russian Ballet, the true Diaghilev Ballets, conducted by G. Leslie Heward, formerly one of the younger conductors of the B.N.O.C.

Russian music was again in evidence at the Central Hall concert on the 6th, when the Balalaika Seven were heard.

Amongst the other orchestral and band concerts which deserve

Broadcast Music of the Month

mention are those of the Band of H.M. Welsh Guards, the National Orchestra of Wales, and the City of Birmingham Police Band under Richard Wassell.

Ashmoor Burch, a popular singer, was heard in some of the early concerts; a singer of the National Sunday League concerts, operatic and choral works, his work is always of artistic value. Osmund Davis, the well-known tenor, has figured prominently in most big concerts since he made his debut at Queen's Hall ten years ago. Apart from his classical

Bella Redford (mezzo-soprano)

Stanley Kaye (pianist)



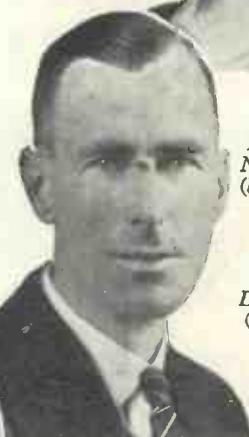
as well as baritone on occasion.

On the feminine side, such artists as Kate Winter, Elsie Suddaby, Mavis Bennett, Megan Thomas, Rizpah Goodacre, and Muriel Sotham are all too well known to need further comment here.

In various programmes from 2LO and 5GB have figured Dorothy Kitchen, the Coburn Sisters, charming duettists, Janet Eccles, Nancy Hepton, a fine soprano heard at 2LO on the 7th, Bella Baillie, Dorothy King, also sopranos, Bella Redford, a mezzo-soprano heard often

(Continued on page 384)

Stuart Gardner (baritone)



Left : Bertram Newstead (baritone)
Right : Nigel Dalloway (vocalist)

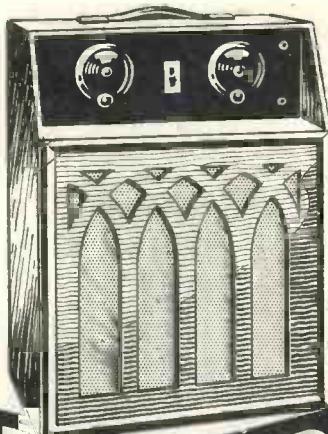
Rizpah Goodacre (contralto)

recitals at Aeolian, and Wigmore Hall, etc., he has specialised over the ether in the English music of Gerrard Williams and Holst.

Many singers have been heard from the B.N.O.C. company on tour, and amongst the concert platform artists may be mentioned Tom Purvis, an excellent tenor; Bertram Newstead, a baritone; Stuart Gardner known for his many broadcasts at 2LO; and John Anderson, who is a speaker



Bella Baillie (soprano)



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Broadcast Music (Continued)

Nancy Hepton
(soprano)

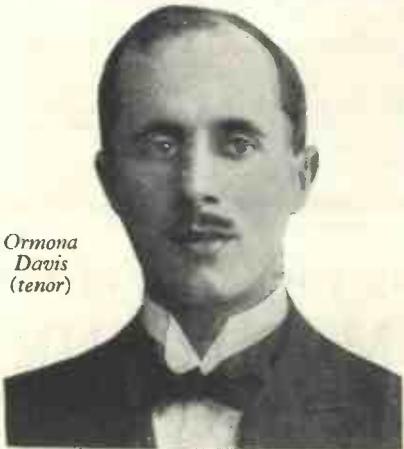


from Manchester, and Jenny Wynne, who joins issues with Arthur Ackerman as the Folk Song Entertainers, and specialises with him in the singing of folk tunes.

As regards instrumentalists, here, as usual, the piano stands out most prominently. Recitals have been given by Lafitte, Johanne Stockmarr, Suzanne Bertin, the French pianist, and Gordon Bryan, all classical artists whose names are connected with the great concerts of the country.

For the violin we have relied mainly on the fine playing of Emilio Colombo, Moschetto, and Alphonse du Close, with their restaurant orchestras, the classical element being provided by the miniature orchestras such as the Gershon Parkington Quintet, the Albert Sandler Trio, Amar-Hindemith String Quartet and the Olof String Sextet. Such bodies

Ormona Davis
(tenor)



are amply large enough to provide light and popular music and classics, and often "come over" much better than the large orchestras.

The lighter element still appears to rely on syncopated noises and low-comedy sketches, but amongst the artists who have starred in their own especial characteristics may be mentioned Ann Penn, with her imitations, Albert Whelan, the Australian variety hall star.

To lighten the burden of heavy effusions which have been poured on us lately, we are promised a microphone version of *The Prisoner of Zenda*, the famous novel and play by

Anthony Hope. Amongst the talks, mention might be made of one given by John Anderson in

Tom Purvis
(tenor)



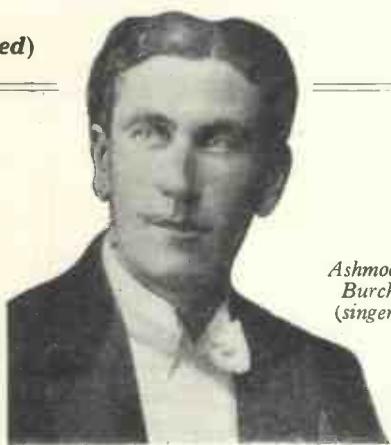
Muriel Sotham

Leonard Salisbury (leader of the Salisbury Singers)

the Children's Hour from 5GB on April 1, entitled "The Theatre's Lamplighter." Of interest, too, was a broadcast by M. Louis Quievreux, "Why I Like the British People."

The concerts of the new series held at the Peoples Palace, Mile End, will undoubtedly prove as popular as those at the Queens Hall, and their being held on Thursday evenings instead of Fridays will allow of more people being actually in the hall. Under the batons of Sir Landon

Ashmoor Burch
(singer)



Ronald and Percy Pitt, the programmes are in safe hands.

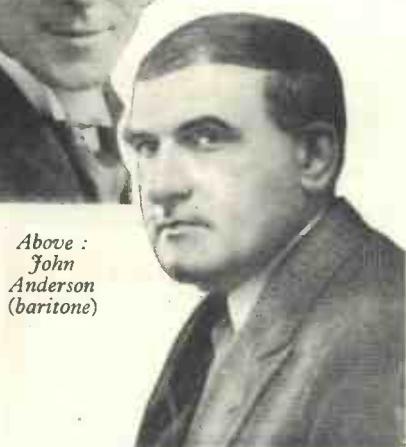
Naturally the number of singers predominates in wireless concerts and although diction and clarity of articulation are by no means perfect with some of the new-comers, most of the early broadcasters have attained a full working ability to "manage the mike," and sing as naturally as if they were on the actual platform.

Two other plays of the month stand out, Stanley Houghton's *The Dear Departed*, and *Dropped from Heaven*, by Dion Titheradge.

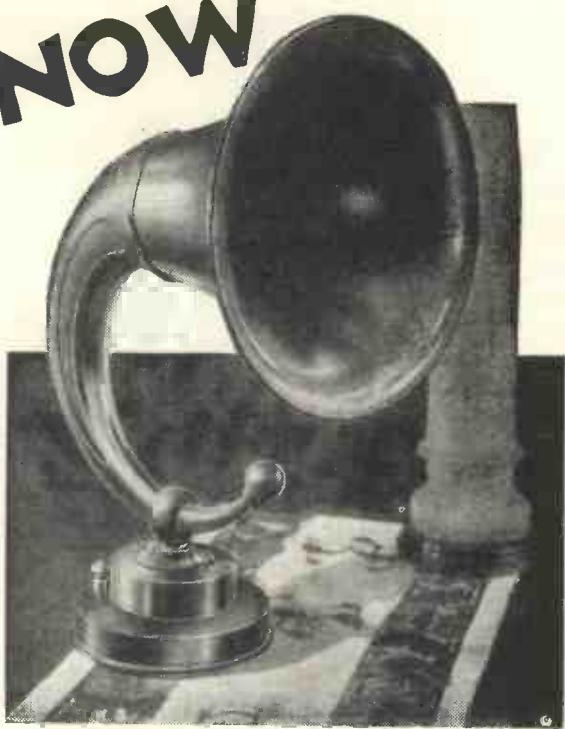
For the World's Great Plays series we have had Tchekov's *The Cherry Orchard* as representative of continental art, and the wearisome outpouring of G. Bernard Shaw's *Saint Joan*.

Perhaps now we might have a series of the World's Worst Plays—they could not be more boring on the whole, and might prove amusing.

Above :
John Anderson
(baritone)



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How to Choose, Buy and Operate Your Portable (Continued)



CHAKOPHONE SCREENED THREE

Circuit : Three valves; one screened-grid H.F., leaky-grid detector, and pentode L.F.

Wavelength Range : 250 to 550, and 1,200 to 2,000 metres.

Overall Dimensions : 16 in. by 10 in. by 16 in.

Weight : (a) without batteries, 14 lb.; (b) in complete working order, 28 lb.

Finish : Waterproof Rexine black or antique brown, grained leather finish.

Adaptable for external aerial and earth, external loud-speaker, external batteries, mains working, and gramophone pick-up.

Price : £25 8s. 6d. (deferred terms).

Maker : Eagle Eng. Co., Ltd., Warwick.



Details of the Aeonic suitcase portable will be found on page four of the supplement

ORMOND MAHOGANY PORTABLE

Circuit : Five valves; two choke-coupled H.F., leaky-grid detector, and two transformer-coupled L.F.

Wavelength Range : 240 to 550 and 1,000 to 2,000 metres.

Overall Dimensions : 18 in. by 14 in. by 9 in.

Weight : (a) without batteries, 23 lb.; (b) in complete working order, 35 lb.

Finish : Mahogany.

Adaptable for external aerial earth, and loud-speaker; for external batteries and mains working only to order.

Price : £25 8s. 9d.

Maker : Ormond Engineering Co., Ltd., 199 Pentonville Road, King's Cross, N.1.

PHANTOM REGIONAL

Circuit : Four valves; two screened-grid H.F., detector, pentode.

Wavelength Range : 250 to 550, and 1,000 to 2,000 metres.

Overall Dimensions : 22 in. by 15 in. by 8½ in.

Weight : in complete working order, 50 lb.

Finish : indestructible leather suitcase type.

Adaptable for external aerial and earth, and external loud-speaker.

Price : £44 2s. (deferred terms).

Maker : Rolls Caydon Sales, Ltd., 77 Rochester Street, S.W.1.

BRITISH GENERAL PORTABLE

Circuit : Three valves; detector, two transformer-coupled L.F. amplifiers.

Wavelength Range : 200 to 2,880 metres.

Overall Dimensions : 19 in. by 16 in. by 8 in.

Finish : Polished oak.

Adaptable for external aerial and earth.

Price : £12 12s.

Remarks : The design is based on the Chapman-Reinartz Two described in *Amateur Wireless* last October. Folding frame aerial opens out to generous size. Every Ready H.T. and L.T. batteries. Polar condensers.

Maker : British General Mfg. Co. Ltd., Brockley, S.E.4.

ALL-WAVE PORTABLE

Circuit : Eight valves; one screened-grid H.F., detector, oscillator, two intermediate frequency, detector, low-frequency, and power valve.

Wavelength Range : 15 to 70, 200 to 550, and 800 to 2,000 metres.

Overall Dimensions : 18 in. by 17 in. by 8 in.

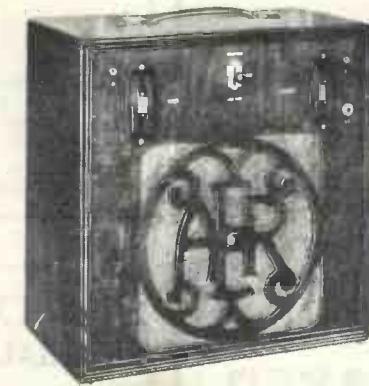
Weight : in complete working order, 30 lb.

Finish : Leather, mahogany, and oak.

Adaptable for external aerial, earth, and loud-speaker.

Price : £52 10s. (deferred terms).

Maker : Rees-Mace Manufacturing Co., 39a Welbeck Street, London, W.1.



This Aeonic transportable model is described on page four of the supplement



The Halcyon Screened-grid Four is described on page fourteen of the supplement

Draw the attention of your friends to the special portable supplement in this issue; they will be glad to know of it!

GALLOWAY

Circuit : Eight valves; super-het.

Wavelength Range : 200 to 500, and 1,000 to 1,600 metres.

Overall Dimensions : 19 in. by 10 in. by 9 in.

Weight : (a) without batteries, 14 lb.; (b) in complete working order, 44 lb.

Finish : Teak natural finish, waxed.

Adaptable for external loud-speaker, external batteries, and mains working.

Price : £46 (deferred terms).

Remarks : Batteries external in separate carrying case, loud-speaker external, to choice.

Maker : J. & L. Galloway, Ltd., 38 Mair Street, Glasgow, S.W.1.



On page seven of the supplement you will find particulars of this Halcyon cabinet three-valver

Look out for the next issue of "Wireless Magazine" (Published on May 24); it will contain further information about portable receivers.

(Continued on page 388)

WHAT H.T.CURRENT DOES YOUR SET CONSUME?

Ever Ready "STANDARD" Series. W. 16-66 volt. 12s. 6d. $9\frac{1}{2} \times 3\frac{1}{2} \times 3\frac{1}{2}$, for 6 milliampere emission.

These batteries represent the finest value for money based on cost per hour of service for low power receiving sets.

Ever Ready "HIGH CAPACITY" Series. W. 34-66 volt. 22s. $14\frac{1}{2} \times 5\frac{1}{2} \times 3\frac{1}{2}$, for 10-16 milliampere emission.

These batteries represent the finest value for money for high power receiving sets.

The "WINNER" Series. Winner 66. 7s. 6d. $9\frac{1}{2} \times 3\frac{1}{2} \times 2\frac{1}{2}$, for 6 milliampere emission.

These batteries are good value for money, and at the stated emission satisfactory service is guaranteed.

FOR satisfactory and economical service you must use H.T. Batteries of correct capacity. The following table is a useful guide to the battery you should install. The Ever Ready Company provides a suitable and reliable Battery of any voltage for every set.

The "POPULAR" Series. Popular 2-66 volt. 9s. 6d. $9\frac{1}{2} \times 3\frac{1}{2} \times 3$. Small Capacity for 6 milliampere emission. In brown metal containers. Suitable for the usual two valve sets.

POWER CAPACITY for 10-16 milliampere emission. Popular Power 64. 14s. 6d. $14\frac{1}{2} \times 5\frac{1}{2} \times 3$.

These units have large capacity cells and will give economical service with power valves requiring heavy emission of current.



"SUPER 1" Super Capacity 45 volt. 21s. $4\frac{1}{2} \times 8\frac{1}{2} \times 8$, for 16 milliamperes and over.

These batteries will give reliable service on any high power set known.

Ever Ready Batteries are convenient, trouble free, give purity of tone and are the handiest form of H.T. supply.

**BRITAIN'S
BEST BATTERIES**

Advt. of The Ever Ready Co. (G.B.), Ltd., Hercules Place, N.7.

When you send your order don't forget to say you "saw it in the 'W.M.'"

How to Choose, Buy and Operate Your Portable (Continued)

NEOPHONE (Class A)

Circuit : Five valves; two H.F., detector, and two L.F.

Wavelength Range : 250 to 500 and 1,000 to 2,000 metres.

Overall Dimensions : 15½ in. by 13 in. by 9½ in.

Weight : (a) without batteries, 18½ lb.; (b) in complete working order, 28 lb.

(these weights are specified in mahogany; proportionately heavier if in oak).



Adaptable for external loud-speaker, and mains working.

Price : in oak, £15 15s.; mahogany, £16 16s.

Remarks : Mains converters can be supplied in place of H.T. batteries, at an additional cost of £2 13s. 6d. for D.C. current, and £4 8s. 6d. for A.C. This set incorporates the Neophone patent seamless vulcanite cone-diaphragm speaker.

Maker : The Neophone Engineering Co., 9 and 10 Little Saint Andrew Street, St. Martin's Lane, W.C.2.

SERAPHONE JUNIOR

Circuit : Five valves; two H.F., detector, two L.F.



Wavelength Range : 250 to 500, and 1,000 to 2,000 metres.

Overall Dimensions : 14½ in. by 8½ in. by 15½ in.

Weight : (a) without batteries, 16 lb.; (b) in complete working order, 29 lb.

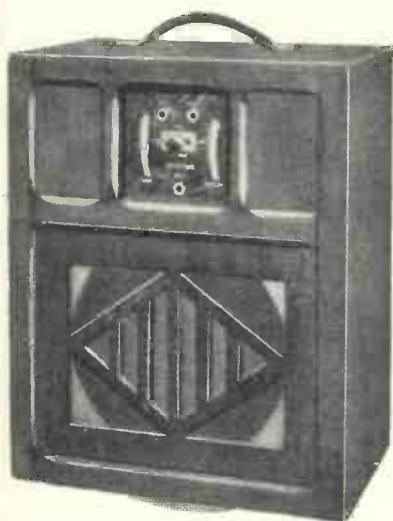
Finish : Black leatherette.

Adaptable for external aerial and earth.

Price : £15 15s. (deferred terms).

Remarks : Battery consumption is 5 milliamperes.

Maker : The Seraphone Company, Ltd., 189 Regent Street, W.1.



handle. Waterproof cover. Double-capacity battery. Battery consumption is 5 to 6 milliamperes.

Maker : The Seraphone Company, Ltd., 189 Regent Street, W.1.

WESTMINSTER SCREENED-GRID PORTABLE RADIO GRAMOPHONE

Circuit : Four valves; two screened-grid for H.F. amplification, triode for detector, and a pentode for L.F. amplification.

Wavelength Range : 210 to 600, and 750 to 1,900 metres.

Overall Dimensions : 20 in. by 18 in. by 9½ in.

Weight : (a) without batteries, 38 lb.; (b) in complete working order, 58 lb.



Finish : Walnut cabinet, with oxidised silver fittings.

Price : £42 (deferred terms).

Remarks : Turntable, pick-up and handle for gramophone motor all pack within cabinet when not in use. Set is permanently mounted on a rotating base, allowing directional effect of long- and short-wave frame aerials to be taken advantage of.

Maker : Dubilier Condenser Co. (1925), Ltd., Ducon Works, Victoria Road, N. Acton, London, W.3.

SERAPHONE DE LUXE

Circuit : Five valves; two H.F., detector, two L.F.

Wavelength Range : 250 to 500, and 1,000 to 2,000 metres.

Overall Dimensions : 14½ in. by 8½ in. by 17½ in.

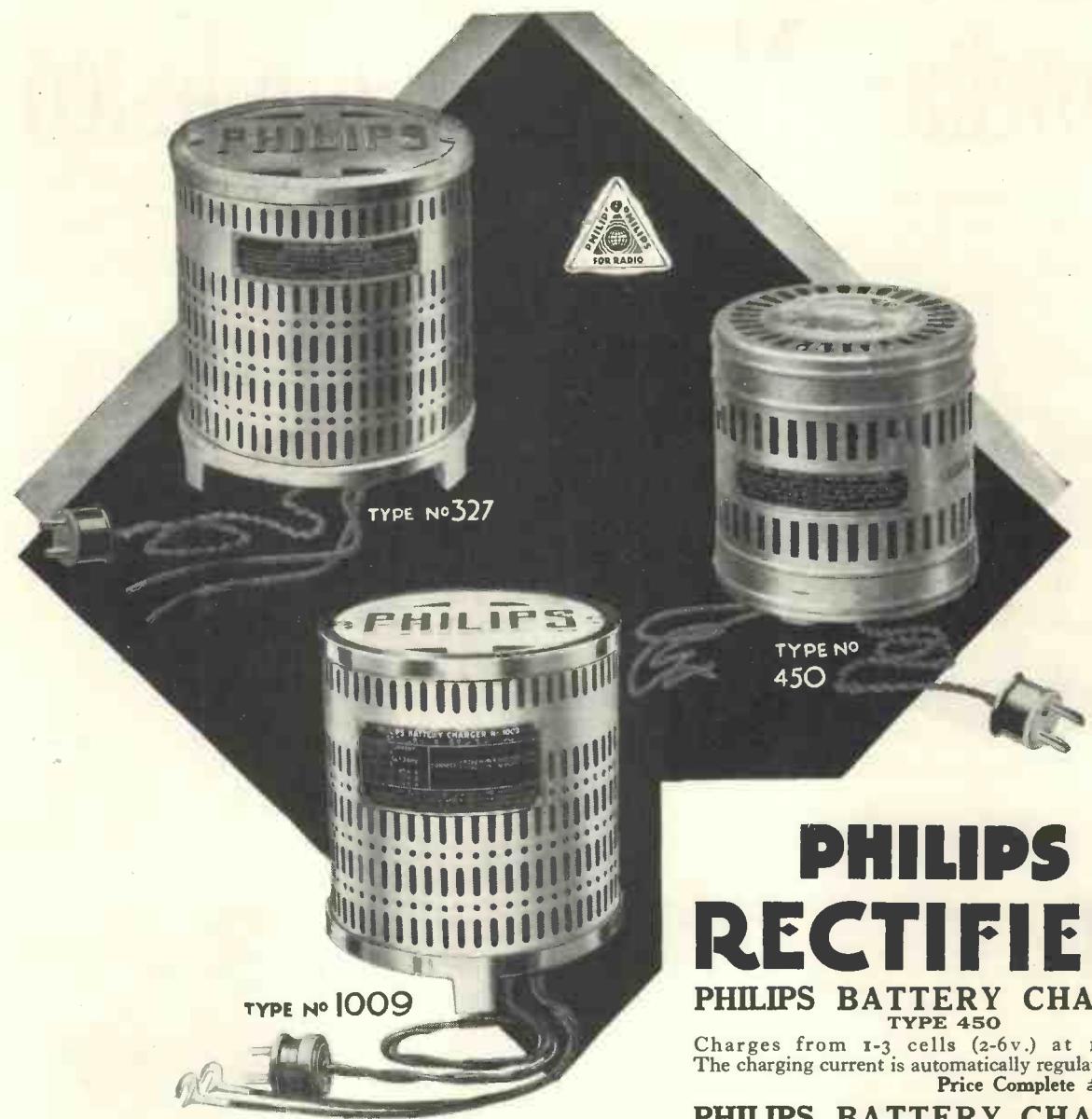
Weight : (a) without batteries, 21 lb.; (b) in complete working order, 37 lb.

Finish : Walnut or mahogany.

Adaptable for external aerial and earth, and external loud-speaker.

Price : £26 5s. (deferred terms).

Remarks : Adaptable for gramophone pick-up. Turntable. Collapsible



PHILIPS RECTIFIERS

PHILIPS BATTERY CHARGER TYPE 450

Charges from 1-3 cells (2-6v.) at 1.3 amps.
The charging current is automatically regulated.

Price Complete £3.10.0

PHILIPS BATTERY CHARGER TYPE 327

Charges any number of cells from 1-6 (2-12v.) at 1.3 amps.
The charging current is automatically regulated.
Useful for charging Car Batteries as well as for Radio work.

Price Complete £4.15.0

PHILIPS DUAL BATTERY CHARGER TYPE 1009

For H.T. Accumulators and L.T. Accumulators.
Charges any number of H.T. cells up to 60 (i.e. 120 volts).
Charging current varies between 60 and 90 m/a.
Charges 1-6 cells of L.T. accumulators at 1.3 amps.

Price Complete £5.10.0

PHILIPS

for Radio

ADVT. OF PHILIPS LAMPS LTD., RADIO DEPT., PHILIPS HOUSE, 145, CHARING CROSS RD., LONDON, W.C.2
AVK.

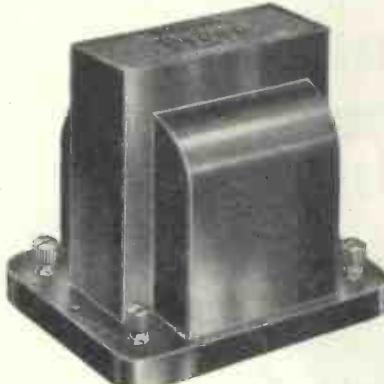
Speedy replies result from mentioning "Wireless Magazine"

Novelties & New Apparatus Tested

BROWN TRANSFORMER

THE remarks made in these columns previously on the development of low-frequency transformers apply particularly to the new Brown instrument, which is exceptional in its theoretical qualities and entirely convincing in practice.

The winding of this instrument is



Brown low-frequency transformer

placed in four sections, the primary being on top of the secondary. The ends of the windings are taken out to four terminals mounted at the corners of a brown rectangular moulded base measuring 3 in. by 4 in. by 2½ in., which also forms part of a moulding enclosing the windings and core.

One of the chief features of this transformer is the design of the iron core, which comprises an almost extravagant quantity of high-permeability steel. This, together with a well-proportioned primary winding, gives the astounding primary inductance of over 200 henries with no polarising current, while a current of 4 or 5 milliamperes can be passed through the primary without reducing the value of inductance unduly.

The step-up ratio is 3:1, yet despite the enormous inductance possessed by the primary and secondary windings, such factors as the leakage inductance have been so proportioned that the characteristic remains approximately straight up to frequencies of 5,000 cycles.

Naturally such an instrument is not cheap, but at a price of 30/- it represents, in our opinion, good value for money. The makers are S. G. Brown, Ltd., of North Acton, W.3.

B.T.H. VALVES

B.T.H. valves are too well known to need any introduction; a short time ago this company brought out a new series of valves having nickel filaments. The use of nickel permits a longer filament to be employed with consequent greater emission, and the new type are a great advance over the old-fashioned valves of one or two years ago.

**Tested by J. H. Reyner,
B.Sc., A.M.I.E.E., at the
Furzehill Laboratories**

We have recently tested a range of two-volt valves, which readers will see have thoroughly up-to-date characteristics.

In the first place we have the RC210, a valve with an amplification factor of approximately 50 and an A.C. resistance of 180,000 ohms. This is useful as a first stage resistance-coupled valve in low-frequency amplifiers or for resistance coupling in high-frequency amplifiers.

The HF210 is particularly suitable for use in transformer-coupled H.F. circuits or as a detector valve followed by a fairly high-impedance primary transformer. The amplification factor here is approximately 20 with an A.C. resistance of 28,000.

The third of the series is the GP210, an excellent valve of its type, with an amplification factor of 13 and a resistance of 14,000. As an anode-bend rectifier or a first-stage low-frequency valve, this is excellent.

We then have a 215LF whose power-capacity characteristics are far in excess of the old type low-frequency valves and which is thus eminently suitable for use in the stage preceding the final power valve; for small power outputs it may be employed in the last stage. It has an amplification factor here of approximately 6 with a resistance of 7,000 ohms.

Finally, we have one of the most important valves in the series, namely the P227, which, as its nomenclature suggests, is a power valve. With an amplification of 4 and an impedance of 2,700, the excellence of the valve will be realised; it is particularly suitable for handling large grid swings of the order of 12 to 14 volts at 120 volts H.T. and at the same time giving a good amplification.

In spite of its excellent characteristics and performance, the filament consumption is only .27 at 2 volts, which is

It matters not whether your knotty problem is a theoretical or a practical one—in either case the Technical Staff of the "Wireless Magazine" is ever ready to help you out of the difficulty. Just write your query out on one side of a sheet of paper (this small point saves us time and enables us to send an answer quicker) and send it with the coupon on page iii of the cover, a stamped addressed envelope and a fee of 1s. (postal order, not stamps) to : Information Bureau, "Wireless Magazine," 58/61 Fetter Lane, E.C.4.

decidedly economical for such a valve.

We have on many occasions tested these valves out in most up-to-date receiving sets and can testify to their efficiency and economy; the large variety of types in the two-volt range enables the optimum one to be picked for a given stage, and this adds considerably to the overall results.

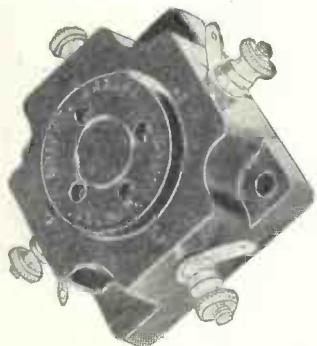
The makers are the British Thomson-Houston, Ltd., of Crown House, Aldwych, W.C.2.

MARCONIPHONE VALVE HOLDER

THE perfect antimicrophonic valve holder would be mounted on some elastic medium having insufficient density to cause much resistance to motion. It is possible partially to obtain the right effect by mounting the holder on springs; but these cause a considerable rebound, particularly if they are stiff and have a high degree of elasticity.

Rubber, although perishable, is a more suitable material for use with valve holders because it absorbs shock with less rebound, and this material has been successfully employed in the new Marconi-phone valve holder.

The inner portion of this holder carrying the valve sockets is supported by



Marconiphone antimicrophonic valve holder

four rubber buffers attached to an outer insulated moulding. In this manner ample support is afforded to the valve in the socket, but internal shock is well damped out with little tendency for rebound to occur. Four terminals project sideways and are fitted with soldering tags.

The connections are soldered from the sockets and are clamped to the terminals. Two holes are provided for screwing the component down to the baseboard.

We found that a normal type of valve fitted readily into the holder and was exceptionally well insulated from external vibration. The address of the Marconi-phone Co., Ltd., is 210-212 Tottenham Court Road, W.1.

(Continued on page 392)

You could ask for no more in a Portable!

There are so many makes to choose from these days that the question of choice is no easy matter. But there are several outstanding features in the PEERLESS Portable Five that place it easily at the head of the great portable "army." Its one tuning control makes operation effortless and simplicity itself. Given average conditions you can receive at full Loud-speaker strength.

And the Speaker—a Cone Model giving you volume and purity of tone with amazing fidelity. Absolutely self-contained with unspillable accumulator, the PEERLESS Portable Five is obtainable in solid hide or rexine travelling case. When you have seen and heard it you will agree with us when we say that you could ask for no more in a portable. Full particulars from the address below.

PEERLESS Portable 5

Rexine - covered model, price 15 gns. cash, or 28/6 down and 12 monthly payments of 28/6 to complete purchase.

15 GNS.
INCLUDING ROYALTY

Solid Hide-covered model, 16 gns. cash, or 32/6 down and 12 monthly payments of 32/6 to complete purchase.

The Bedford Electrical & Radio Co., Ltd.,
22 Campbell Rd., BEDFORD



NOW READY

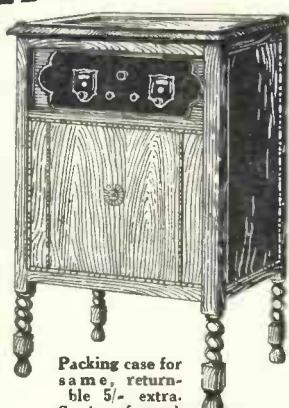
—AND IN STOCK

A really practical and common-sense cabinet with turned legs and beautifully finished for the COSSOR MELODY MAKER—a really handsome piece of furniture needing nothing more than to just drop your set inside it, with ample space for batteries and accessories. Fitted with hinged lid and detachable front and back in solid Oak and French Polished.

Price each £3 5s.

PORTABLE CABINETS.

A special line of portable cabinets covered in Leatherette. Various Colours. Each 30/- Finished in Oak or Walnut, Hand Polished. Each 35/- Carriage on one 3/-; or two 4/6 extra.



For the Best in Radio

WILL DAY LTD.

(THE BEST IN THE WEST)
19 LITTLE STREET, LEICESTER SQUARE, LONDON, W.C.2.
Telephone: (2 lines) Regent 0921 and 0922
Telegrams: Titles, Westland, London

You will get prompt replies by mentioning "Wireless Magazine."

WEARITE COMPONENTS

ARCADIAN PORTABLE

as described in "Amateur Wireless" for March 23rd, 1929

Coils	10/6
Screen	9/6
H.F. Chokes (Standard)	6/6
Push-pull Switch, G22	1/-
Valve Holder, LAS5	2/6
Grid Leak Clips	1/6
Coil Formers	7/6

H.F. Choke for Wayfarer Portable (iron core)	6/6
--	-----

Anti-capacity Switch, 2-way	6/-
Wave Change Switch (with terminal)	1/6

Dual Range Tuner, WG2, as used in Ferranti Circuits	15/-
---	------

WRIGHT & WEIRE, LTD.
740, High Road, TOTTENHAM N.17
TELEPHONES: TOTTENHAM 3847-3848.

Novelties and New Apparatus Tested (Continued)



This is the Duplex Clarostat resistance
CLAROSTAT RESISTANCE

THE Clarostat is probably well known to readers as a reliable variable resistance capable of handling reasonably high anode current without overheating.

A novel type known as the Duplex Clarostat, manufactured by the American Mechanical Laboratories, has been submitted for test by Claude Lyons, Ltd., of 76 Old Hall Street, Liverpool.

Essentially, this component consists of two Clarostats in one metal case having one common terminal. The resistance of each part, which extends from 220 ohms to 500,000 ohms, may be varied separately by rotating a screw with the aid of a screw-driver.

The adaptations such a component of are many.

Rated at 10 watts, the component should be capable of dropping 100 volts at 100 milliamperes. This rating is too optimistic as our tests indicated that, with heavy currents of this order, the instrument becomes unduly hot. We found, however, that a drop of 100 volts at 50 milliamperes is within its capacity, and such values are rarely exceeded in practice.

COSSOR TRANSFORMER

THE factors which decide the performance of a low-frequency transformer have been investigated with such thoroughness that we are now able to revise our ideas on the design of such instruments.

Up to comparatively recently the number of turns on the primary was considered of paramount importance, but the recent discovery of a new iron having greatly increased permeability has not only allowed designers to decrease the extent of the winding, but has, in consequence, reduced such harmful effects as self-capacity.

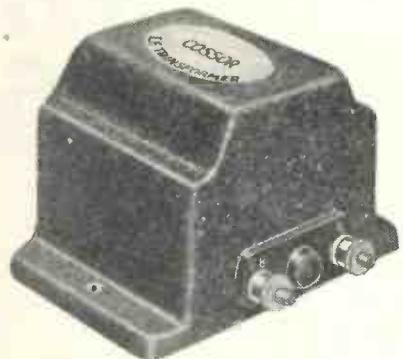
The new Cossor low-frequency transformer embodies the improvements referred to above.

An examination of the interior of the components reveals that the primary winding is placed on a central bobbin, between two secondary bobbins, this

serving to minimise the secondary capacity, whilst obtaining a high coupling factor. A special high-permeability steel is used for the core, thereby enabling a high inductance to be obtained.

Our tests on this instrument revealed that the primary inductance was approximately 60 henries with no D.C. current flowing through the winding. This is a high figure considered in conjunction with a 3-1 step-up ratio. The reproduction, as might be expected, is decidedly pleasing.

At a price of 21s., it represents good value. The makers are A. C. Cossor, Lt., of Highbury Grove, N.



Cossor low-frequency transformer

RESISTON
PANELS

are used in many
of the
Portable Sets
described in this issue

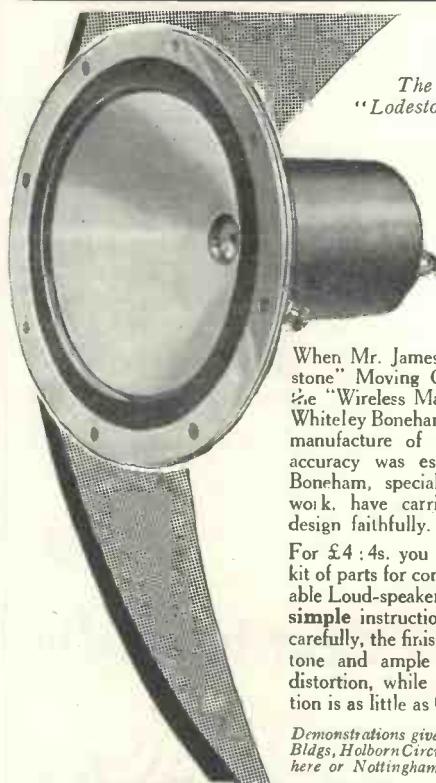
THE reason is not difficult to find. Such a beautiful Panel could not fail to enhance the appearance of any Set. A Panel with such qualities as Resiston has—perfect insulation, great strength, permanent colour, low dielectric constant—could not fail to increase the efficiency of any Set. Use Resiston in your Set—your Wireless Dealer stocks it.

FREE! A Helpful Book!

"The Panel Makes all the Difference" is a little book you should read before you choose the panel for your next Set. Send for a copy to Dept. W.M., American Hard Rubber Co. Ltd., 13a Fore Street, E.C.2

Choose "RESISTON"
for your next Set!

CA 8513



The
"Lodestone"

Made to
**Mr. W.
JAMES'S
Specification**

When Mr. James designed the "Lodestone" Moving Coil Loud-speaker for the "Wireless Magazine," he entrusted Whiteley Boneham & Co., Ltd. with the manufacture of the parts. Absolute accuracy was essential and Whiteley Boneham, specialists in Loud-speaker work, have carried out Mr. James's design faithfully.

For £4 : 4s. you can buy the complete kit of parts for constructing this remarkable Loud-speaker and if the extremely simple instructions given are followed carefully, the finished speaker gives pure tone and ample volume without any distortion, while the current consumption is as little as 0.5 amp.

Demonstrations given daily at 21 Bartlett's Bldgs, Holborn Circus, E.C.1. Literature from here or Nottingham Rd., Mansfield, Notts.

WHITELEY BONEHAM & Co. Ltd.,
Nottingham Road, Mansfield, Notts.

NORTHERN RADIO CO.

WE CAN SUPPLY:—

	£ s. d.
THE SIGNAL BOOSTER	£3 10 0
ECONOMY S.G. FOUR	£6 10 0
CLIPPER TWO (with Accessories)	£7 10 0
THE TITAN THREE	£4 15 0
KILOMAG FOUR	£12 10 0
DOMINIONS FOUR	£12 10 0
THE BINOWAVE FOUR	£12 10 0

Further details of the above sets can be forwarded on application. All sets are wired up, aerial tested, and guaranteed. Marconi Royalties included in price in all cases.

We undertake to wire up free of charge any set published in the radio press if parts bought from us.

CABINETS

We can supply the following hand-made Cabinets, superfine quality, in Oak. All 10-in. Baseboards (included):

TITAN THREE, 17/6. DOMINIONS ADAPTOR, 15/- CLARION THREE, 17/6. DOMINIONS FOUR, 22/6 SCREENED-GRID FOUR, 20/-. TWINFLEX, 20/- Mahogany, 5/- extra.

THE FIVE-POUNDER FOUR

Good quality components. Received 24 stations on L.S. Covers both wavebands. Price, including Royalties, carriage paid £5 10 0

EBOONITE

Superfine Ebonite, highly polished one side, the other side matt.

7 by 14	6/-	8 by 12	6/-
7 by 18	7/6	8 by 16	7/6
7 by 21	9/-	8 by 20	9/6

THE AT HOME THREE

Components as specified

£5 16 1

Accessories

5 1 0

£10 17 1

THE CLARION THREE

A "Star" set. Thirty-one stations on loud-speaker. No tiresome coil-changing

£6 0 0

THE WAYFARER PORTABLE

A really efficient portable at last. Exceptional performance. Completely built up, ready to listen in

£15 0 0

Valves, as specified

£3 9 4

DOMINIONS FOUR ADAPTOR

£4 0 0

Short-wave Coils, 15 130 metres

£2 12 6

Extra Broadcast Coil

£0 16 6

THE TWIN FLEX

A really powerful two-valver

£5 0 0

NORTHERN RADIO CO. Temple Row, WREXHAM.

Advertisers take more interest when you mention "Wireless Magazine"

IN ALL THE LEADING PORTABLES

Since the makers of practically all the leading portable sets supply Exide Unspillable Batteries as standard, and since the designers of that fine set for home constructors—the Mullard Master Five Portable—specify Exide Unspillable Batteries, is it not obvious that these famous batteries must possess qualities which place them far and away ahead of all other unspillable batteries?

Exide

THE LONG LIFE BATTERY THE UNSPILLABLE SERIES



The Battery specified for the Mullard Master 5 Portable. Exide Battery, Type USP7. Price 14/6

For suitcase type receivers use one of the WP series as the plates are fully immersed in both carrying and operating positions.

You can now buy Exide Trickle Chargers at these new reduced prices:—For H.T.—£3 : 7 : 6. For L.T.—£2 : 4 : 0. For H.T. and L.T.—£5 : 0 : 0.

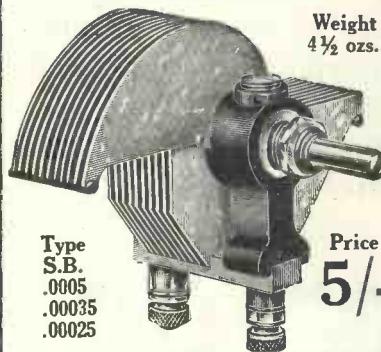
Obtainable from Exide Service Agents and all reputable dealers.

EXIDE BATTERIES, CLIFTON JUNCTION, NR. MANCHESTER.
London Sales & Service Depot—215-229, Shaftesbury Avenue, W.C.2

PORTABILITY

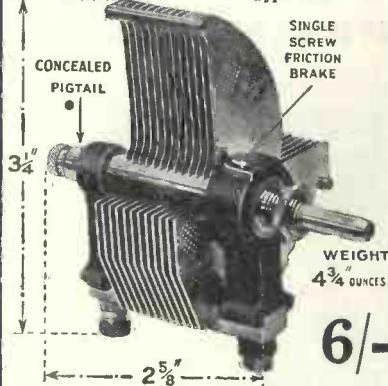


Make
**THE SMALLEST
 LIGHTEST and most
 EFFICIENT
 CONDENSERS**



Above also made TWIN and TRIPLE GANG.

"DE LUXE" model
 Type DB.



**FORMO-
 DENSOR**



Ref. Max. to Min. Price. Ref. Max. to Min. Price.
 F .0001 .0000075 2/- G .001 .0002 2/-
 J .0003 .000025 2/- H .002 .001 3/-

**ANTI-MICRO
 PHONIC
 VALVE
 HOLDER**
 First Grade
 BAKELITE
 Price 1/3

CROWN WORKS, CRICKLEWOOD
 LANE, LONDON, N.W.2.

Getting the Best from a Portable

(Cont. from
 page 319)

set. To do this (in the case of a two-dial set) very slowly turn one dial right round, at the same time sweeping the other dial backwards and forwards at a slightly faster pace.

In a well-designed set both dial readings will be approximately the same for a particular wavelength and this makes tuning easier to carry out in practice than it is to describe. The idea is to keep both dials "in step," as it were.

As soon as a signal is picked up, readjust the "reaction" or "volume" control for the best results.

Calibrations for Sets

Tuning will be very much simpler than this, however, if the set is supplied already calibrated, that is, with a list of the proper dial readings for each wavelength. If the set is not calibrated, start making a list of dial readings at once. Unless a station changes its wavelength, it will always come in at the same dial readings.

There will be no other adjustments to make with the majority of

receivers, except to change the high-tension batteries at intervals (anything from three to nine months, according to the type of set and the amount it is used) and have the accumulator charged.

Accumulator Recharging

If the set is used a great deal, the accumulator may need charging as often as once a fortnight and in this case it is a good plan to buy a spare, so that one is always ready for use while the other is being recharged (a process that may take from twelve to forty-eight hours).

In these notes I have attempted to put the novice on the right track for getting the best results from a modern portable. It is, of course, impossible to cover every point in the space available, but I shall be glad to help readers, in a subsequent article, if they will send me a post card detailing their difficulties.

One final tip: Don't forget to switch off when you have finished listening!

The Clipper Two

An Appreciation from
 Leicester

LAST month we devoted considerable space to the description of a simple all-wave two-valver called the Clipper. There is every indication that this set will be popular amongst WIRELESS MAGAZINE readers, and we are glad to publish the following comments from a Leicester reader:

"I have built the Clipper Two as described in the WIRELESS MAGAZINE for April. May I just say that out of the many sets I have constructed there is not one to equal it for either range or volume as a two-valver set."

"This set, as a two-valver, in my opinion is unbeatable."

Full-size blueprints of the Clipper are available for 1s. each, post free (ask for No. W.M.135), and back copies of the "W.M." containing full constructional details can be obtained for 1s. 3d. each, post free.

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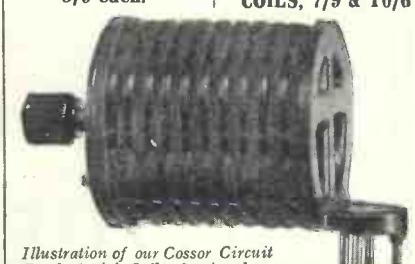


Illustration of our Cossor Circuit
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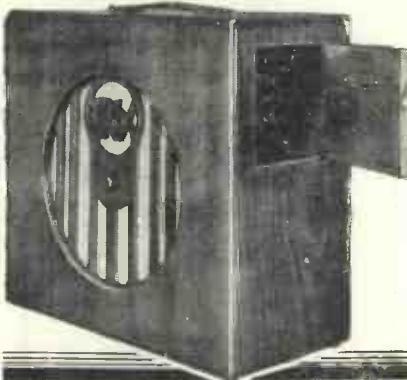
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Reaction— A Mixed Business!

FASHION in radio technicalities has brought about almost a natural death of the straightforward reaction arrangement utilising a moving coil and no by-pass condenser.

At present no set is thought modern unless it has either reaction of the Reinartz type or else a by-pass condenser to prevent H.F. currents passing through the primary of the L.F. transformer, or through the anode resistance if an R.C. stage follows the detector.

Reinartz Circuit

The Reinartz arrangement gives other advantages than smooth reaction, as is well known, but the chief reason for its claim to popularity is that the anode circuit is, in effect, split. One path leads through the reaction condenser and winding. This is for the H.F. currents. The other leads through an H.F. choke, which should effectively prevent the passage of the radio-frequency currents, to the load in the plate circuit. Thus, if the H.F. choke is efficient, there is no mingling of the H.F. and L.F. components.

How does this affect you, you may ask. Well, if you have an old-fashioned type of set which is not so satisfactory on the distant stations as you would like, and the trouble is traced to faulty reaction or difficult reaction control, you can most probably effect a cure by altering the reaction arrangements.

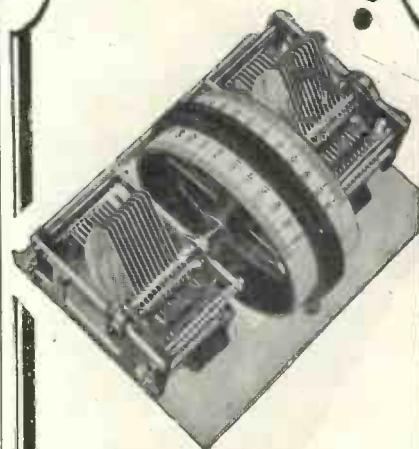
Retaining the Moving Coil

If you still want to retain the moving-coil arrangement, an H.F. choke should be placed in series with the reaction winding (in the lead *not* connected to the valve anode), and a by-pass condenser should be placed between the junction point of reaction winding and choke, and earth. This condenser may have a value of about .001 microfarad.

If it is smaller than this it will not satisfactorily by-pass all H.F. currents, while if larger it may have some effect on the L.F. component and may change the tone of signals.

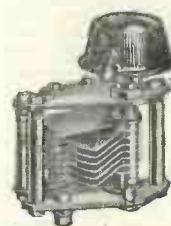
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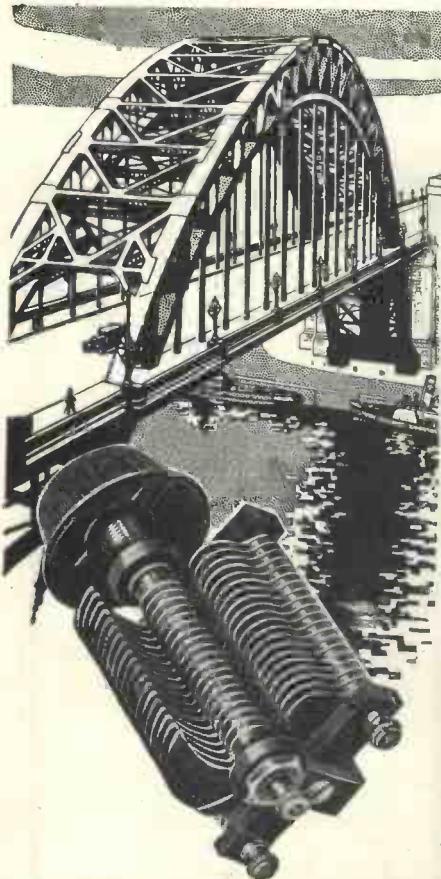
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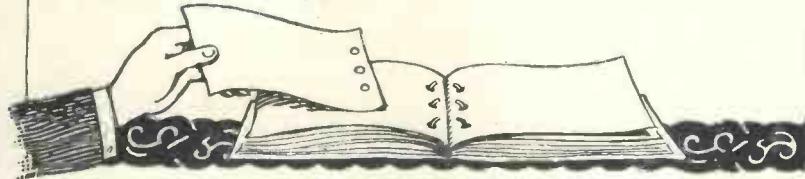


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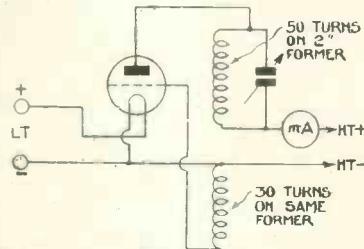
Month by month these sheets can be cut out and filed—either in a loose-leaf folder or on cards—for reference. The sequence of filing is

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. 121

Oscillating Valve Tester



Circuit of tester

A SIMPLE form of valve emission tester was given in Sheet No. 3. This involved an arrangement whereby the actual anode current of the valve was measured, and this, by comparison with the characteristic curves published by the makers, indicated whether the valve is giving its correct emission or not.

This, however, is not always convenient, for the particular characteristic curve may not be available and it may thus be difficult to say whether the valve is up to standard or not. Moreover, the arrangement is one requiring a

multi-range instrument, for the emission with zero grid volts with an RC valve is of the order of 1 or 2 milliamperes only, while with a super-power valve the emission may rise to as much as 30 milliamperes.

A somewhat simpler method of testing which does not involve a comparison of the emission with any published characteristics is to arrange the valve in an oscillating circuit. If the valve emission is satisfactory and the performance of the valve is up to standard, it will maintain oscillations in a suitable circuit irrespective of the type, that is, whether it is an RC valve or whether it is a power valve.

Such a tester is illustrated in the diagram. The anode circuit is tuned and the grid circuit contains a reaction coil so wound as to give good oscillation provided the valve is in working order.

A milliammeter in the anode circuit indicates whether the valve is functioning correctly. Although, in the non-oscillating condition, the emission may be quite small, if the valve is of a high internal resistance, yet due to the oscillations, the effective anode current rises considerably and, in practice, the milliammeter in the anode circuit will read from 10 to 20 milliamperes or more depending upon the high-tension voltage required when the circuit is in an oscillating condition.

WIRELESS MAGAZINE Reference Sheet

No. 122

Potentiometers

A POTENTIOMETER is a much used instrument in electrical practice. It is a device for dividing a voltage supply into two or more pre-arranged portions. If, for example, we have a supply at 200 volts and we wish to obtain 100 volts only, we can do this by connecting a potentiometer across the supply and taking off a tapping at a suitable point.

A potentiometer consists of a resistance connected across the supply as shown in the figure, a sub-voltage being taken from a tapping across a part of the resistance. If the tap is in the centre the voltage will be divided into two equal parts, so that the output voltage will be one half of the input.

In general, the voltage on the tapped portion will be obtained from the expression:

$$V_{out} = \frac{R_2}{R_1 + R_2} V_{in}$$

This simple expression only applies as long as the current taken from the tapped portion is negligible compared with the current taken by the potentiometer itself. This may be stated in another way by saying that the resistance R_2 connected across the output portion, as indicated by the dotted lines, must be large compared with the potentiometer resistance R_1 .

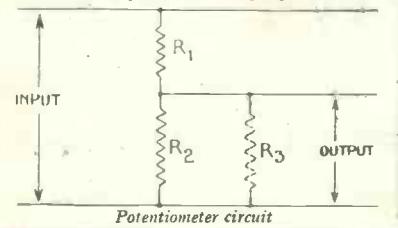
Otherwise the potentiometer must be con-

sidered as being made up of R_1 in series with R_2 and R_3 in parallel, which will give quite a different relationship.

For example, assume a potentiometer of 300 ohms resistance, centre tapped, so that $R_1 = R_2 = 100$ ohms. If load resistance R_3 also equals 100 ohms, the effective resistance of R_3 and R_1 is only 50 ohms so that the potentiometer becomes a 3:1 tapping instead of a 2:1 device.

The expression for the effective voltage developed where the load resistance is appreciable is as follows:

$$V_{out} = \frac{R_2 R_3}{R_1 (R_2 + R_3) + R_2 R_3} V_{in}$$



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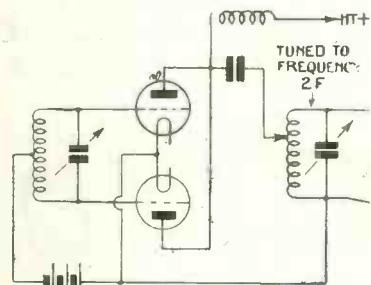
Frequency Doubler

IT is often useful for short-wave work to be able to double the frequency of an oscillation. For example, it may be more practicable to generate oscillations at a relatively low frequency and to double them in successive stages, amplifying at each stage until the required frequency is obtained. This method is particularly useful at very high frequencies corresponding to wavelengths of 5 or 10 metres.

A simple form of frequency doubler is shown in the diagram. It will be seen to consist of two valves in a push-pull arrangement, these being adjusted to act as anode-bend rectifiers. The positive half cycle passes through one valve while the negative half cycle passes through the other valve.

Each impulse is passed through to the anode circuit which is tuned to twice the frequency and as the impulses occur every half cycle, they are therefore at double the frequency of the fundamental, thereby corresponding to the tune of the anode circuit.

The arrangement is shown having an anode tap in the usual way so that the optimum condition may be obtained. The anode tap is adjusted until maximum current is obtained,



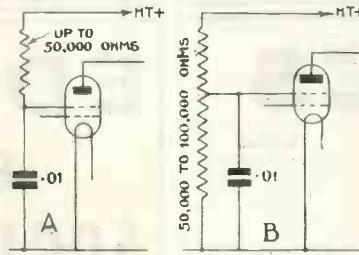
Circuit of frequency doubler

this being the case when the external and internal impedances in the anode circuit are matched.

High-tension supply is obtained through a suitable H.F. choke, the high-frequency oscillations being by-passed through a blocking condenser on the tuned-anode arrangement.

Screening-grid Control

A METHOD of obtaining the necessary control of the screen voltage in modern H.F. valve circuits is to supply the screen with high-tension from the full H.T. tapping through a fixed or variable resistance. This method avoids the necessity of taking a separate tapping for the screen voltage and under some conditions gives a semi-automatic regulation of the screen voltage to the correct operating value.



Arrangements for obtaining screening-grid control

The method, however, is only strictly applicable to valves of the same make and only then on the assumption that the characteristics are tolerably uniform. Where a receiver is designed for use with any make of valve, it is preferable to utilize a potentiometer arrangement as indicated in figure (b).

Here the voltage from the H.T. supply is connected across the full potentiometer and a certain portion thereof is tapped off to apply voltage to the screen. Such an arrangement is much less dependent upon the current actually taken by the screening-grid so that the system is one which can be employed universally.

It is necessary in all cases to provide a ready path for any high-frequency currents from the screen to earth. This must be done by connecting a low resistance condenser to the filament circuit as is indicated in the two diagrams. This condenser should preferably be fairly large and should have a mica dielectric.

A value of .01 microfarad is sufficient for practical purposes and such a value is, in general, to be preferred to the use of a larger value of paper condenser as the mica condenser will have lower losses at high frequencies.

Differential Condenser

THE necessity for adequate by-passing of the high-frequency currents in a detector circuit is often not appreciated. This point has been dealt with to some extent in Sheet No. 80, where the necessity for using a by-pass condenser when magnetic reaction was used was noted.

The majority of circuits to-day employ capacity-controlled reaction systems similar to that shown in figure (a). The reaction condenser, however, is often made small and towards the bottom of the wavelength range, little or no condenser is required in order to produce the necessary reaction effect.

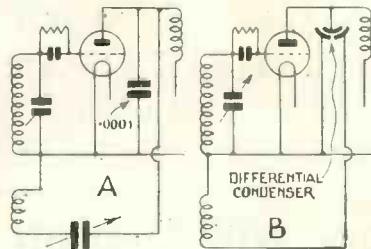
In such circumstances, the high-frequency currents in the detector stage have no ready path to earth and must force themselves into the L.F. stages. In such cases, a fixed .0001-microfarad condenser should be connected from the anode of the detector to L.T.—as illustrated in the figure.

This will not be found to affect the reaction seriously and will increase the smoothness of operation of the whole circuit and the quality of reproduction.

An alternative method is to use a differential condenser having two sets of plates. The capac-

ity of one set increases while the other decreases. This arrangement is connected in circuit as shown in figure (b), one set of plates serving for reaction control and the other for by-passing the H.F.

Where the reaction condenser is small the by-pass condenser is large and vice-versa, the total by-passing action being thus maintained constant.



Use of differential condenser

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What Are Alternating Currents? (Con. from page 331)

frequencies as high as one thousand million, an almost incredibly rapid rate." Megohm paused. "Then," he queried, "is that the only alternating current we have in the set?"

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"Then do you separate these two out?"

"Yes, when we come to the detector stage. We may amplify the original high-frequency currents first if you like, but then we pass them through a detector which separates the high-frequency currents themselves from the low-frequency modulations and then we amplify these low-frequency currents until they are strong enough to work a loud-speaker."

"Then, altogether, we have four types of current flowing in a wireless receiver?"

"Yes," agreed the lad. "'S marvellous, ain't it?"

EIVISON & PAYNE

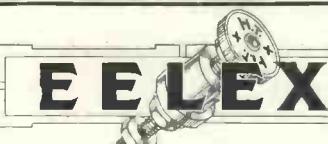
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