

TWO MORE GIFTS FOR READERS

Popular Wireless

Every Thursday
PRICE
3d.

No. 528. Vol. XXII.

INCORPORATING "WIRELESS"

September 24th, 1932

THESE TWO BLUE PRINTS

FREE INSIDE

The "SPACE BREAKER"

The "L.G. TWO"

Also Featured:
 Problems of Selectivity
 Kit Criticisms
 What to see at the MANCHESTER EXHIBITION
 Etc., etc., etc.

READY RADIO

1'- Book of NEW Circuits—FREE!

See special offer on page 89.

ADVT.

Take
your
choice
from
the
world's
best



Different listeners have different requirements—and the Blue Spot range of Loudspeaker Units and Cabinet Speakers has been planned to suit every requirement and every purse.

1 66K

the world-famous unit improved and brought up-to-date. Clear, pure, undistorted reproduction with every word and note true to life - - - 15/-

66KC—the 66K unit mounted to a suitable chassis - - - 19/9

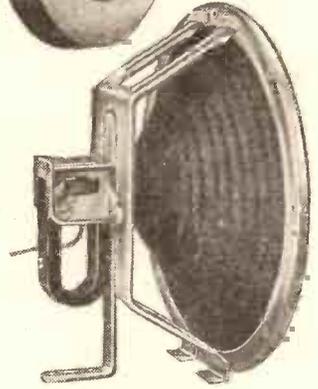
31K—the 66R unit in a specially designed cabinet of oak - - - 31/6



2 100U

the loudspeaker that gives a performance equal to a good moving coil speaker. Both bass and treble notes perfectly reproduced. Normal and Pentode valves — no matching transformer required. Sensitive even to very small inputs. Can be used for battery or electric sets. Complete mounted to chassis - - - Now 32/6

100D—100U unit in a very special oak cabinet - - - Now 52/6



3 66R

the unit that gives tremendous volume without distortion or any signs of distress. Every sound and syllable exactly as the original - - - 35/-

44R—the 66R unit in an oak cabinet of unusual design - - - 52/6

45R—66R unit in a well-made oak cabinet of attractive shape - - - 52/6

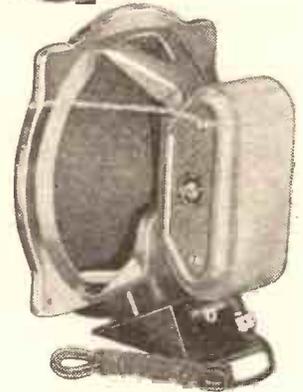


4 99PM

the greatest moving coil speaker ever manufactured. Special magnet forged from highest grade magnet steel giving POWERFUL and PERMANENT energy. Exceptionally high magnetic energy in air gap—1,320,000 ergs. Dust proof plates. Cadmium plated pole pieces. Specially designed cone. The most perfect reproduction wireless has ever known. 59/6

75PM. Last season's Permanent Magnet repeated "by demand" - - - 75/-

32PM—99PM speaker in a cabinet of superfine walnut—a quality cabinet for a quality speaker 87/6



BRITISH MADE

EACH ONE THE LEADER OF ITS CLASS!

For Units write for Catalogue P.W.51.U.
For Cabinet Speakers write for Catalogue P.W.51.S.

THE BRITISH BLUE SPOT COMPANY LTD

BLUE SPOT HOUSE · 94/96 ROSOMAN ST., · ROSEBERY AVENUE, LONDON, E.C.1
Telephone: Clerkenwell 3570. Telegrams: "Bluspot, Isling, London."

Distributors for Northern England, Scotland and Wales: H. C. RAWSON Sheffield and London, Ltd., 100, London Road, Sheffield; 22, St. Mary's Parsonage, Manchester; 44-46, High Bridge, Newcastle; 37-38-39, Clyde Place, Glasgow.

FERRANTI

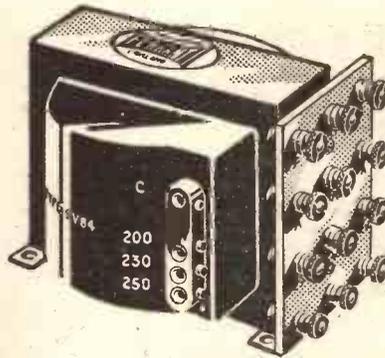
1882 —
1932

There is
fifty years'
experience
behind every
Ferranti Mains
Transformer.

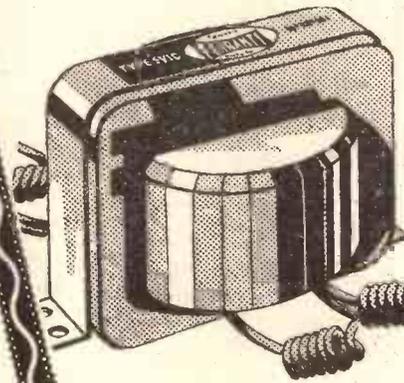
Where else can
such experience
be found?



TYPE EM6



TYPE SV 84



TYPE SV 10

Write for leaflet
W. 522/1 which
gives full details
of all models.

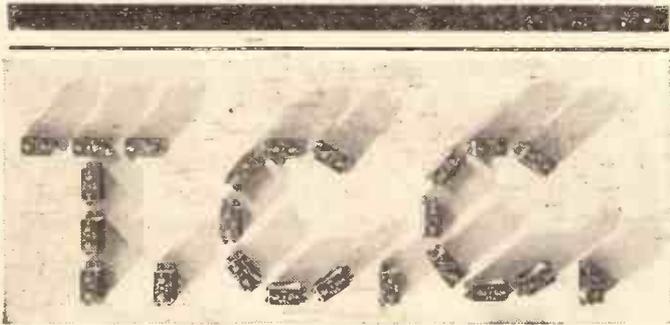
Available for 200/250 volts 40/100 cycle supplies.
Voltage regulation 5% from full to $\frac{1}{2}$ load.
Insulation Resistance not less than 200 megohms
Pressure Tested at 2000 volts A.C.
Non-Hygroscopic Insulation—does not absorb
moisture. Earth shield between windings
Arrangement of windings reduces external
magnetic field (which produces hum) to minimum.
Liberal rating giving temperature rise far below
that dangerous to insulation.
Rigorously Tested under actual load conditions.

- TYPE EV 4.**—For use with the full-wave Rectifying Valve, Marconi-Osram type U 10, Mullard type DW 2, or Cossor type 506 BU, to give a D.C. output when smoothed 25/- of 250 volts 60 milliamps. Price
- TYPE EV 5.**—For use with the full-wave Rectifying Valve, Marconi-Osram type U 12, Mullard type DW 3, or Cossor 442 BU, to give a D.C. output when smoothed 27/6 of 200 volts 115 milliamps. Price
- TYPE SV 4.**—H.T. and L.T. Transformer. For use with U 10 or DW 2 valve. Output 240 volts 35 milliamps, 4 volts 1 amp. for Rectifier, 4 volts 2 amps for Indirectly-Heated Valves, and 6 volts $\frac{1}{2}$ amp. for Output Valve. Price 27/6
- TYPE SV 10.**—For use with large Power Amplifiers using U 14 Rectifier. Output : H.T., 400 volts 120 milliamps; L.T., 4 volts 2.5 amps. for Rectifier, 5.25 volts 1.6 amps. for 2 LB 5a's, and 4 volts 3 amps. for Indirectly-Heated Valves. Price 90/-
- TYPE SV 13.**—For use with the full-wave Rectifying Valve, Marconi or Osram type U 12, to give a D.C. H.T. output of 330 volts 120 milliamps, 4 volts 2 $\frac{1}{2}$ amps. for filament of Rectifier, 4 volts 6 amps. for Indirectly-Heated Valves. Two 4 volt 1 amp. windings for two separately biased P.14 Push-Pull Output Valves. Price 87/6
- TYPE SV 14.**—For use with two full-wave Rectifying Valves, Marconi or Osram type U 14, to give a D.C. H.T. output of 440 volts 160 milliamps, one winding giving 4 volts 5 amps. for filaments of two Rectifiers, one winding giving 4 volts 6 amps. for Indirectly-Heated Valves. Two 4 volt 2 amp. windings for feeding the filaments of two Push-Pull separately biased PPS/400 Output Valves. Price 98/6
- TYPE SV 84.**—H.T. and L.T. Transformers. For use with U 12 valve. Output : 250 volts 70 milliamps, 4 volts 2.5 amps. for Rectifier, 4 volts 5 amps A.C., and 4 volts 1 amp A.C. L.T. windings, centre tapped. Price 36/-
- TYPE EM 3.**—For use with Westinghouse Metal Rectifiers, types HT 5 or HT 7, to give various D.C. outputs up to 200 volts 28 milliamps to the Rectifier used. Price 22/6
- TYPE EM 6.**—For use with Westinghouse HT 8 Metal Rectifiers, D.C. output 250 volts 60 milliamps. Price 22/6
- TYPE SM 2.**—For use with Westinghouse Rectifiers types HT 5 and HT 7, and also providing 4 volts 6 amps A.C. Price 26/-
- TYPE SM 34.**—For use with Westinghouse Rectifier, type HT 8, also providing 4 volts 5 amps and 4 volts 1 amp. Price 30/-

Types SM 2, SM 34, and SV 84 Mains Transformers are specially suitable for use in connection with Super-Heterodyne Receivers.

FERRANTI

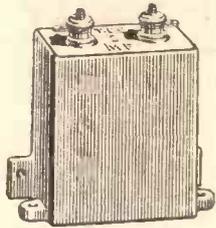
MAINS TRANSFORMERS



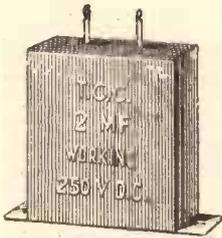
CONDENSERS OF REPUTE

WHAT THE INITIALS T.C.C. MEAN TO YOU

WHEN you see a condenser with the initials T.C.C. on it you see a condenser that is the result of 25 years specialized research—one that is built up of the finest materials procurable, by highly skilled workers. It is a condenser of unquestioned reliability—one in which radio technicians, set designers, experimenters and amateurs alike pin their faith. Be guided—use only T.C.C.



A 2 mfd. Non-Inductive T.C.C. Condenser. Price 3/10d. Made in capacities from .01 to 2 mfd. prices 1/10 to 3/10. Working voltage 200 D.C.



Here is a 2 mfd. T.C.C. Paper Condenser type 64 tested 500v. D.C. for working up to 250v. D.C. peak—in capacities from 0.1 to 10 mfd. Prices 1/10 to 14/-.

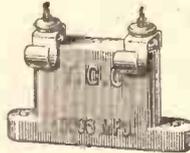


The latest T.C.C. production—a chassis mounting aqueous Electrolytic condenser. In capacities 8 mfd. 440 volts working, 9/-, 4 mfd. 440 volts working, 8/- and 7 mfd. 460 volts working, 9/-



The Upright Mica Condenser with grid leak clips. In capacities from .00005 to .25 mfd. Prices 1/6 to 18/- Working voltage 250 D.C.

Here is shown the T.C.C. type "M" Mica Condenser. Made in capacities from .00005 to .01. Prices 1/- to 2/3. Working voltage 250 D.C.



T.C.C. ALL-BRITISH CONDENSERS

The Telegraph Condenser Co., Ltd., Wales Farm Road, N. Acton, W.3.

A THIEF— a silent... sneaky thief



Valve deterioration is a slinking silent fellow creeping on you un-awares, robbing your wireless of its tone value, its clarity and even its selectivity. Valve deterioration robs you cunningly—just a little at a time, so little that you scarcely notice it until one day you realise that you are not hearing the wireless programmes as well, or as clearly, as you used to. The real enjoyment has—somehow—gone.

The fault is not in your set but in your valves. Twelve months work—or even less with some receivers—is as much as you should expect from your valves. After that efficiency is much lowered and running costs are much increased. A new set of ETA valves will restore the original purity and crispness of your reception. ETA valves will make your set as good as ever it was or even better. ETA valves give and maintain the highest possible standard of reproduction.

YOU NEED NEW VALVES
GOOD VALVES — ETA VALVES



ETA

PRICES FROM
5/6

THE INTERNATIONAL VALVE

SERVICE COUPON

To the ELECTRICAL TRADING ASSOCIATION LTD.,
Aldwych House, Aldwych, London, W.C.2.

A. Please let me know the correct type of ETA valves to replace my present valves which are as under

1..... 2..... 3..... 4..... 5.....
(Insert type letters and number)

B. Please advise me which ETA valves to use for the following receiver or circuit.

Specify Type No. and Name

Name.....

Address.....

P.W. 24/9/32.



Pick-ups.

2/6
DOWN

**DISTINCTIVE IMPROVEMENTS
KEEP HARLIE PICK-UPS
ALWAYS IN THE LEAD**

Other manufacturers have taken the Harlie as the model of perfection and have tried to make their quality and output the same as the Harlie, but Harlie Pick-Ups are always "a Season ahead" because the improvements are our own and not released until the Olympia Exhibition. Therefore, by our specialising we offer the finest Pick-up obtainable.

EXCLUSIVE HARLIE FEATURES.

1. The original Harlie knife edge bearing has been improved.
2. Free and highly sensitive stylus movements.
3. 35 per cent. of cobalt magnet.
4. Pole pieces of special high permeability alloy.
5. Spring counter-balance insures correct weight on record.
6. Ball-bearing base allows free swing over record.
7. Remarkable frequency response range giving uniform tone quality.
8. Unusual tone volume for reproduction from screen grid receivers.
9. Is triple tested for frequency output by the finest precision instruments.
10. Individually tested for tone accuracy.

The new Harlie Electric Pick-Ups will successfully deliver all the quality that the Engineer and Manufacturer built in the Radio Receiver, Amplifier and Speaker Unit.

2/6 Down, Further 2/6 in 7 days and 5 monthly payments of 5/- (Cash Price 27/6.) (Complete with Fixing and Connecting Instructions.)

**The New Harlie
Pick-up Booklet
TELLS HOW TO
BRING YOUR RE-
CORDS TO LIFE**

Tells you how to play records with superb realism and brilliant distinction through your Radio Set, with only a few minutes' alteration; how to eliminate needle-scratch; how to double the playing life of your records; how to obtain volume control. It tells you all about how a Pick-Up works, and much more besides. It is written in the simplest way so that you don't get a headache over technicalities, and is bang up-to-date.

Post coupon below for your **FREE** copy now.



**TONE
SELECTOR
and
SCRATCH
FILTER**

Definitely improves reproduction of radio or gramophone records—gives different tones—normal, brilliant, bright, mellow, deep. When used in conjunction with a gramophone pick-up it eliminates all needle scratch. Obtainable for 1/- and further 1/- in 7 days and 2 monthly payments of 1/6— (Cash Price 4/6.)

All Harlie Products are obtainable on our Hire Purchase scheme through our registered Dealers.

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**HARLIE LTD.,
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Please forward :

Free Booklet
De Luxe Pick-Up
Tone Selector

Cross out items not wanted

for which I enclose P.O. value (No stamps)

Name

Address

P.W.7

The Greatest PICTURE STAMP Collecting Scheme Ever Devised

STARTS THIS WEEK

EVERY BOY'S WORLD IN PICTURES

There will be 144 different picture stamps, each measuring $2\frac{1}{4}$ by $1\frac{1}{2}$ inches, and superbly produced in FULL COLOURS. They are divided into six sets, illustrating such thrilling subjects as ROUGH RIDERS, AEROPLANES, SHIPS, ENGINES, DOGS and the Art of SELF DEFENCE. Of course there is also an Album for the stamps, and this is also being given FREE. It is a SUPER ALBUM, priced at 6d., measuring 10 by 7 inches, and has been specially designed to hold the complete collection of 144 stamps.

First SIX STAMPS

IN FULL COLOURS

and SUPER ALBUM

FREE with MODERN BOY

ON SALE NEXT
SATURDAY, SEPT. 24th

2^D.

Your youngster must not miss this great Double Gift number of MODERN BOY. Make sure of his copy by asking the newsagent to save a copy for you. This picture stamp collecting scheme is going to be the latest craze. Don't be out of it, or your boy will miss all the fun and the finest collection of picture stamps ever presented with any boys' papers.

6 stamps will also be presented every week in both The RANGER and The MAGNET, commencing with the issues on sale SATURDAY, SEPTEMBER 24th.



The actual stamps are $2\frac{1}{4}$ by $1\frac{1}{2}$ ins. and are superbly produced in FULL COLOURS.

FOR EVERY SET — there's a PILOT AUTHOR KIT

CASH — C.O.D. — or H.P.

EVERYTHING RADIO CARRIAGE PAID TO YOUR DOOR

COSSOR MELODY MAKER. Model 335. Complete with valves, speaker, and cabinet. Cash Price, £7/17/6. Carriage Paid. Send **10/-** only. Balance in 11 monthly payments of 14/10.

RADIO FOR THE MILLION "STATION MASTER 3" (Model A.). With valves and cabinet. For battery use. Cash Price, £5/11/0. Carriage Paid. Send **10/2** only. Balance in 11 monthly payments of 10/2.

SLEKTUN SCOUT S.G.3.—S.G., Detector and Power. Pilot Author Kit "A" (less valves and cabinet). Cash or C.O.D. £4/8/6. Carriage Paid. Send **8/1** only. Balance in 11 monthly payments of 8/1.

EPOCH "20 C" PERMANENT MAGNET MOVING-COIL SPEAKER. (New Edition.) With 3-ratio input-transformer. Cash Price, £1/15/0. Carriage Paid. Send **6/6** only. Balance in 5 monthly payments of 6/6.

R & A "VICTOR" PERMANENT MAGNET MOVING-COIL SPEAKER DE LUXE. With 6-ratio input transformer and protecting grill. Cash Price, £3/10/0. Carriage Paid. With **6/5** order. Balance in 11 monthly payments of 6/5.

W.B. PERMANENT-MAGNET MOVING-COIL SPEAKER. Type PM4. Complete with transformer. Cash Price, £2/2/0. Carriage Paid. Send **5/9** only. Balance in 7 monthly payments of 5/9.

THIS YEAR'S WINNER

LISSÉN "SKYSCRAPER 3." Chassis model with (Lissen) S.G., Detector and Pentode valves. Cash Price, £4/9/6. Carriage Paid. Send **8/3** only. Balance in 11 monthly payments of 8/3.

BLUE SPOT SPEAKER UNIT AND CHASSIS. Type 100U. Cash Price £1/19/6. Carriage Paid. Send **5/5** only. Balance in 7 monthly payments of 5/5.

ATLAS ELIMINATOR. Type A.C.244. Three tappings, S.G., detector and power. Output: 120 volts at 20 m/a. Cash Price, £2/19/6. Carriage Paid. Send **5/6** only. Balance in 11 monthly payments of 5/6.

GARRARD INDUCTION GRAMOPHONE MOTOR. For A.C. Mains. Model 202. Mounted on 12-inch Nickel Motor Plate with fully automatic electric starting and stopping switch. Cash Price, £2/10/0. Carriage Paid. Send **4/7** only. Balance in 11 monthly payments of 4/7.

REGENTONE W.I.F. H.T. ELIMINATOR for A.C. Mains, tapped S.G. Detector and 120/150 v. at 12 m/a. Cash Price, £2/15/0. Carriage Paid. Send **5/1** only. Balance in 11 monthly payments of 5/1.

COLLARD INDUCTION MOTOR with PICK-UP. For A.C. mains. 12 in. turntable, moulded pick-up, automatic stop, and volume control. Cash Price, £4. Carriage Paid. Send **7/4** only. Balance in 11 monthly payments of 7/4.

SPACE BREAKER

Described this week.

KIT "A" Author's Kit of specified components including ready drilled panel and terminal mounts, but less cabinet and valves. CASH or C.O.D. **£5:8:3** Carriage Paid. Or 12 monthly payments of **9/11** Carriage Paid.

KIT "B" As Kit A, but WITH VALVES, less cabinet. CASH or C.O.D. Carriage Paid. **£7:17:0** Or 12 monthly payments of **14/5** Carriage Paid.

KIT "C" Complete Author's Kit, with valves, cabinet and ready drilled panel. CASH or C.O.D. Carriage Paid. **£8:12:0** Or 12 monthly payments of **15/9** Carriage Paid.

IMPORTANT. Parts, Kits, Miscellaneous Components, Finished Receivers, or Accessories for Cash, C.O.D., or H.P. on our own System of Easy Payments. Send us a list of your wants. We will quote you by return. C.O.D. orders value over 10/- sent carriage and post charges paid.

OLYMPUS FOUR

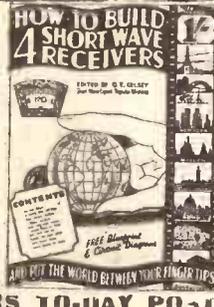
Kit "A" Author's Kit of specified components including ready drilled panel and terminal strips, but less valves and cabinet. CASH or C.O.D. Carr. Paid **£4:12:6** Or 12 monthly payments of 8/6. Carriage Paid.

THESE ARE THE PARTS THE AUTHOR USED

	£	s.	d.
1 Colvern 3-gang coil unit, as specified	1	8	6
1 Utility 3-gang .0005 mfd. condenser, type W.314/3	1	7	6
4 W.B. 4-pin valve holders	2	0	0
1 Watmel 10,000-ohm potentiometer	5	6	0
1 Ready Radio 3-point push-pull switch	1	6	0
4 Dubilier r-mfd. condensers, type Q200	8	0	0
1 Tolsen 2-mfd. fixed condenser	3	0	0
3 Dubilier type 665 fixed condensers (.0001, .0003, .0005)	1	6	0
2 Lissen 2-meg grid leaks with wire ends	2	0	0
4 Graham-Farish 1,000-ohm resistances	6	0	0
2 Colvern 50,000-ohm strip resistances	4	6	0
2 Dubilier 1-watt resistances (1) 20,000 ohm; (1) 100,000 ohm	2	0	0
1 Igranic H.F. choke	3	9	0
1 Tolsen 0005 differential condenser	2	6	0
1 Wearite 9 in. x 7 in. extension rod; 1 1/2 in. reducing connector 1 1/2 in.; and 1 bracket	1	0	0
1 Panel, 14 in. x 7 in., ready drilled	4	6	0
4 Bulgin terminals	1	0	0
2 Terminal strips, 3 in. x 1 1/2 in.	1	6	0
1 Baseboard, 14 in. x 10 in.	1	6	0
Wire, screws, flex, etc.	1	9	0
Kit "A", cash or C.O.D.	£5	8	3
4 Spec'ial Valves Cabinet	£2	8	9
	15	0	0

L.G. TWO

Kit "A" Author's Kit of specified components including ready drilled panel and terminal strips, but less valves and cabinet. CASH or C.O.D. Carr. Paid **£2:4:4** Or 8 monthly payments of 8/9. Carriage Paid.



PILOT RADIO ENVELOPE No. 3. Tells you how to build an amazing 5-valve super-het. Contains point-to-point wiring, assembling and operating instructions with full-size blueprint and photographs. **1/-**

HOW TO BUILD 4 SHORT WAVE SETS. Edited and written by T. C. Kelsey. The only book of its kind published devoted solely to building short-wave sets in the home. Amazingly fascinating. With full-size free blueprint. **1/-**

PILOT RADIO ENVELOPE No. 1. Buy this and build a sixty-station 3-valve battery set. Blueprint, photographs, and complete assembly and operating instructions in every envelope. **1/-**

IMMEDIATE DELIVERY FROM STOCK

PETO-SCOTT CO. LTD. 77, CITY ROAD, LONDON, E.C.1

Dear Sirs,—Please send me C.O.D./CASH/H.P. for which I enclose £ s. d. CASH/H.P. Deposit. Send me your **FREE 1933 Catalogue**

NAME
ADDRESS
P.W. 24/9/32

PILOT BAND-PASS UNIT

Whether your set is Mains or Battery operated, the **PILOT BAND-PASS UNIT** cuts out programme interference effectively and sharpens tuning to needle-point selectivity. It is simple to attach and can be operated by anyone without technical knowledge. No valves or extras required.

Instantly converts any Set to Band-pass Tuning. Needle-sharp Selectivity.

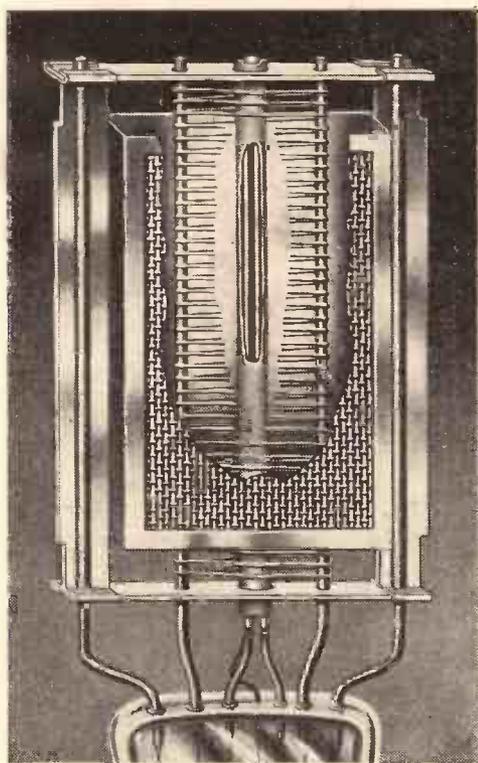


25/- CASH or C.O.D. Or 6 monthly payments of 4/6

Buy by Post — it's Quicker

CONSISTENCY

Below is an enlarged section of a Cossor A.C. Mains triode—the 4X M.H.L. The use of two Mica Bridges ensures life-long alignment of the elements. Note the "cut-away" view of the cathode, showing the heater wire in position.



The employment of Mica Bridge Mounting in Cossor Valves ensures microscopic accuracy in the assembly of the electrode system. As a result the characteristics of every valve are identical with those of the original design developed in the laboratory. Variation is impossible. The performance of each valve is therefore safeguarded—the Mica Bridge is a virtual guarantee of performance and reliability.

SPECIAL OFFER

Send for a free copy of one of the most comprehensive valve catalogues ever published. This, the Cossor 72-page Valve Catalogue, contains full technical data, characteristic curves, operating conditions etc., of all types of Cossor Valves. Please use the coupon.

To Messrs. A. C. Cossor Ltd., Melody Dept.,
Highbury Grove, London, N.5.

Please send me, free of charge, a copy of the
72-page Cossor Valve Catalogue, B.14.

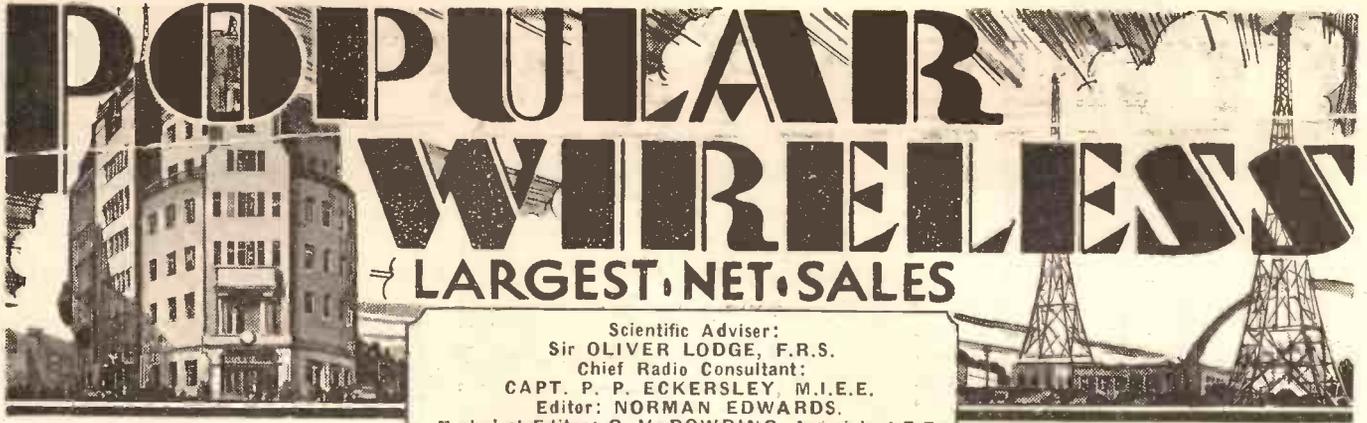
Name.....

Address.....

P.W. 24/9/32.

COSSOR VALVES

A. C. Cossor Ltd., Highbury Grove, London, N.5.
Depots at Birmingham, Bristol, Glasgow, Leeds, Liverpool,
Manchester, Newcastle, Sheffield, Belfast and Dublin.



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 CAPT. P. P. ECKERSLEY, M.I.E.E.
 Editor: NORMAN EDWARDS.
 Technical Editor: G. V. DOWDING, Associate I.E.E.

TWO OF THE BEST.
 WHAT GRINS!
 A NIGHT OUT.
 "STOUT FELLAHS."

RADIO NOTES & NEWS

WHAT AN IDEA!
 OVERHEARD.
 £50 REWARD.
 GOOD NEWS.

Our Great Gift.

HAVE you unfolded your free Blue Prints yet? Two of the best, they are—which you ought to use at once, or else preserve carefully for some future occasion. For it's not every day that you get a full shillingworth of up-to-date radio design, given away with a magnificent three-pennyworth of radio reading, such as you now have in your hands.

And that reminds me: Be sure to get the aforesaid hands ready to grab next Thursday's "P.W." for it is going to be an out-and-outer!

The "Apex."

INSIDE your copy of "P.W." next Thursday you will find a full-size blue print of the "Apex." The "Apex" being absolutely the last word, top-notch and summit of three-valve design.

What stations it ropes in, what it costs to build, and all specific details of that kind I leave to the Technical Hounds to explain in future articles. But one thing I do know—never have I seen such captivating, congratulatory, ear-to-ear grins as those that lighted up the Research Department on the day the "Apex" was tested!

So remember—next week, full-size, free "Apex" blue print to every reader.

Radio and Police.

SEE that the Manchester City police have been busily experimenting with wireless equipment on police cars from the fire-station building in London Road. This habit seems to have caught on among the boys in blue, for Bradford, Stockport, Newcastle, Southampton, Brighton and Scotland Yard have all been credited with developments of great importance in this direction.

Where is it all leading?

In the U.S.A.

IN America they do an enormous amount of this police radio work, and recently the "Manchester Guardian" published a letter from a Cheshire resident of

Los Angeles which gave a few sample calls sent out from police headquarters there.

Here are some of them:

"Calling car 152, one-five-two; at 6.30 p.m., South Pico, an attempted suicide.

"Calling car 55, fifty-five; at San Pedro and Vermont, a drunk lying on the side-walk.

"Calling all cars, calling all cars; Manual Garcia, aged 105, one hundred and five years old, has been missing from home since yesterday morning. Was wearing blue pants, tuxedo, and beach slippers when he left home.

"Calling car 101, one-hundred-one; gas station at South Spring and Van

mentioned that he had had a very good time. A very good time indeed!

Over 5,000,000 Of Us!

JUST before the Radio Show there was a lot of talk about the Five-millionth Licence, which it was expected the Post Office would issue about that time.

With people purchasing radio licences at Post Offices all over the country it is impossible to say who actually bought the five-millionth issued; and it is no easy matter to estimate even on which day that grand total was reached.

But one thing we can do. Pat ourselves on the back, whilst reflecting that we listeners collectively put our hands in our pockets for the very respectable sum of about fifty thousand pounds a week. Stout fellahs!

THE GREAT "COME-DOWN"!



Exhausted after having broken all the altitude records in their balloon, Prof. Piccard and Dr. Cosyns are at the moment of landing lying on the ground, while excited spectators clamour and collect souvenirs! Radio played an important part in this achievement of Prof. Piccard's, and it is expected that observations of great importance to wave-propagation have been made.

That Coughing.

WE all know how distinctive some people's coughs can be, and we have all heard coughs from a radio audience during church services and so forth. But how many people can equal the experience that befell a Cleorthorpes lady?

Together with a friend who was holidaying with her, she attended the chapel at Colwyn Bay some weeks ago, to hear the sermon that was being relayed as an outside broadcast by the B.B.C.

Two days later she received a letter from her mother which said, "Your cold does not seem to be much better. I recognised your cough during the earlier part of the service!"

Ness, two suspicious characters; fear hold-up, hurry.

"That is all."

His Night Out!

ACCORDING to this informant the speaker's voice comes through in low monotone, and it all sounds very dramatic.

Incidentally, the 105-year-old gentleman was found the next day, still in his tuxedo. He refused to say where he had been, but

Television Tests With Australia.

DID you know that television tests have for some time been conducted between this country and Australia?

The Marconi Company has had the matter in hand over here, using its own experimental station G 2 B S. At the Australian end Amalgamated Wireless (Australasia) have been employing their Sydney station, on short waves.

G 2 B S is situated at Chelmsford, Lut

(Continued on next page.)

NEWS—VIEWS—AND INTERVIEWS (continued)

is nothing whatever to do with G5SW, the Empire short-wave station there. As a matter of fact, it is of entirely different type, G2BS being a beam station, with its transmissions projected towards Sydney.

"Ariel" in Petticoats.

AS a postscript to his letter in our issue of August 27th, "Foleshill" informs me that his wife is of opinion that I am a woman. Heavens! Where did she get that notion from? No woman could display the wit, commonsense, and calm judgment which these columns contain! However, as this libel must be disposed of I have given the Editor a photograph of myself for publication. He has promised to print it this week in another column. So look out!



The New Midland Regional.

SOME of the big newspapers appear to have misread a B.B.C. official communication about the Droitwich station, with the result that I am getting a lot of inquiries about the future position of Midland Regional broadcasting when moved from Daventry.

The B.B.C.'s idea was to purchase a site at Droitwich on which to build a new transmitting station to replace the present one at Daventry.

"It will be a twin-wave station with two high-power transmitters. The one will have a power of 100 kilowatts, and will broadcast on a long wave, while the other will be a medium-wave with a power of 70 kilowatts.

"The new long-wave station will take the place of Daventry 5XX, while the medium-wave transmitter will displace the present one at Daventry which serves the Midland Regional."

Daventry 5XX and the Midland Regional transmitter will, of course, remain in operation until the new station at Droitwich is built.

Overheard at the Show.

"HOW many free samples have you got, Alf?" "And I said to her, I said, 'Well, I said, 'I wish your Maud 'ud play the piano like Rahmanoffs, then we wouldn't 'ave to have the loudspeaker going all out when she practyses,' I said." "Yes, I know—but what is *mush*?" "I want a little set—just a toy—with four or five valves—for my little boy—something quite cheap." "Look, Harry! Picture of Sir John Marconi inventing time signals!" "I've bought a 'Wasp,' complete with tubes and speaker." If the last speaker cares to apply to "Ariel" he



"SHORT WAVES"

A wireless paper says that two thousand years ago wild boars prowled over what is now the site of Broadcasting House. Even now the place is not entirely free from the tame species.—"Punch."

NOT THE POLICE "STATION."

Householder (discovering burglar at safe): "What are you after?"
Burglar: "Only trying to git Daventry, sir!"—"The Sketch."

Answer to Correspondent.—No, the crash you heard last week was not an atmospheric disturbance. That was caused by a little studio accident when the announcer inadvertently dropped his false teeth on the microphone. In other words, a "false" alarm.

"Butterscotch a danger to radio," says an Evening Paper.
Couldn't the announcer eat it after hours?
—"Punch."

In a recent article one of our contemporaries stated that the correct temperature for the storage of wireless sets is sixty degrees.
We ourselves have consigned some of them to a much greater heat.

"Anything hon the 'air to-night, sir?" enquired the barber.
"I don't know," curtly replied his victim;
"I'm not interested in wireless."

can have unlimited wasps, tubes and all, complete with striped jerseys—off my plums.

Manchester's Big Push.

LONDONERS, having got Olympia off their chests, can enthusiastically wave on Manchester's great radio show, which runs at the City Hall from September 28th to October 8th.

I was talking to one of our leading manufacturers the other day, and he said: "I always look forward specially to the Northern Radio Show. They're so openly keen up there, whereas the Londoner likes to look blasé about everything even when he is really enthusiastic inside."

Are Londoners as blasé as all that?

BACK TO WORK!



Readers are always asking to see a portrait of "Ariel," so here is a genuine one that was taken on a recent "hike." But, as usual, he preserves the secret of his identity!

Where's That Meter?

IT is to be hoped that after the Northern Radio Exhibition is over we shall not have many more "stolen" announcements like one which followed London's show.

In that the Automatic Coil Winder and Electrical Equipment Co., Ltd., of Winder House, Douglas Street, S.W.1, offered a reward of £50 for information leading to the conviction of the thief, and the recovery of the Universal Avometer which was stolen from their stand at Radiolympia.

This was the only completed instrument on their stand and was with forty other Avometers, so it is evident that the person who took it knew what he wanted; or else confused Avometer with "Ave-a-meter," and interpreted the latter as an invitation!

The Moral of Jemima.

A SIMPLE *miaow-u*, from a strolling and probably scared pussy-cat, and the British Isles, including the popular daily press, exploded with merriment.

Why? We have all heard a cat utter and have not laughed thereat. But this particular *miaow* made even the Announcer—Reith-trained—become a sniggering human being. The truth is that Jemima broke the awful solemnity of the slow march of the B.B.C. programmes. In effect, it threw a custard-pie and caught the solemn-faced Robot "a proper packet." An announcer's spontaneous giggle is worth a dozen of the B.B.C.'s vaudeville programmes, and I hope that the moral of the incident will not be lost at Broadcasting House.

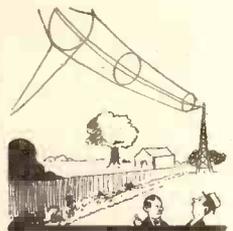


Olympian Orders.

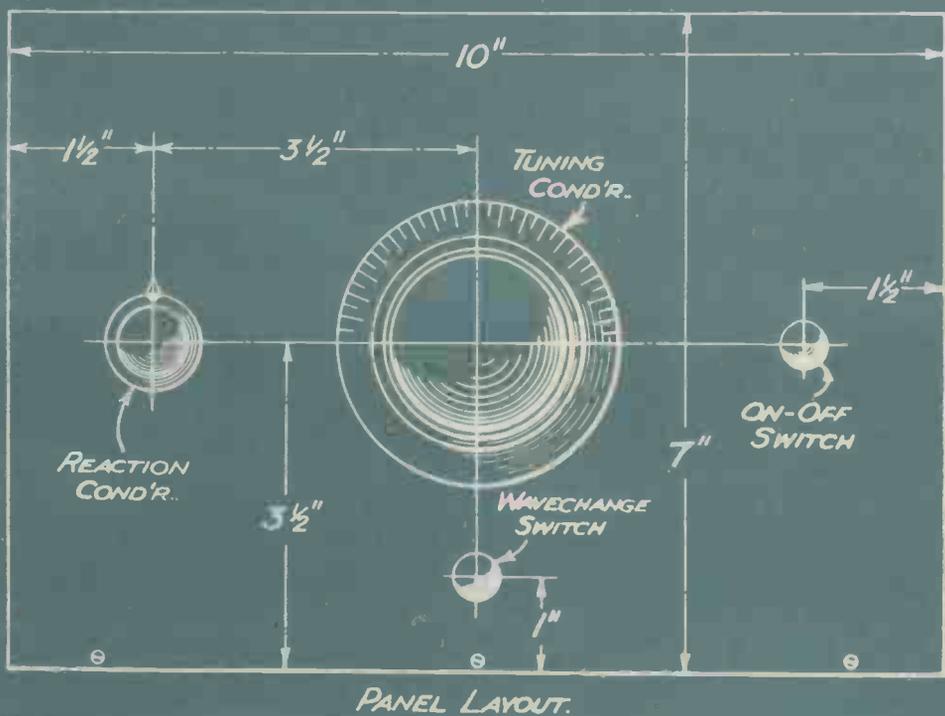
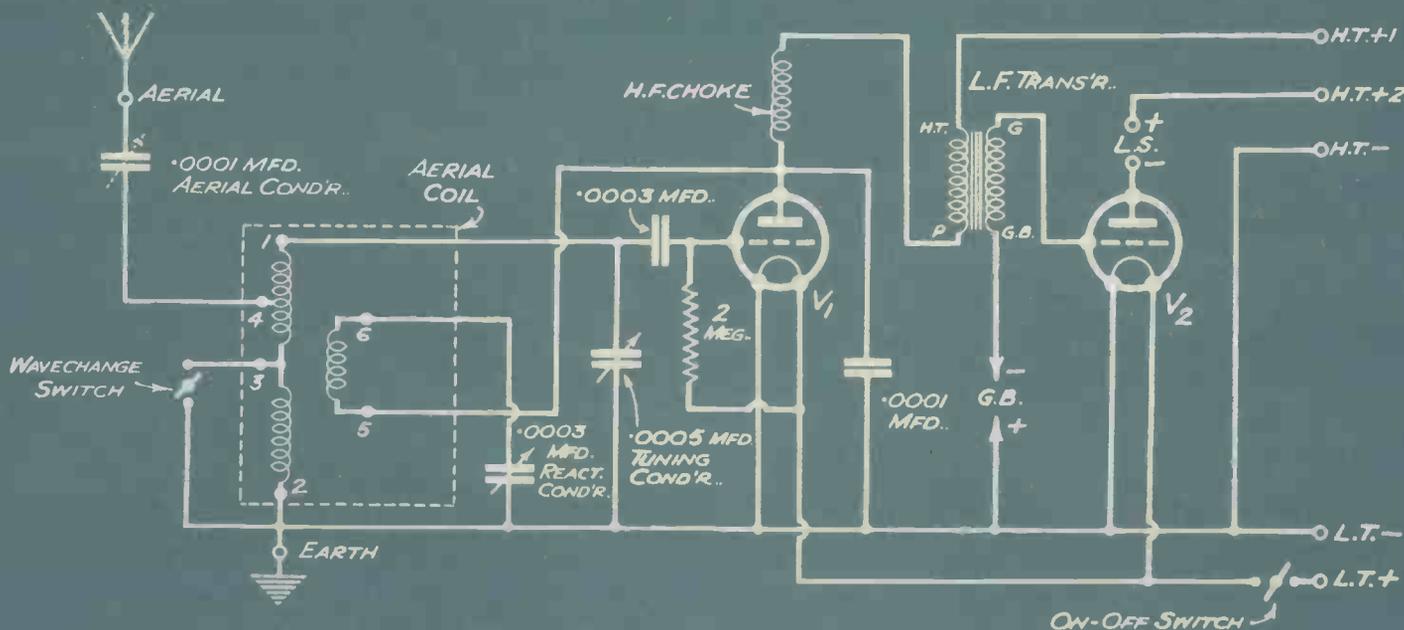
THE manufacturers have been comparing notes, and smiling and rubbing their hands over the Radio Show at Olympia. It appears that the value of the orders booked was about £50,000,000, compared with £29,000,000 last year. It is calculated that this means work for 20,000 extra hands. Good news indeed.

Would It Were True.

I HAVE just remembered a remark which I saw in our esteemed contemporary the "Sunday Referee," namely, "The better the energy-collecting properties of your aerial, the better the entertainment which your set will give you." How I wish it were true! Unfortunately our aerials have no influence on the B.B.C. and its programmes, which are stereotyped and organised to death. You can stick a pin into any one of the 24 hours of a given day and then say which quintette will be playing at the pierced hour.



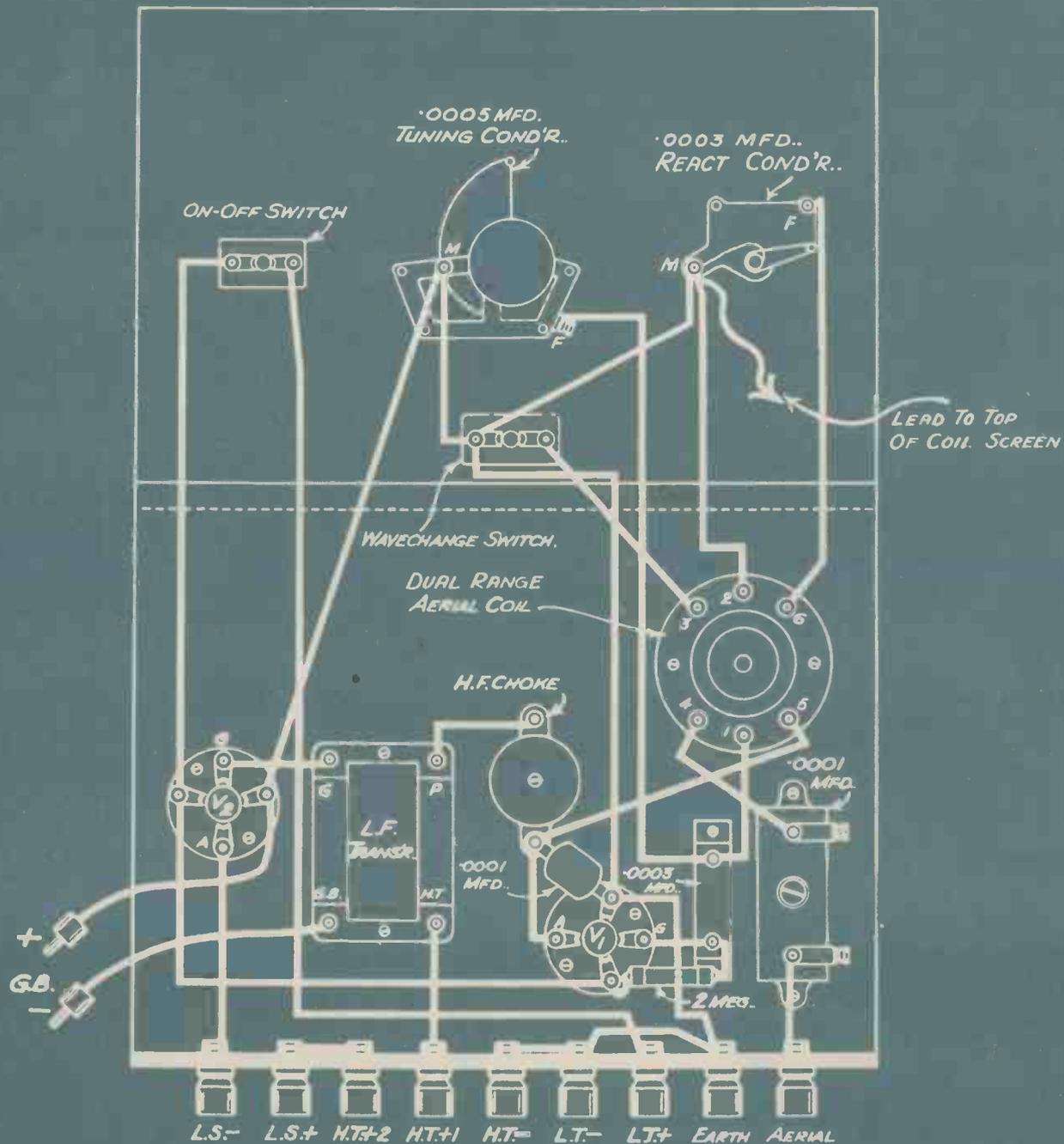
ARIEL.



P.W. Blue Print No. 63. The
"L.G." Two. Price 6d.

COMPONENTS AND MATERIALS.

- 1 Panel 10 in. × 7 in.
- 1 Cabinet to fit with baseboard 8 in. deep.
- 1 .0005 variable condenser with slow-motion drive.
- 1 .00025 to .0003-mfd. reaction condenser.
- 1 Screened coil (dual-range type) without incorporated switch.
- 2 Push-pull on-off switches.
- 1 L.F. transformer.
- 2 4-pin valveholders.
- 1 .0001-mfd. max. compression condenser.
- 1 H.F. choke.
- 1 .0003-mfd. fixed condenser.
- 1 .0001-mfd. fixed condenser.
- 1 2-meg. grid leak with tags.
- 9 Indicating terminals.
- 1 Terminal strip 10 in. × 2 in.
- 18 gauge tinned copper wire and sleeving, flex, screws, battery plugs, etc.



DRAWN BY **L.T.**
 CHECKED BY **B.K.**
 SERIAL NO. **63.**

P.W. Blue Print No. 63. The "L.G." Two. An easily constructed receiver for local listening. It is particularly suitable for everyday loudspeaker use, where a set is required mostly for entertainment from the local station, with excursions in search of more distant programmes. It utilises one of the modern screened coils, and has an easily set selectivity control. Valves: One detector or H.L. type and one small power, such as the P220. H.T., 100 to 150 volts.

THE "L.G." TWO

(Continued from previous page.)

to Continental stations must have considerably decreased.

It must not be thought that we believe only a few people want distant programmes. There are five million radio set users, remember. Five million is a huge number, and is enough and to spare to include a very varied selection of listener types.

And we will hazard that a million or two never wander farther afield in the ether than their local National and Regional transmitters. The "L.G." Two is particularly addressed to them. We do not claim that it will receive scores of foreign stations for that reason. Nevertheless, those who experiment with it in that direction will be pleasurably surprised by the results they may get.

No Soldering.

In thus modestly putting forward our claims for the "L.G." Two, we allow ourselves a margin!

The "L.G." Two can be assembled by anyone. No previous experience at all is necessary. There is no complicated mechanical work of any kind. The only tools required are a pair of pliers and a screw-driver. There is no soldering to do.

Buy the panel drilled according to the dimensions given in the drilling diagram. Most shops charge at most a few pence for panel drilling, while some do it free. Obtain a terminal strip drilled ready for terminals, or with the correct number of terminals already fitted.

If you do happen to purchase an un-drilled panel or terminal strip, don't try to make the holes with wood-working tools. Metal-working tools are required.

Ply-wood is a good substitute for ebonite or bakelite for the panel of such a set as this "L.G." Two, but five or seven-ply may be too thick for the particular makes of components you purchase.

The panel components should be fixed in position before the panel is screwed to

the baseboard, or the pressure you apply as you ply your pliers to the component securing screws may loosen the panel fixing screws.

There is no need at all for us to impress upon you the importance of keeping exactly to the plan, for it is common knowledge these days that the layout of a radio receiver is a vital factor in its operation. Certainly it is not so vital in a two-

A FREE BLUEPRINT OF THE "L.G." TWO IS GIVEN AWAY THIS WEEK!

to the component positions indicated in our wiring diagram.

The wiring is perfectly straightforward. Use a single-strand covered wire of fairly stout gauge. We recommend this because it will be stiff enough to allow you to make strong loops in the ends of the leads.

It is hard to make a flexible stranded or thin wire stay under screw terminals.

Its Own Tabs.

You will note that the grid leak and condenser we have used each has its own connecting tabs or leads, instead of terminals. This is a convenient type of component. There seems little point in having terminals necessitating separate leads on such small, light articles. They don't urgently require to be screwed down to the baseboard, and can quite well be suspended on their own wiring tabs.

Flexible leads will be needed for the grid-bias connections. Also, you will want a pair of plugs for their ends. The grid-bias

battery can be fixed at the back of the inside of the cabinet, or it can be stood on the baseboard by the L.F. transformer, as it will be a quite small battery for this set.

Suitable Voltages.

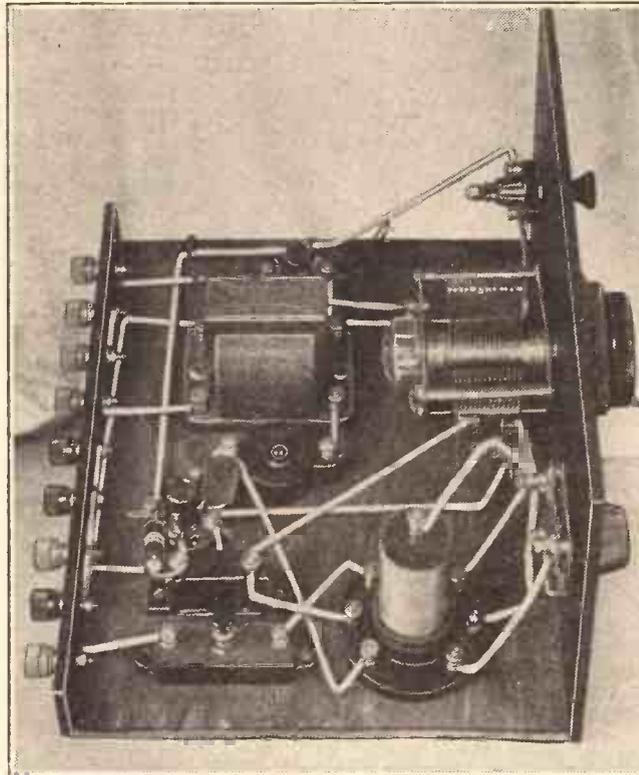
About 60 volts H.T. will suit most detector valves, and a little over 100 will be ample for the type of small power valve recommended.

The grid-bias will depend upon the individual power valve and H.T. employed. The set is simplicity itself to operate. You have only the tuning and reaction controls to adjust, once the selectivity condenser has been set in accordance with your particular local conditions.

RECOMMENDED VALVES

Make.	Det.	L.F.
Mullard	P.M.2D.X.	P.M.2A.
Mazda	H.L.210	P.220
Cossor	210H.L.	215P.
Marconi	H.L.2	L.P.2
Osram	H.L.2	L.P.2
Tungram	H.210	P.220
Eta	B.Y.1814	B.X.604
Lissen	210H.L.	P.220
Six-Sixty	210H.L.	220P.A.

THE ACME OF SIMPLICITY



So simple and straightforward is the construction of the set that the most inexperienced novice can build it, and, what is more, be certain of success. Follow the blueprint carefully and you will not have any difficulty.

valver as in a big "H.F." set, but it is still sufficiently important to make it well worth your while strictly to adhere

HERE ARE THE PARTS YOU NEED

- 1 2-point push-pull switch (Lissen, Tunewell, Ready Radio, Telsen, Bulgin, etc.).
- 1 2-point push-pull switch (Ready Radio, etc.).
- 1 0005-mfd. S.M. tuning condenser (J.B., Ormond, Formo, Lotus, Cyldon, Utility, etc.).
- 1 0003-mfd. reaction condenser (Polar, Ormond, Igranic, Telsen, Ready Radio, Peto-Scott, etc.).
- 1 Canned coil (Lissen).
- 1 H.F. choke (Lewcos, Type M.C.; Ready Radio, Lissen, Telsen, Igranic, etc.).
- 1 L.F. transformer (Ferranti A.F.10, Lissen, Ready Radio, Tunewell, Telsen, R.I., Varley, Igranic, etc.).
- 2 4-pin valveholders (Lissen, Lotus, W.B., Ready Radio, Tunewell, Benjamin, Bulgin, Telsen, Igranic, etc.).
- 1 Grid leak, 2 meg. (Igranic with wire ends, Lissen, etc.).
- 1 0001-mfd. fixed condenser (Dubilier 665).
- 1 003-mfd. fixed condenser (Dubilier type 620, T.C.C., Telsen, Lissen, etc.).
- 9 Terminals (Bulgin, Belling-Lee, Igranic, Ealex, Clix, etc.).
- 1 Pre-set condenser, max. 0001 mfd. (Formo, R.I., Sovereign, Telsen, Lewcos, etc.).
- 1 Panel, 10 in. x 7 in. (Permeol, Peto-Scott, Wearite, Goltone, Becol, etc.).
- 1 Terminal strip, 10 in. x 1½ in. (Permeol, Peto-Scott, Wearite, Goltone, Becol, etc.).
- 1 Baseboard, 10 in. x 8 in.

ACCESSORIES.

LOUDSPEAKERS.—Marconiphone, Epoch, H.M.V., Celestion, Ferranti, B.T.-H., R & A, Ormond, Blue Spot, Cossor.

BATTERIES.—L.T. 2 volt. (Exide, Ediswan, Pertrix, Lissen, Ever Ready, Oldham).

H.T. 100-120 volts (Pertrix, Lissen, Ever Ready, Ediswan, Drydex, Siemens).
G.B. To suit output valve (Pertrix, Siemens, Ever Ready, etc.).

MAINS UNIT.—To give 15 m/a at 120 volts (Atlas, Heayberd, R.I., Formo, Tunewell).

RECOMMENDED AERIAL AND EARTH EQUIPMENT.—Electron "Superial," Graham Farish "FILT" earthing device.

Problems of Selectivity



If we were asked the meaning of selectivity I suppose most of us would answer something like this: The more selective a receiver, the more it is able to bring in a particular station without interference from nearby stations. We all understand what this means, and I think for ordinary working purposes it would be quite a fair answer.

When you come to look into it more closely, however, you find that the question of selectivity is not so simple as it seems. For one thing it obviously involves the number and closeness of adjacent stations. A receiver which was sufficiently selective five or more years ago, when there were fewer stations on the air, might be hopeless to-day when stations are so much more closely crowded together. Further than this, there are a number of other considerations which enter into this question of selectivity.

I am led to these observations by a remarkable paper entitled "The Selectivity of Broadcast Receivers," by Professor C. L. Fortescue, read before the Institution of Electrical Engineers a short time back. This paper raises a number of extremely interesting points with regard to the reception and reproduction of signal.

A Good Definition.

It touches upon the important question of sidebands and presents some novel and arresting views on the whole question of the limits of selectivity of a broadcast receiver. A good definition of selectivity is given in the paper, which is as follows: "The selectivity of a receiver may be described as the extent to which the output of sound is independent of the waves emitted from all sources other than the transmitter from which the desired programme is being received."

Bound up with the question of selectivity is that of faithfulness in the reproduction because, as is well known, the question of

distortion in the reproduction often sets a limit in practice to the degree of selectivity which can be utilised. In other words, if the sound output is not necessarily to be an exact replica of the modulation of the waves radiated from the transmitter, what deviation is permissible, and under what conditions?

This brings us to the question of the audio-frequency range which must be catered for. Contrary to general belief, many quite ordinary sounds comprise frequencies well outside the usual range of about 50 to 5,000 cycles per second.

For instance, the female voice often has

parts, just as in an ordinary telephone conversation the listener himself provides anything up to fifty per cent. of the intelligibility.

Harmonic Components.

The modulated incoming signal may be analysed into an infinite series of harmonic components, the frequency of these components being distributed above and below the frequency of the unmodulated transmitted wave, over a range which is equal to the range of the audio-frequency sound that is being transmitted.

The unmodulated wave is, of course, what we call the "carrier" wave, whilst the harmonic components are the familiar "sidebands." For a given receiver with a given adjustment, each sideband component gives rise to a sound output the fundamental frequency of which is equal to the difference between the frequency of a sideband component and that of the carrier wave itself.

From this we have the curious result that if, when the receiver is receiving the carrier wave of the desired transmission, a component of the same frequency as that of a sideband, but from some other transmission, falls upon the receiving aerial the results must be the same as if this wave had been a sideband of the desired transmission.

The Corresponding Sidebands.

In other words, the various waves which are falling upon the receiving aerial at the same time as the signals from the desired transmitter, must all contribute to the sound output in the same way as the corresponding sidebands contribute.

The greater the range of sidebands for which provision is made, therefore, the greater will be the range of interfering components also included.

(Continued on next page.)

The question as to whether the increased selectivity in receivers will allow of broadcasting stations being operated with a smaller wavelength separation is one which is being very generally debated at the moment. The interesting discussion on this page shows that, apart from receivers, it would not be possible to bring the stations any closer together—in fact, any improvement must be in the nature of a wider spacing than the 9 kilocycles at present employed.

components reaching to a frequency of 10,000, whilst such sounds as hand-clapping and the operation of typewriters and such-like machines have been found to comprise components reaching as high as 15,000. The frequency limitation of the ordinary radio receiver is now well recognised and in talking-film practice provision is often made for a response up to as much as 10,000 cycles.

Then there comes the very important question of the uniformity of response over the working audio range.

Uniform Response.

In this connection it is rather curious that so-called "musical" observers, so far from being the most critical judges of the uniformity and general quality of a sound, are often actually less critical than the average observer, the reason being apparently that their very musical instinct causes them to supply in imagination the missing

PROBLEMS OF SELECTIVITY

(Continued from previous page.)

The author of the above-mentioned paper then raises the extremely interesting question: "Is it not clear, therefore, that the limit of selectivity of a broadcast receiver is solely determined by the range of audio-frequency notes for which it is designed?" And if we do not accept this position, are we not in effect attributing to the receiver the power of discriminating between identical waves, but coming from different sources, and of saying: "This one I must receive and this one I must not receive?"

Now leaving for a moment the question of the limit of selectivity and turning to the question of the degree of selectivity actually used in practice, there is no doubt that a

This would still supply all that the loudspeaker could digest, so to speak, whilst at the same time the energy received from other transmissions would then become extremely small.

Double-Hump Curve.

As regards the best arrangement for obtaining the necessary selectivity, it is well-known that a two-coupled circuit giving a double-hump curve will in proper conditions give a fair approximation to uniform response over a certain range. Although it involves tuning two circuits and adjusting the coupling for the best results, this method is quite commonly used.

The ideal frequency-response curve would, of course, be a rectangular curve covering the desired high-frequency range of, say, 10,000 cycles on each side of the carrier frequency. To get within reasonable distance of this ideal condition, however, involves a complicated filter which is not only expensive but difficult of adjustment,

Now we come to one of the most important questions in relation to selectivity, and that is, whether the use of very selective receivers will permit of the ether being packed with transmissions very close to one another in wavelength.

It is commonly supposed that the extent to which the ether can be so packed depends simply and essentially upon the selectivity of the receivers in general use. In view of the facts already set out, however, it is concluded that for broadcast purposes (as distinct from Morse signalling, for instance, where the range of sidebands may be extremely small) there is no ground for this view either theoretically or experimentally.

Wider Spacing.

Even the possibility of using only one sideband is not promising, since it complicates the correction and the insertion of the carrier-wave at the receiver is impracticable. In fact, any tendency that may be observable is in the direction of a wider spacing in the frequency spectrum rather than the reverse.

In the very short space at my disposal it is impossible to do justice to the many important and interesting points raised by Professor Fortescue in the Paper under review, or to the shrewd analysis of certain popular beliefs. His observations on the question of the selectivity of the receiver itself and also his conclusions with regard to the spacing of transmission frequencies in the ether must, however, be of particular interest to radio experimenters and listeners alike.

USE A FUSE

A precaution that will save you the cost of a new valve.

NEVER before was the likelihood of burning out valves so great as in modern sets with metallised valves. And, therefore, never before was the need for an H.T. fuse so great.

It is quite all right if the valve holders are so wired up that the filament pin which is connected to the metallised coating is taken to L.T. negative, but it so often happens that these valves are used in a set which has not been specially wired for them.

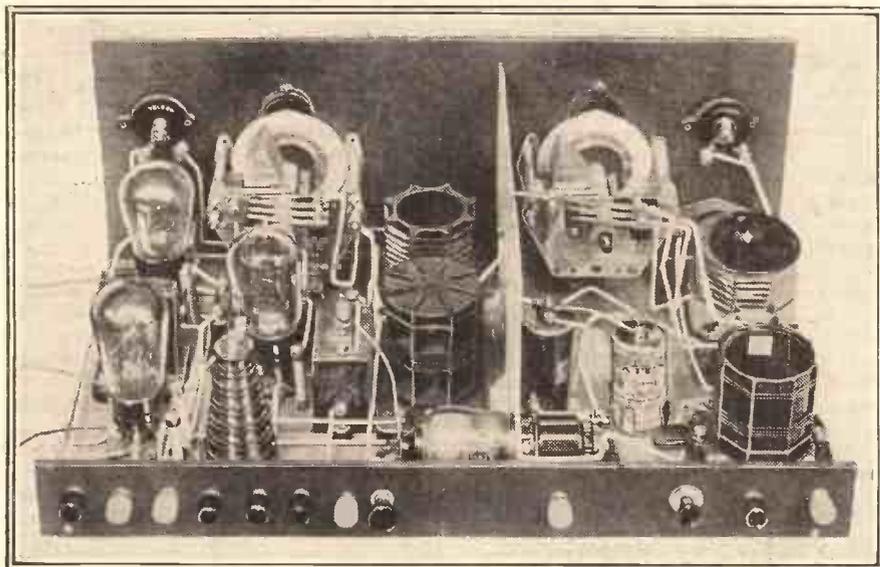
In that case, if a flex lead from H.T., such as the lead to the anode of an S.G. valve or the pigtail on a super-heterodyne coil, comes into contact with the coating of a valve—bang go all the valves. Unless you are so lucky as to be using an almost run-out H.T. battery!

The metallised coating being connected to L.T. positive and the H.T. negative to L.T. negative, the battery is put in parallel with the accumulator, and is thus directly connected to the filaments. An ordinary flash-lamp type fuse in the negative H.T. lead will avoid all danger.

The best place for it is close up to the negative plug where this goes into the battery, then it will also safeguard the battery from short circuits should its negative lead come into contact with some point wired up to H.T. positive. Some plugs have a fuse-holder incorporated in them, which is a great convenience.

This short note may seem like rubbing in a point which is often dealt with, but if you follow the advice you will be glad of the rubbing-in when that fuse goes and your valves remain intact.

A. S. C.



A SET THAT IS REALLY SELECTIVE

Faithfulness of reproduction is closely bound up with the question of selectivity, since distortion sets a limit to the amount of selectivity which can be utilised. The popular "Cosmic" Four, seen above, fulfils these conditions by providing for good reproduction with extreme selectivity.

good many receivers will take in high-frequency energy over an unnecessarily wide range of frequency, in consequence of which they suffer from interference from neighbouring frequencies, both the sidebands and the carrier waves of such transmissions being received.

The Mean Value.

The breadth of the response curve must be considered in relation to various components; for example, the loudspeaker may be limited to a useful frequency-response of, say, 2,000 or 3,000, whilst the response curve of the receiver may be such that it responds to, say, 30 per cent. of its maximum response when the incoming frequency is as much as 50,000 above or below the mean value.

In view of the limitations imposed in such a case by the loudspeaker, it would be more satisfactory to readjust the high-frequency response of the receiver and limit it so that the response fell to the above-mentioned 30 per cent. when the incoming frequency was only, say, 5,000 cycles removed from the mean frequency.

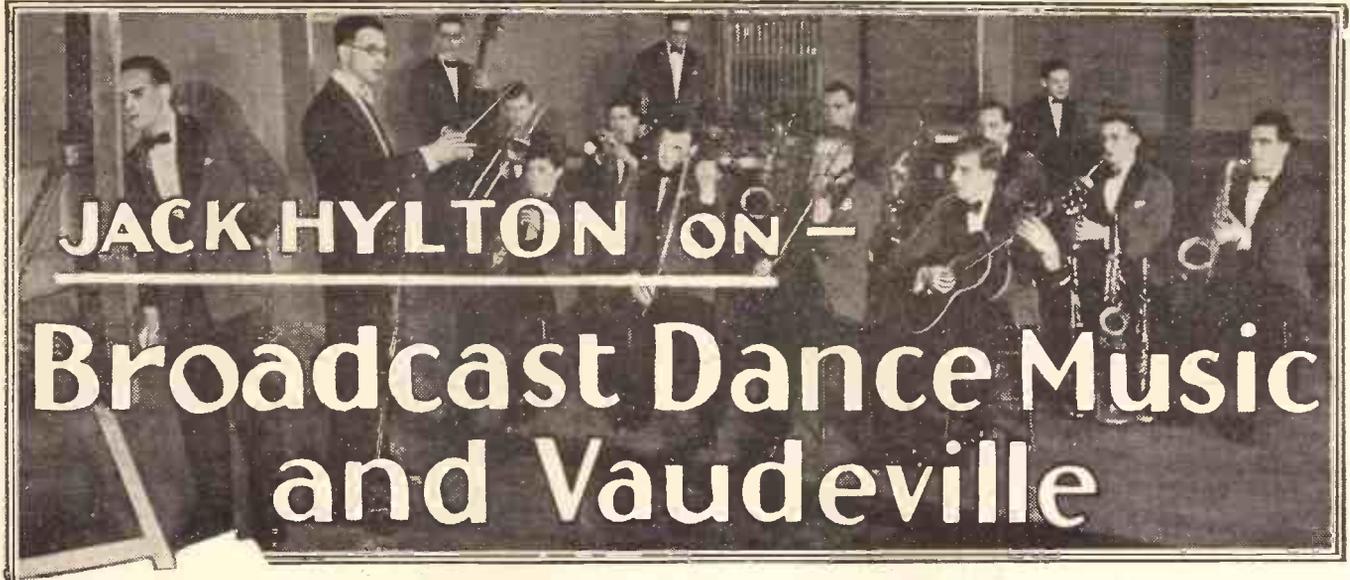
if provision has to be made for more than one wavelength.

If a single circuit is used with a high decrement this can be made to give fairly uniform response over the desired frequency-range, but, as indicated above, it is very subject to interference.

Bearing in mind that the loudspeaker causes the most serious errors, it is suggested in the Paper under consideration that the decrement of the high-frequency circuit should be reduced to a sufficient extent to make the interference relatively small, but only to reduce the high-frequency sidebands to such an amount that the errors produced should be less than (indeed small compared with) those due to the loudspeaker.

Errors in the Speaker.

You will see that on this very interesting argument this aspect of the problem of selectivity depends chiefly upon the loudspeaker. As errors inherent in the speaker become reduced, so the question of the shape of the resonance curve of the receiver will become of more and more account.



JACK HYLTON ON— Broadcast Dance Music and Vaudeville

“Jack Hylton has done for modern dance music what Sousa did for the march,” was the opinion of a famous musician recently. It is, therefore, interesting to find Jack Hylton, in this article, championing the cause of dance music as light entertainment, apart from its value for dancing.

B. B.C. programme officials are now realising that light syncopated music has its entertainment value apart from dancing. I should not like to say that the B.B.C. has been slow in realising this, but as for many years it has been my pleasure to give performances of dance music intended for listeners and not for dancers, I am naturally enthusiastic about this point of view.

The various bands generally broadcast at the end of the evening's programme, and dance enthusiasts get at least a little music for their dancing. But I agree with those who say that these end-of-programme times for dance music are not entirely satisfactory.

In Favour of Stage Conditions.

If one is holding a “Radio and Gramophone” dance, then records will be used during the early part of the evening when there is no broadcast music available, and then very often when the radio dance band comes on one does not take the trouble to switch over.

The B.B.C. considers that it gives enough dance music, because its primary intention is to please those who listen and not those who dance. It is for this reason that I welcome the new idea of including dance music of a certain type in vaudeville programmes.

My first broadcast after an interval of several years, was from a large B.B.C. studio, where there was the usual vaudeville audience. Now I am all in favour of broadcasting from a studio which, as nearly as possible, approximates to stage conditions.

Different Grouping for Radio.

The “atmosphere” of support provided by an audience certainly helps the programme to go along with a swing.

I have given broadcasts both of the concert hall and the more intimate studio variety. In the Radio Paris and Hilversum studios from which I broadcast when on a Continental tour, I had a very small audience; often only the announcer was in the studio at the time.

For broadcasting my orchestra is grouped

in rather a different way from what it is on the stage. Pat O'Malley, the vocalist, sings close into the microphone, so that it is impossible for me to hear while I am conducting.

At some of the B.B.C. vaudeville broadcasts, on the other hand, we had one of the largest studios available. An audience of nearly two hundred was grouped around us, and the main microphone was suspended in mid-air, as it is in a theatre.

To the listeners in the studio, the general balance of the orchestra probably sounded different from the stage style. That was because we were playing to the microphone and not to the audience.

There are other little technical points which make studio vaudeville broadcasts

of this kind more difficult than straight stage performances. The vocalist has an electrical signalling switch in his hand, by which he can give the cue to the control man when he is about to start singing.

The programme compère (Mr. Christopher Stone on the occasion of my first dual broadcasts) has his notes to read between items, and the whole show is carefully linked up and accurately timed.

Provision of Variety.

As a matter of fact, the B.B.C. were so anxious to produce my dance music broadcasts as a revue show, and not as plain dance music sessions, that Mr. John Watt, a member of the B.B.C. staff and the popular producer of the “Songs of the Shows” series, collaborated with me in arranging the National and Regional “hours” like any ordinary B.B.C. revue production.

The make-up of a programme of this kind is a little different from what I do for theatre presentation. Well-known people, such as Jules Bledsoe and Leslie Sarony, collaborate with me and a number of special items, such as old song medleys, negro spirituals, and so on, are included to make a variation in the dance music.

It is my experience that the modern orchestration of a good dance band, enabling it to deal with practically every kind of musical composition, appeals to wireless listeners. They actually prefer some of my arrangements of semi-classical pieces to the standard orchestral arrangements for a small chamber orchestra, mainly composed of strings.

No Chance of Monotony.

The brightness of tone and the constant variation of colours provided by the many instruments of a dance orchestra obviate any chance of monotony, and that is why dance orchestra arrangements broadcast so well. Monotony is at all costs to be avoided on the wireless.

In further vaudeville broadcasts the B.B.C. has gone still nearer to stage presentation. Limelights have been installed, and the main part of the studio has been darkened during the presentation of several turns to heighten the stage atmosphere.

JACK'S SMILE



Acknowledged to be the master of light syncopated music, Jack Hylton often finds time, between his successful continental tours, to broadcast from the B.B.C. studios.

FREE!

WITH EVERY COPY
OF NEXT WEEK'S

FREE!

POPULAR WIRELESS

A

FULL-SIZE

1/-

BLUE PRINT

A magnificent three-valve receiver employing an S.G. H.F. stage, detector and output valve, with double tuning to ensure selectivity that is ample for all modern conditions.

of
THE
P.W.

“APEX”

Tuning on long and medium waves is provided, and a simple scheme makes it possible to cover the short waves as well.

For local and long-distance listening—an ideal set for home construction.

will be presented

FREE

THERE IS BOUND TO BE A TREMENDOUS RUSH AT THE BOOKSTALLS FOR THIS NUMBER SO IN ORDER TO AVOID DISAPPOINTMENT ORDER NOW.

POPULAR WIRELESS

On Sale Next Thursday - - - - - Usual Price 3d.

What to See at THE MANCHESTER EXHIBITION

The Northern Mecca of radio opens on the 28th of this month at the City Hall, Deansgate, Manchester. This year's show promises to be bigger and better than ever, and it will afford an excellent opportunity for all our Northern readers to become familiar with the outstanding developments of the new season.

MANCHESTER, 1932! Again that Northern milestone to mark another year of progressive development; another year of painstaking research; another year of radio activity such as is probably without parallel in the history of this first decade of broadcasting.

The Best Show.

What an inspiring thought! Can you not see Mancunians in their thousands (and maybe "foreigners," too) converging down Deansgate to the Northern Mecca of radio—the City Hall.

But is it *really* so? Is there *really* all that much that is new to be seen? Is the science of broadcasting *really* keeping pace with old Father Time to such a marked degree. Or does it rather afford the annual worth-while excuse for umbrella-airing?

Not a bit of it! Let me make it quite clear here and now that between the hour of 3 and 3.45 on the last of my six consecutive visits to this "Northern Capital" the sun was seen to shine quite brilliantly. So it does *not* always rain in Manchester?

As for the show itself, which is of much greater consequence, visitors this year can look forward to the best show that has ever been staged in the City Hall.

A Blaze of Colour.

The City Hall is situated in what could hardly be termed a salubrious neighbourhood, yet to anyone entering it during the period of the radio show—and especially to one fresh from the monotony of Olympia's limited colouration—the sight which greets the eye is awe-inspiring, to say the very least of it.

It is a riot of colour justifiable of a visit even were it not to see the tremendous advances that have been made in the cause of home entertainment during the last year.

Everything New.

That much I *can* answer for, even though I may still have lurking doubts concerning the desirability of stuffing a "mac" into my suitcase.

But this year, apart altogether from the fascination of unlimited coloration, the exhibition promises to be one to which every reader of "P.W." who lives within reasonable reach should endeavour to visit by hook or by crook.

There are new sets, new components, new

loudspeakers, new batteries, in fact, new everything, and—of even greater importance—at prices that are more than ever within the reach of all. Isn't that news sufficiently good to penetrate the gloom of the present depression?

Ee, by gum, it is an' all, lad.

But now to details. What are you going to see when you get there?

Most Outstanding Exhibits.

Alas, limitations of space at a time when there is so much else of interest to be included in "P.W." must necessarily preclude reference to every exhibit. Nevertheless, in the remainder of the space at my disposal, it is my intention to give you a survey of at least the most outstanding exhibits. For the rest—well, you must go and see it for yourself, and you have my assurance that you will not be disappointed.

As for the exhibits that I am able to deal with in this survey, to avoid confusion it will be necessary to deal with them in some sort of recognised order, and it is therefore my intention to run through them alphabetically.

We come first, then, to Belling & Lee, a firm appropriately enough whose exhibit is of interest to every home-constructor. A world of wireless without terminals, sockets, wander-plugs, etc., would be about comparable to a suit of clothes without any buttons on it. Yet, in the excitement of all the other things that are to be seen, one is apt to overlook the possibility of development along these lines.

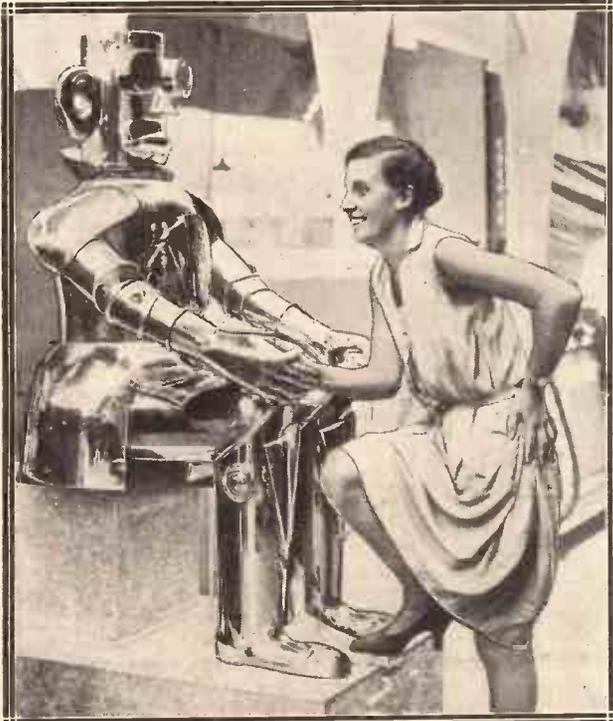
Completely Insulated Terminals.

Not so Messrs. Belling & Lee. And the range of products exhibited on their stand, which includes completely insulated terminals of various designs and lettered by a special process, spade terminals and terminal mounts, fuses and fuseholders, etc., is well worth inspection.

Mention of the name of the British Blue Spot Company will immediately conjure
(Continued on next page.)



HOW DO YOU DO?



How would you like to shake hands with this gentleman? He is the famous Mullard Robot which created such a sensation at Olympia, and who is hoping for a first-class ticket to Manchester!

WHAT TO SEE AT THE MANCHESTER EXHIBITION

(Continued from previous page.)

up in the minds of readers that famous range of speakers which are justifiably in the forefront of modern loudspeaker design. Well, this year's models are better than ever, and the range includes balanced-armature, inductor and moving-coil types to suit every purpose and pocket.

A New Blue-Spot Line.

But possibly the most outstanding exhibit to be seen on this stand is something entirely new for the Blue Spot Company—a battery-operated four-valve receiver of advanced design (2 variable- μ screened-grid valves, a detector and super power) in a truly artistic pedestal cabinet.

At the price of 16 guineas, which, incidentally includes the moving-coil speaker incorporated, this receiver represents a particularly attractive proposition for all those who are interested in the battery-operated models.

With the present congested state of the ether, the need for accurately matched ganged condensers is of greater importance than ever before. That is one of the reasons why you should make a point of visiting the stand of the British Radiophone Co. Here you will find two-, three- and four-gang condensers of the very latest types, and to suit almost every circuit requirement.

An Inexpensive Speaker.

It would have been difficult this time last year to believe that before another twelve months had passed a moving-coil loudspeaker would make its appearance at the astonishingly low price of 27s. 6d. complete with input transformer. Yet that is the creditable achievement of the Celestion people. Their new 27s. 6d. moving-coil chassis represents a very notable advance, and it is but one of the many low-priced but high-performance speakers that are to be seen on their stand.

Climax Radio Electric, Ltd., fall into the category of outstanding exhibitors on the strength of their famous all-electric radio-grams. One of them in particular, the model A.C.3, is one of the cheapest radio-grams on the market, yet even despite its low price of 24 guineas it is symbolic of all that is desirable in up-to-date radio and gramophone practice.

This particular instrument is exceedingly compact, measuring only 20 by 16 by 14 in., and the cabinet, which is of matched figured walnut, is handsome, to say the least of it.

Compact Radio-Gram.

A station indicating dial that is a great help to those not used to tuning a set is one of the features of several mains receivers to be seen on the stand of E. K. Cole. This enterprising firm have established a reputation for high quality but

modest priced receivers, and they look like maintaining that reputation during the coming season.

In addition to their attractive range of sets, you will also see exhibited on the Ekco stand a range of H.T. mains units to suit every possible requirement.

Fresh Products.

Messrs. H. Clarke & Co., whose name requires no introduction as the makers of high-class components and mains units, are starting out this year on two entirely new lines, moving-coil loudspeakers and self-contained sets. The sets are all of the two-valve variety, one for A.C. and one for D.C. mains, and one for battery operation.

This new range of sets represents a very definite step forward towards the time when mains receivers will be within the reach of all. The A.C. model, in particular, which I have had an opportunity of testing, is a first-class job, and when one remembers that it has a moving-coil loudspeaker built into it, the price of ten

"HOW MANY DIALS?"



Sunshades and scanty attire may have been all right in London's sub-tropical exhibition, but at the Manchester Show it is not likely to be so hot. Anyhow, whatever the weather it won't make any difference to the fine range of apparatus that is to be shown.

guineas must necessarily be considered as very low.

You will see all three sets on the stand of Messrs. H. Clarke & Co., to which a visit is well worth while in any case.

The name of Colvern stands out as the makers of a range of coils suitable for almost every modern circuit requirement and for all types of sets. You will see exhibited on their stand coils for every conceivable purpose—coils for "P.W." receivers, coils for the "S.T. 300," coils for super-hets., matched coils for ganged band-pass arrangements; in fact, coils by the hundred!

Modern Coil Practice.

A visit to the stand will afford you an excellent opportunity of becoming familiar with all that is desirable in modern coil practice.

Messrs. Cossor are well to the fore again this year with the 1932 version of their

famous kit-set, the "Melody Maker." In this new model, which you will see exhibited, the circuit consists of a variable- μ S.G. H.F. valve, followed by a leaky-grid detector and a transformer-coupled L.F. stage.

By all appearances, this new Cossor effort is more simple than ever to construct, and yet one look at the finished product is sufficient to convince one of the up-to-date lines on which it has been designed.

Dubiliers have earned their reputation on their famous range of condensers. It is not surprising, therefore, that their new range of resistances has met with universal approbation. As a matter of fact, this new range of Dubiliers has met a long-felt want for a high-class, reliable resistance at a cost low enough for everybody.

To Be Seen in Dozens:

You will hardly be likely to miss them, for you will see them—dozens of them—vertically suspended in serried ranks.

The famous R.K. reproducers and the B.T.H. pick-ups and tone-arms of new and improved designs are items that you should not miss on the stand of the Edison Swan Electric Co. Equally as important exhibits which merit your attention on this stand are the new additions to the famous Mazda range of valves.

Several of these are being shown at Manchester for the first time, and they include a new range of low-consumption D.C. mains valves and variable- μ screened-grid valves for battery and A.C. and D.C. mains operation.

Fascinating Exhibit.

The new Ediswan Cathode Ray Oscillograph for the analysis of wave form, also seen on this stand, is most fascinating.

When I mention the name of Epoch, I have no doubt that your minds will turn to thoughts of loudspeakers. Well, you are wrong; or perhaps I should say you are only partly right!

For this year, after having produced a range of moving-coil loudspeakers Messrs. Epoch have turned their attention to the production of a set—a set balanced particularly to enable the very best to be obtained from the speaker, and, if I may say so, a very noble idea, too!

Popularity of Superhets.

When you are over to look at the new speakers, as you no doubt will be, make a point of examining the set. It really is a fine piece of workmanship.

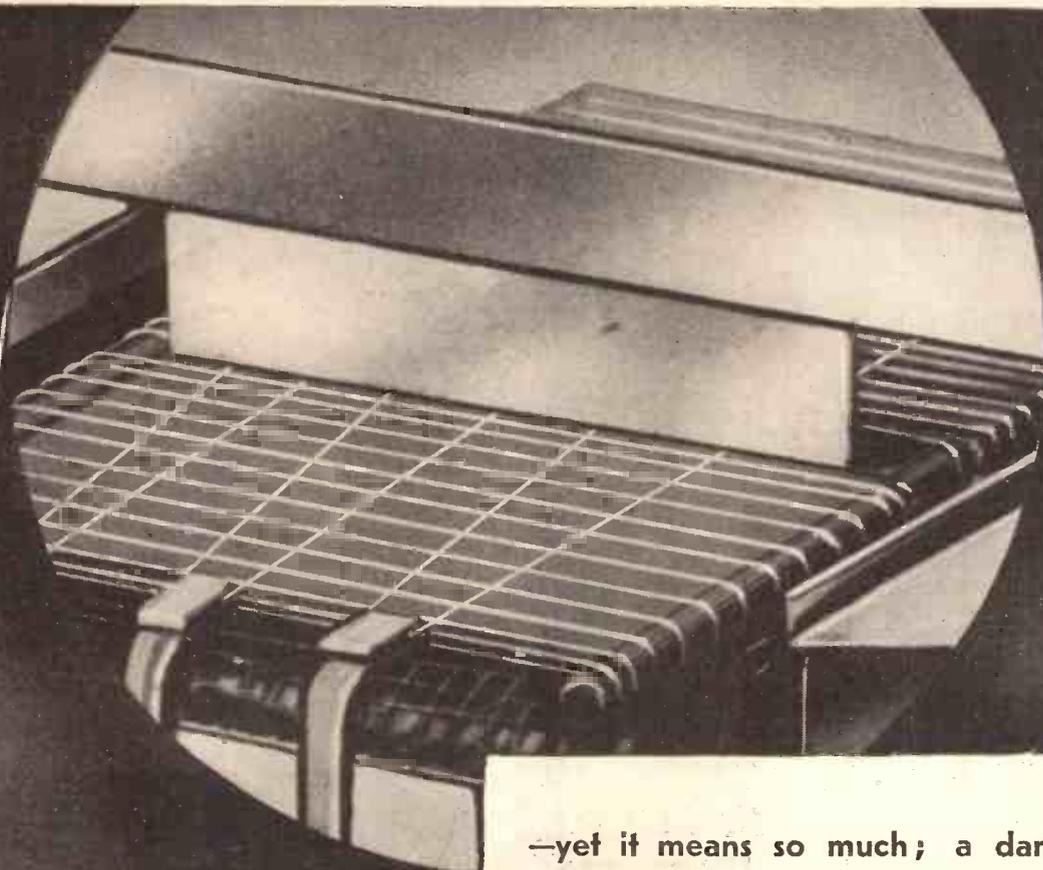
If the London Show can be considered as a forerunner of what will happen at Manchester, there is not much doubt concerning the popularity of super-hets. this year. And talking of super-hets., who could want a better proposition than that recently produced by Ferranti?

It's at the right price, and from practical experience I can vouch for the fact that it really does bring them in, dozens of them!

And the ingenious tone control incorporated works wonders with those sizzling

(Continued on page 74.)

A SIMPLE DISCOVERY—



—yet it means so much; a damping device on the filament—and microphony is conquered. That's the story of the greatest advance in modern valve construction.

This wonderful detector also works at a very low anode current which abolishes distortion due to transformer saturation and consequently gives greatly improved quality. For the same reason of course, the life of your H.T. Batteries is prolonged.

PRICE 7/-. MADE IN ENGLAND.

Mullard

THE · MASTER · VALVE

WHAT TO SEE AT THE MANCHESTER EXHIBITION

(Continued from page 72.)

noises that one associates with super-heterodyne reception. But have a look at it for yourself, and while you are there, do not fail to examine the new season's range of the components for which Ferranti have become famous.

The name of "G.E.C." one automatically associates with that very famous kit-set—the Osram Music Magnet. Surprising though it may seem to those of us who have had experience with previous "Music Magnets," this year's version is better than ever!

Even that is not the only reason why your visit to the exhibition would not be complete without a visit to the G.E.C. stand, for the new range of sets, quite apart from the famous Osram valves, is sufficient to merit your attention.

Famous Components.

It isn't, perhaps, all of us who are interested other than in an indirect way with Band Repeater and Public Address equipment, but that is only part of the show that is to be staged by Igranic at Manchester. The rest of the exhibit strikes very much nearer to the hearts of all "P.W." readers, for it consists of a display of the famous Igranic components.

I feel that their range is already too widely known to warrant anything more than just a passing remark to the effect that this year models are being shown in new and improved forms. But possibly what you do not know is that Igranic are now manufacturing a permanent-magnet moving-coil loudspeaker, and with the reputation that they have established as the makers of high-class components, I feel that it is quite unnecessary to say anything else, even about the moving-coil loudspeaker!

A Comprehensive Exhibit.

One of the features which characterises the exhibit of Lissens is the comprehensiveness of the apparatus they make. I do not believe that there is anything radio that cannot be obtained in this deservedly popular make, and with such a fine array as you will see on the Lissen stand it is difficult to single out any particular one above the others.

But there is one thing that was a perpetual centre of interest at Olympia, and which will probably receive an equally

enthusiastic reception at Manchester. I refer to the new Lissen "Skyscraper" kit for home-constructors.

It is, indeed, an exhibit which nobody who is interested in home construction should miss. But, then, the same thing applies to almost all of the other Lissen productions, which means to say that you ought to visit their stand in any case!

The word "Golden" may not convey much to you at the present moment, but it means an awful lot to Mullards!

Metallised Valves.

It symbolises the successful conclusion of months of painstaking research into the question of metallised valves, for Messrs. Mullard have just produced a range of "Golden" valves to replace the existing metallised ones.

It is claimed that with this new golden covering, the valves are more perfectly

merits particular attention. Their new super-het. is a masterpiece, and it is built into a wonderful piece of cabinet craftsmanship.

High-Grade Apparatus.

Ready Radio, who have for so long (and so efficiently) attended to the needs of the home-constructor, are no longer supplying kits for publication designs. But they are now devoting their technical and manufacturing resources to the production of a whole range of high-grade components.

The models which you will see exhibited on their stand at the City Hall are evident in every single case of the high standard that Ready Radio have achieved, and as component manufacturers I am convinced that they will earn a reputation for themselves even greater than heretofore.

Those of my readers who are interested in battery-operated receivers would be

well advised to pay a visit to the Sovereign stand, where an entirely new range of instruments will be displayed.

While on the subject of battery receivers, I must not fail to call your attention to the Telsen exhibit. Most of the items there displayed are shining examples of the modern tendency to combine art with efficiency—a feature which is largely due to the introduction of the ingenious Telsen Telornor.

Wide Appeal.

The Telsen exhibit is one which must necessarily appeal to all. Whether you are interested in battery sets, mains sets or just components, your visit to the stand will not be in vain, nor will you be disappointed in what you see.

In view of the fact that the exhibition is in Manchester, perhaps

it is a little pointed to finish on an Arctic note! Nevertheless, I feel that my job would not be complete without just a passing reference to the Polar Bears which you will find perched contentedly over the exhibit of Messrs. Wingrove & Rogers.

The reason for their apparent contentment is easily understood, for the products over which they mount guard are in the front rank of modern radio practice.

G.T.K.

NEXT WEEK

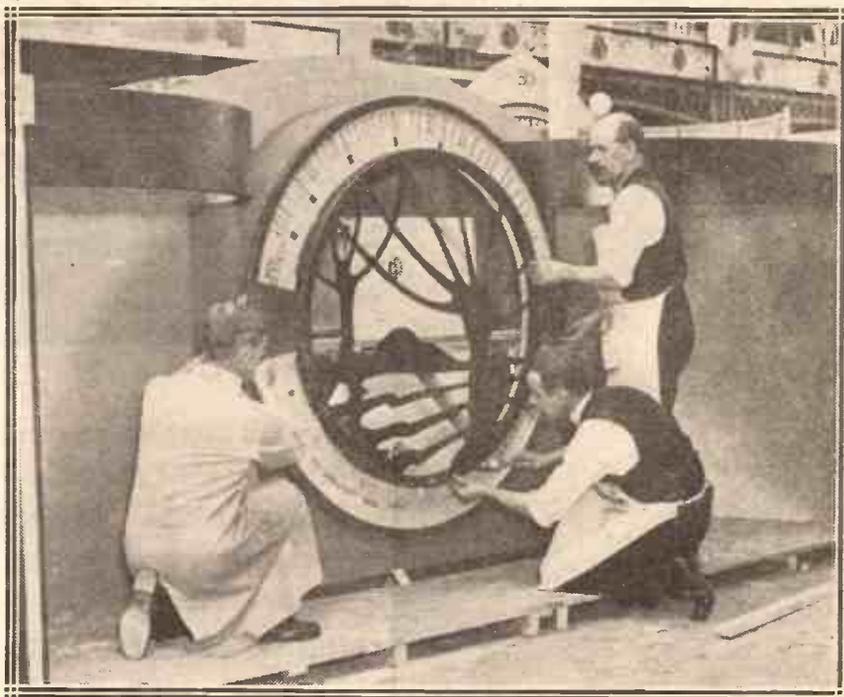
A Full-Size Blue Print of the

P.W. "APEX"

will be presented

FREE

A MID-WINTER NIGHT'S DREAM!



How's this for an outside in receiver tuning dials? It's a large-scale model of the famous station indicator dial that is an outstanding feature of several of the Ekco sets.

screened because of the alloy used which contains a certain proportion of copper. Not that "golden" valves are the only things that you will see on the Mullard stand. On the contrary, there is lots more that will interest you, but I have just singled this out because it shows the thoroughness with which the Mullard people set to work.

Well, I am afraid I am getting towards the end of my space, but there are still countless outstanding exhibits to which I should like to refer.

There is, for instance, the fine range of condensers to be seen on the Ormond stand, an enterprising firm who have recently produced a high-quality moving-coil loudspeaker. Then there is the range of super-inductance receivers manufactured and shown by Philips Radio.

Radio Instruments, too, have a whole lot of apparatus that is new and which

ENTIRELY NEW AND POWERFUL RECEIVER

G.E.C. Radio Supremacy in Radio

AMAZING POWER SELECTIVITY AND PURITY



**YOU NEED THIS
SET FOR MODERN
STANDARDS OF QUALITY
GECOPHONE RADIO RECEIVER**

for A.C. Mains

“VIKING” Model

Here is Radio that satisfies in the highest degree. All that you have ever known of superb quality, rich broad tone and selectivity is definitely superseded by a new sense of thrilling realism given by this set with five valves (including rectifier).

WRITE for Folder BC 6312. This is a most comprehensive production giving the fullest information regarding G.E.C. Radio products. It merits the consideration of everyone who demands the finest reception. The coupon is for your convenience.

SPECIFICATION.

- 1 Four tuned circuits with band-pass input filter.
- 2 Two H.F. screen-grid stages with variable-mu valve.
- 3 Screen-grid detector.
- 4 Power pentode giving undistorted output of 2½ watts A.C.
- 5 Energised Moving Coil loud speaker; provision for external loud speaker.
- 6 Single tuning control, 200-550 and 900-2,000 m.
- 7 Automatic station index.
- 8 Variable-mu volume control without reaction.
- 9 Mains aerial device and facilities for gramophone pick-up.
- 10 Universal mains transformer with 100-150 and 200-250 voltage range, 40-80 cycles.
- 11 Ample smoothing and heterodyne filter.
- 12 Distinguished Gothic cabinet of matt walnut.

PRICE 23 GNS.

including OSRAM Valves and Royalty.

HIRE PURCHASE

TERMS:

Deposit £2,
12 monthly
payments
of £2.

COUPON

Please send me Folder No. B.C. 6312 giving particulars of GECOPHONE Radio Receivers and Loud Speakers

Name _____
Address _____
The General Electric Co. Ltd.
Magnet House,
Kingsway, London
W.C.2
P.W.

Cut out and paste on a postcard, or
enclose in unsealed envelope, ¼d. postage

BETTER RADIO FOR THE DISCRIMINATING LISTENER

Advt. of The General Electric Co. Ltd., Magnet House, Kingsway, London, W.C.2

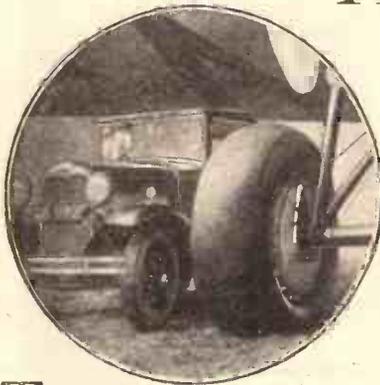


IMPERIAL AIRWAYS

trust to



MARCONI VALVES



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

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

THERE IS A MARCONI VALVE FOR EVERY PURPOSE

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

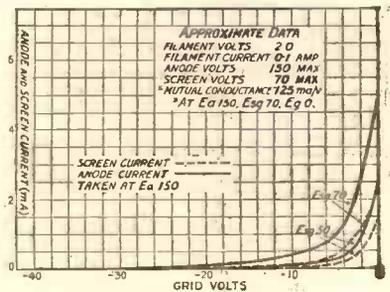
THIS IS THE TWO VOLT RANGE

vs.2.	Variable-Mu Screen Grid	16/6
s.22.	Screen Grid (Single stages)	16/6
s.21.	Screen Grid (Multi stages)	16/6
H.2.	High Magnification	7/-
HL.2.	Medium Magnification	7/-
HL.210.	Medium Magnification	7/-
LP.2.	Power	8/9
P.2.	Super Power	12/-
PT.2.	Pentode	17/6
DG.2.	Double Grid	20/-

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

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

Price 16/6



CAPT. ECKERSLEY'S QUERY CORNER



Don't address your letters direct to Capt. Eckersley; a selection of those received by the Query Department in the ordinary way will be answered by him.

Under the above title, week by week, our Chief Radio Consultant comments upon radio queries submitted by "P.W." readers.

PERMEABILITY—SCREENING—THE "ECKERSLEY" TUNER—RESISTANCE CAPACITY COUPLING.

Measuring Permeability.

S. K. (Blackheath).—"An iron core is said to have a certain permeability, that is, permits the passage of so many lines of force per square inch or centimetre. This is all very well, but how does one really know that iron has this property?"

"The lines of force are not visible to the eye. Is there an instrument which counts them? If so, how is one to know that the instrument 'tells the truth'?"

I like your mistrust.

Our greatest discoveries have come from the mind which questions and never accepts unless at first hand.

But the idea of permeability and its measurement all fits in so nicely to the pattern, is so constantly checked and counterchecked, as to make the questioning, once answered, a waste of time.

We measure permeability by arranging in essence to measure the quantity of electricity generated in a known coil which cuts all the lines concentrated in the iron. The denser the field the greater the "kick" on a galvanometer which is connected to the coil which cuts the lines.

It was Faraday who first showed that the voltage induced in a coil cutting a magnetic field at right angles is proportional to the density of field, the amount of wire in the field, and the velocity of the wire's movement.

This has been checked and counterchecked by many methods and so we can measure field density.

Baseboard Screening.

C. S. T. (Colchester).—"In designing an all-mains A.C. set, would it be advisable to use a copper-covered baseboard for the set proper, and an iron baseboard for the remainder. Or will either metal be suitable for the whole of the baseboard?"

I do not think you need bother with iron. Copper is an easy material to work with, and so is wood, so copper-covered wood is the best form of construction.

If you are thinking to stop low-frequency component coupling by using iron, forget the idea. You can only get freedom from low-frequency induction by careful and experimental placing of components.

Instability and Filter Output Schemes.

R. A. Y. (Liverpool).—"I have recently added a filter output scheme to my set (det. and 2 L.F.) with the result that the set is now unstable, whereas previously it was quite stable. Should not a filter output help to stabilise a set?"

I do not understand the expression "filter output scheme." Do you mean you

"filter out" certain frequencies or that you prevent D.C. from flowing in the loudspeaker windings?

I take it you mean that you have done the latter.

I cannot find a good explanation to show why the new connections should introduce instability. It might be a wrong choke value or condenser value, but I doubt it.

Make the condenser big—2 or 3 mfd. Make the choke big—20-30 henries if you like—when everything should be all right. In any case try decoupling one stage.

Principle of "Eckersley" Tuner.

F. M. (Oxford).—"I notice that the method of coupling the 'Eckersley' tuner is by means of a resistance. Doesn't this resistance result in an enormous loss of volume? What would happen if the value of the resistance was decreased from say 100,000 ohms to 50,000 ohms?"

Let us work it out. The coupling of the Eckersley tuner is essentially as (a) which we can transform to (b). E is a voltage produced in the aerial. The first closed circuit and the second behave to this voltage exactly as if they were resistances, provided they are "in tune."

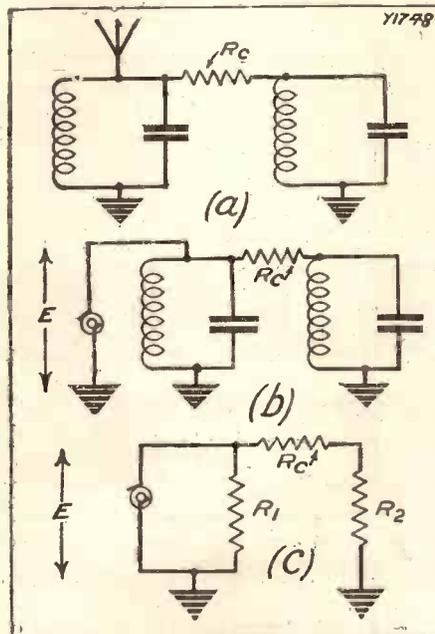
Now the impedance (or resistance, if you like) of these circuits is of the order of

100,000 ohms. The generator has a relatively low internal impedance, and so we have a voltage E applied across R_c (Fig. C), in series with R_2 , the impedance of the circuit "in tune." Now if R_c is 100,000 ohms and R_2 is 100,000 ohms, then the voltage across R_2 is $\frac{1}{2} E$. We have lost half the voltage which is, comparatively speaking, nothing audible.

If we make R_c 50,000 ohms we should lose less. But remember R_2 varies with frequency—at total "off tune" it may be 1,000 ohms when the voltage is merely one-hundredth.

We lose enormously "off-tune," but so we have to, to get selectivity. With 50,000 ohms for R_c , therefore, the system is less selective.

HOW IT WORKS



A diagrammatic explanation of the operation of The Eckersley Tuner dealt with in the reply to F. M. (Oxford).

Voltage Drop and R.C.C.

P. N. (Hampstead).—"In a receiver which I recently constructed the valve in one of the L.F. stages is rated to pass an anode current of 3 milliamps at 120 volts. A 30,000-ohms coupling resistance and a 20,000-ohms decoupling resistance are connected between the anode of the valve and H.T. +."

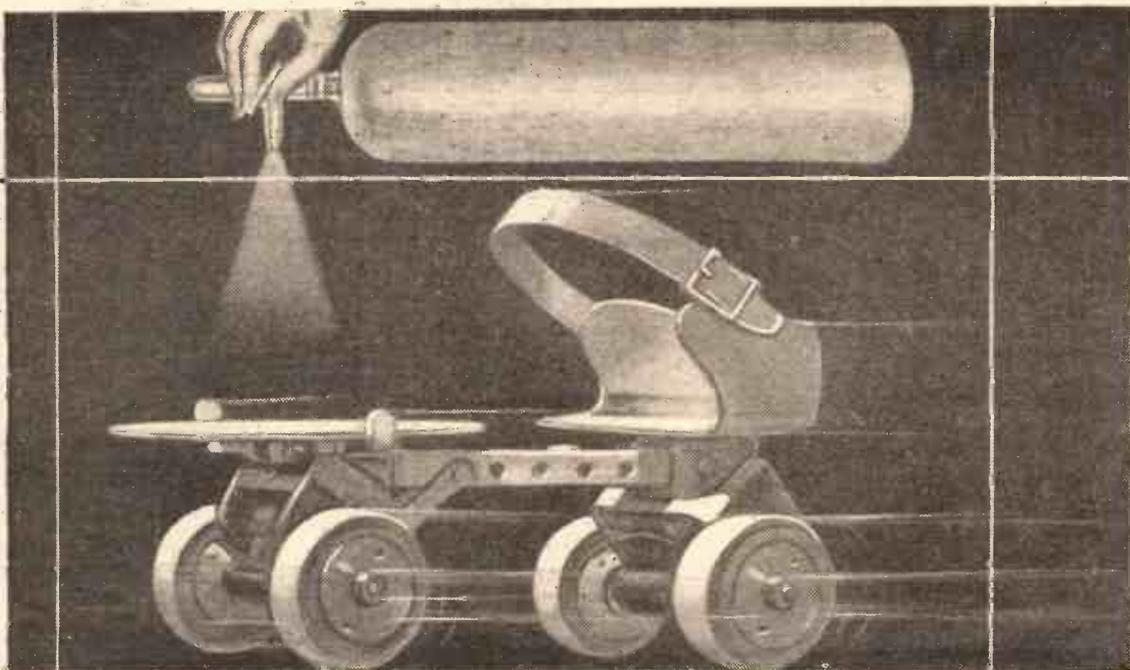
"With the normal anode current of 3 milliamps a drop of 150 volts will occur in the two resistances, and as only 120 volts are applied to the H.T. terminals, it would appear that no voltage can be applied to the valve anode, and yet in spite of this the receiver operates fairly satisfactorily. I must admit that this effect puzzles me, and if you could indicate where my reasoning is incorrect, I shall be glad."

IS RATED to pass 3 milliamps—the valve is rated to pass 3 milliamps.

But in the case you give it won't! Suppose the steady effective resistance of the valve is 20,000 ohms. Then the total resistance of the circuit is $30 + 20 + 20$ (thousands) = 70 thousand ohms. And the applied volts are 120. Therefore the current is 1.7 milliamps — $(30 + 20) 1.7 = 85$ volts are dropped in the resistances and therefore $120 - 85 = 35$ volts are left for the valve.

Not enough.

HOW
STUDIO
SOUNDS
ARE
PRODUCED



Here's your radio railway train



Shrill whistles, hissing steam, the clank of wheels, the gathering speed . . . all these noises are produced in the Effects Studio by means of simple mechanical devices like the roller skate and the compressed air cylinder you see above. The result is amazingly realistic; and that realism you can retain in your reproduction by using the pure power of a Lissen Battery in your set. There is a process used exclusively in this Lissen Battery which produces power of remarkable purity; power so sustained that over prolonged periods of time it remains steady, noiseless and abundant always. Every radio dealer sells the Lissen High Tension Battery; ask for it firmly by name.

LISSEN H.T. BATTERY

lasts longest and provides a pure high tension current
that will give stage realism to your radio drama!

THE most inveterate grumbler can find little to complain about just now either in the number of foreign stations that can be tuned in or in the volume that is obtainable from them.

Atmospheric interference has calmed down and everything in the broadcast garden would be lovely were it not for one nuisance which is becoming more and more noticeable. This is the heterodyne whistle which accompanies so many otherwise excellent transmissions.

Heterodyne Suppression.

These heterodynes are going to be one of the big problems of the near future. There is no question that the 9-kc. separation, which is the basis of the present wavelength allocation, is not sufficient, but there are so many stations to be fitted in that one does not see how it can possibly be increased.

In all probability some kind of heterodyne suppresser in the form of a special filter will have to be incorporated in the long-distance set.

Apart from heterodynes—and it must not be thought that every foreign station's transmissions are spoilt in this way—conditions upon the medium waveband are little short of amazing at the present time, such is the wealth of foreign stations that can be received with a set of average sensitiveness and reasonably good selectivity.



Realising the importance of providing listeners with up-to-the-minute news about long-distance stations and conditions, "P.W." publishes every week the notes of a Special Correspondent who nightly searches the ether in order to provide a log that is really up to date.

If you have any doubts about the wonderful choice of stations that awaits the long-distance enthusiast upon the medium waveband just try this little experiment this evening at any time after about seven o'clock. Turn the tuning dial or dials down towards their lowest readings and apply just sufficient reaction to make the set lively. Now turn quite rapidly, without pausing to identify stations, right up to the top of the scale, taking about a couple of minutes to do so. You will find that there is something to be heard at almost every division of the dials as you move from one end of the scale to the other.

My star stations on the medium waves just now is Breslau, who comes in so strongly that you cannot help finding him when you make a search upwards from Hilversum's settings. Unfortunately, another tremendous station, the Poste Parisien, is on a neighbouring wavelength and some readers may have a little difficulty in separating these two giants.

Berlin and Belgrade.

Stations that have not been heard well for some little time are reappearing in

considerable numbers on wavelengths between 200 and 550 metres. Berlin Witzleben, for instance, is not difficult as a rule to pick up, and almost next door to him you may hear Belgrade.

Barcelona is much better heard in some parts of this country than in others, and there is a definite in-

crease in his volume. Brno is not as a rule difficult to find and you should certainly look out for Lyons Doua. Munich, on 533 metres, is a station worth attention.

Vienna is improving rapidly and often provides fine reception. Don't omit to search for Katowice (408 m.) or Bordeaux (on 304 m.). The latter station was hardly heard at all for many weeks during the summer, but he is now rapidly coming back.

A Happy Hunting Ground.

Bratislava is another station worthy of attention on the medium waveband and you may add to the list of those now likely to be worth picking up, when conditions are good, Goteborg, Toulouse P T T, Lille P T T, Horby and Genoa.

Fécamp varies a good deal and is subject to rather bad fading at times. Budapest shows every sign of becoming shortly a first-rate medium-wave station.

The long waves are a very happy hunting ground just now. Huizen, Radio-Paris, and Zeesen are at the top of their form, whilst Motala, Kalundborg and Oslo are generally to be heard in daylight as well as after dark.

STILL readers' logs continue to pour in, and still the log I mentioned a few weeks ago, from "W. W.," of Exeter, beats all-comers. If you think you have received a creditable number of short-wave broadcast stations, just send in your list before it is too late.

About the Eclipse Tests there is little to be said. At the moment of writing these notes, the short-wave listeners have responded fairly well, but from the hundreds of thousands of broadcast listeners who could have made some observations, I have received the gratifying total of one letter!

From this it appears that I was right when I said that you couldn't beat the short-wave merchants for keenness about their hobby. I must make a special mention of our friend, "W. H. R." (Plymouth), who sent in a curve for four or five days that was a positive work of art. His is easily the most useful report received as yet.

Help One Another.

Apropos my note about PA-oASD a little while back, two readers have been good enough to send in full particulars. The station uses 50 watts on 3,760 kc. (about 79.5 metres). In case anyone wants to write him direct, his full address is

SHORT-WAVE NOTES



News and views regarding an exciting and fascinating waveband.

By W. L. S.

W. F. Jacot, Euterprestraat 73, Amsterdam.

"J. P." (Ashton) wants to know the size of the condensers in the 5-metre receiver described in "M.W." The variables are: .00002 (tuning), .0001 (reaction), and those used in the original set were of the Cyldon "Bebe" type. The fixed condensers may be of any convenient make or type, and one .001 and one .002 are required.

"W. B." otherwise Mr. W. Barden, of 9, Grecian Street, Maidstone, wants to hear from other enthusiasts in that district with a view to starting a short-wave club.

This sort of request is always well worth watching, and I am very keen on the "local club" idea. Even six short-wave

enthusiasts working together can be very much more helpful to each other than the same six each paddling solitary canoes! Some of you live readers in other parts of the country might well try the same scheme.

Two fans in Coventry have each asked me for the address of the other one, so it looks as if something might be in the wind up there, too.

The Bath Problem.

Col. Dennis, of station EI 2 B (Irish Free State), mentions the terrific reception of Rio de Janeiro that appears to be the general rule nowadays, and enquires about the input of that station. Does anyone know the official figures? He finds Rio much stronger than the North Americans.

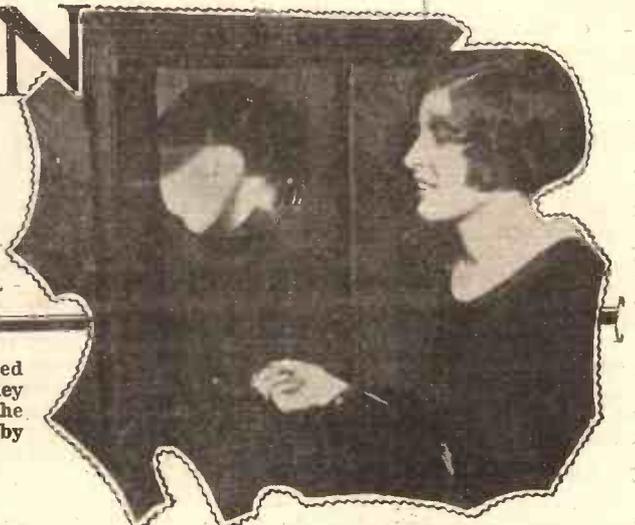
"F. N. B." sorely wants help on a little problem concerning a bath! He has a "super dead-spot" on his receiver, which suddenly flops out of action at 32 metres and comes to the surface again on 38. This he can only trace to the natural wavelength of the bath, on the other side of the wall from the set. My own advice to "F. N. B." is to upset the natural wave of the bath by keeping it filled with water; but perhaps someone may come along with a more helpful idea?



TELEVISION *in* AMERICA

An article describing a new form of Television now being experimented with in the States. It employs waves of such high frequency that they come within light range, photo-electric cells being used at the receiver instead of an aerial. The system is here described by

AUSTIN FOX.



TRANSMITTING television images by light waves, as announced recently by Dr. E. F. W. Alexanderson, of the General Electric Co., Schenectady, New York, is one of the latest developments in the United States of this uncertain and frankly controversial field of wireless.

Short-Wave Radiations.

The principal interest in his experiments appears to lie in the concentration of attention upon extremely short-wave radiations for the most efficient television work; as Dr. Alexanderson expresses the opinion that one major difficulty in present transmission is the diverse paths followed by radio waves. As this would cause a series of images by each wave sent, as the various broken parts came in at the receiver, blurring and flickering would seem inevitable.

Light waves, he points out, are known to travel in straight lines under proper optical control. Thus all broken wave reception could be eliminated by the use of light waves. The principle of his light-wave television is simple. He plans to transmit a powerful light beam to one or more photo-electric cells. The light source is connected to a regular valve-transmitting unit, in turn connected to a television scanning unit.

Scanning Cells.

As light variations are impinged on the scanning photo-cells, these are turned into electrical currents in the usual manner, pass through the amplifier, and cause variations in the intensity of the light source.

The photo-cell receivers, sensitive to light fluctuations, register the flickering of the arc light in the same manner that the scanning source registers the lights and shadows of the original object to be televised. This creates a modulated electric

current which is passed through a television receiver and on to a screen, showing the same image that the scanning mechanism sees.

It is in reality nothing more than an adaptation of John Bellamy Taylor's work, also at the General Electric Laboratories, on the transmission of sound over light beams. Mr. Taylor used a regular radio amplifier unit, making a neon-filled tube fluctuate to sound-wave variations.

This neon beam he could focus on a photo cell at whatever distance he chose, dependent upon the strength of the light source. The sound could thus be translated back from light fluctuations to electric current and brought out of a loudspeaker just as a radio message might.

Dr. Alexanderson has to overcome some great difficulties in his scanning problem, no

treme. He suggests powerful arc lights mounted on the top of tall buildings and focussed in such manner that they can be picked up by photo-cell receivers in the average home—a photo cell rather than a wireless aerial perhaps mounted on the roofs of houses.

Interference by Trees.

For purely local use, due to the limitations of the distance to be covered by any light beam, the interference of fog and smoke might be overcome, he is quoted as saying, by the use of the Langmuir and Westendorp fog penetrating light, which has been demonstrated in Schenectady for use in aviation.

The matter of interference by buildings, trees, or other shadows; the engineering problem of setting up a series of high-

intensity light sources which would shine in all directions without any gaps due to mirror or lens-beam control; and the probability of any exposed photo-electric cell becoming dirty to the point of inefficiency of function within a brief time, would seem to indicate discouragements of a practical nature which these workers may find as they go along.

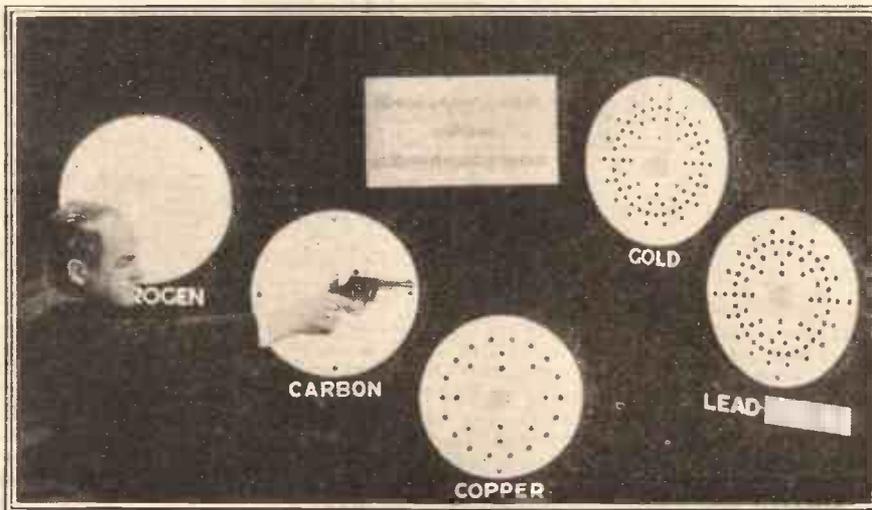
Frankly Sceptical.

And even in regard to the fog-penetrating light mentioned, I have, during the last four or five years, heard of and seen demonstrated several so-called fog or smoke penetrating rays, not one of which could

really stand the test of a sensitive, well-balanced photo-electric cell circuit trying to detect the signals through a heavy smoke screen or rain storm: While I have not seen the Langmuir hold-up, I shall be frankly sceptical until I do.

This seems to be the newest departure
(Continued on next page.)

BOMBARDING LEAD INTO GOLD!



At a recent scientific gathering in the States, it was suggested that as the only difference between atoms of lead and gold is that lead has three more electrons than gold, it might be possible to produce this precious metal by electronic bombardment.

doubt. He admits that the entire thing is in the experimental stage, and that he has no idea when or whether it will be applicable to television as a whole.

However, according to reports, he is quoted as allowing himself some speculation on its potentialities; speculations which on analysis would seem optimistic in the ex-

TELEVISION IN AMERICA

(Continued from previous page.)

in television about which anything is being said publicly. There are many tests and experiments being carried out by various people, and there is also an ultra-short-wave station being set up on a New York skyscraper for future work; but I am not yet at liberty to give the details about this latter.

It is extremely difficult to estimate the number of television receivers now in use in the United States. One writer suggests that from the best figures he can get there must be at least 2,000 in what is commonly called the "metropolitan area"—that is, within a radius of one hundred miles of New York City.

Flagging Interest.

It is interesting to note that the flagging interest of the "ham," or amateur constructor, has been somewhat revived by the new phase of radio, and that many private receiving sets are being built by them.

No word has so far been available about Baird or his further plans for financing operations over here. The "wired" television of Bell Telephone Laboratories is still considered more of a laboratory experiment than otherwise, as the cost of installation and maintenance is prohibitive.

Radio Victor and Philco (the latter now manufacturing under the Farnsworth patents) appear to be making greater progress than any other group at the present time. The R.C.A. people are working with the cathode ray scanning device, while one theatre in New York (owned by Moss—a variety house) gives as part of its weekly programme a short television exhibition.

No Real Entertainment Value.

None of the results so far can lead to a very optimistic view of the immediate future of television. The theatrical performance, the individual sets, the experimental receivers, etc., have shown only that television has for the moment no real entertainment value.

The leaders in the radio industry are all agreed on that point, and are more or less sitting back "holding their breath" against either the discovery of a new

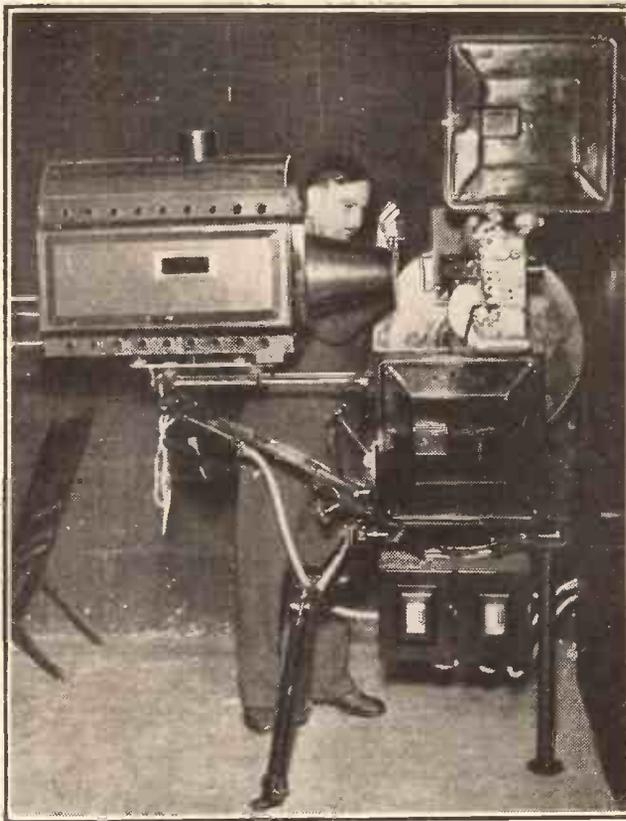
principle or the new application of some known one which may show them the way to solve television problems.

They have bought their caution dearly, at that. Due to one of the most stupid pieces of publicity ever released people almost entirely stopped buying ordinary receivers.

About three years ago one of the head officials of a very great manufacturing organisation permitted himself to be quoted as saying that he could see television "just around the corner," and that there was little reason to believe that it could not be an achieved piece of engineering within the year—possibly meaning that only as a transmission engineering feat and quite forgetting the general public: or thinking of it from the theatrical side only.

It took the radio dealers and manu-

TELEVISION AID FOR AIRMEN



Some American transmitting apparatus that was used for television experiments between the ground and an aeroplane in flight.

factors at least three months to prove that there was no use in waiting for television before either replacing old sets or buying new ones—television was going around as many corners as the engineers were, and would still be far away after a long pursuit. This was probably one of the most costly slips that a publicity department has made for a long time, in its unwanted negative effect.

Now they all say that they are "proceeding behind closed doors"; and when they admit that television is still in a purely experimental stage, they are not trying to clear their shelves of old stock in the way of receiving sets, but are honestly attempting to convince the public that the wild promises and absurd claims of success made by a few "fly-by-night" stock promotion

schemes—of which there are unfortunately quite a number in America—do not mean that television is here for the "man in the street." Nor that it is, in all probability, anything but an interesting scientific and engineering study in which they have asked the public to join—its primary interest still being its novelty.

When the time comes that they can get from a television screen the clear "resolution" of the cinema; when they can present to large audiences, or show to the individual in his living-room, scenes from plays, views of sporting events, or news events—then, certainly television will become a great industry. But no one dares to predict for a certainty whether or not that time will ever come.

AN EARLY TYPE MICROPHONE

Its construction described by REGINALD TEECE

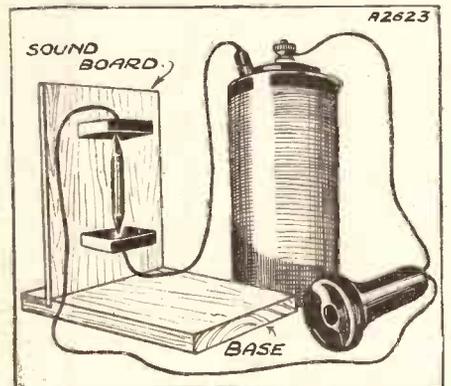
THE strange apparition on this page is that of an early microphone. Hughes, the inventor, was successful in using this queer instrument to magnify very faint sounds in 1878.

The microphone consists of a pine sound-board secured to a stout base, as shown in the sketch. Two small blocks of carbon are mounted on this sound-board, between which is loosely supported a further piece of carbon in the shape of a pencil, sharpened at both ends. The small blocks are connected to a Leclanche battery and a telephone receiver.

On providing a suitable means of producing sounds—such as the ticking of a watch, which was put on the base—the piece of carbon arranged loosely between the blocks vibrated in unison with the original sounds and produced a corresponding flow in the circuit, which actuated the telephone.

The sounds were of much greater amplitude when heard in the receiver, but the success

SIMPLE CONSTRUCTION



The microphone consists of a pencil of carbon mounted between two carbon blocks. A telephone ear-piece and a cell are the only other requirements.

of the idea depended greatly on the delicate setting of the carbon pencil between the supports.

Imagine a talk to schools, or the news bulletin, coming over the wire to-day in this fashion!

FROM THE TECHNICAL EDITOR'S NOTE BOOK.

Tested and Found-?



A GECOPHONE LOUDSPEAKER

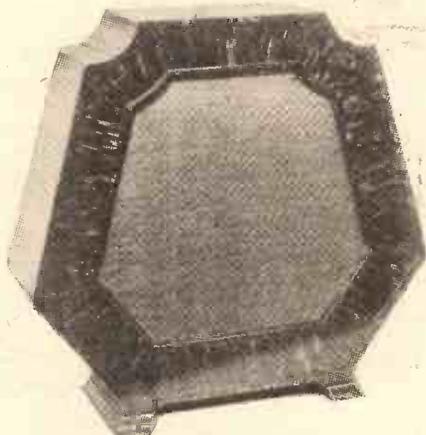
LOUDSPEAKER sensitivity adjustments are disappearing, and so another control is passing out of the hands of listeners. This is all to the good, for the simpler radio becomes the better it is for everybody.

Before the advent of the moving-coil, practically all speakers embodied sensitivity controls as a matter of course. The reason was because the sensitivity of the ordinary electro-magnetic depends largely upon the closeness of its association with the magnet pole-pieces.

But the smaller the separation between these two elements the more restricted is the armature movement, so, in the average instrument, you could not have sensitivity and big volume at the same time.

The new Gecophone Magnetic Loudspeaker suffers from no such limitations,

PROVISION FOR MATCHING



Alternative tappings are provided to enable this Gecophone speaker to be matched with different output valves.

and there are no adjustments to be made by the listener.

There are, however, alternative tappings, so that the instrument can be matched with any output valve, and this is not so much an adjustment as a method of installation.

It is very compact in construction, for the unit is mounted inside the cone.

The chassis, which comprises the unit and diaphragm assembly, lists at 21s., and the complete loudspeaker built into a fine bakelite cabinet retails at £2 5s. 0d.

ALWAYS KEEPS DAMP



"Filt" ensures a good earth connection because it maintains a damp condition in the surrounding soil.

I first heard this Gecophone Magnetic Speaker at Coventry, and although I thought it sounded excellent, I held my final judgment in reserve until I had the opportunity of testing it under my conditions!

I have now done this, and have discovered no reason to alter my original opinion. For the price, it is as good as anything I've tested, and a great deal better than most. It is also thoroughbred G.E.C. in its manufacture and finish.

THE "FILT" PERCOLATIVE EARTH

In my opinion, the earth connection is receiving far less attention these days than it should. From several points of view it is vitally more important than the aerial, especially with certain types of sets.

A water-pipe may or may not make a good earth; in a number of instances which have come to my notice a piece of wire wrapped round a fireguard would have given better results!

But there is no contact electrolysis (such as worries the water companies), and no insulating joints in a "direct" earth. When it can be properly arranged, this type is by far the best both from a radio and a lightning protection point of view.

And it is very easy to install a good buried earth with the aid of a Graham Farish "Filt." (It only costs 2/6 complete.)

"Filt" is a compact device containing special chemical material of a highly hygroscopic character. That means to say, it has the power of attracting moisture to it. As you may know, there is always a certain amount of moisture, even if only in a vaporous form, in what we call "dry earth" in the middle of the summer. "Filt" condenses and concentrates this moisture and ensures a highly efficient earth connection at all times. It constitutes a new application to radio of a valuable chemical principle.

NOVEL TUNING DEVICE

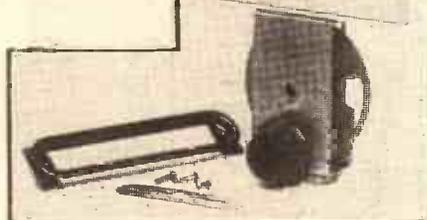
There has been a tendency to go round in circles in the design of tuning dials—in more than one sense of the term.

However, Messrs. Wilkins and Wright have broken clean away from traditional practice with their new Straight-Line Dial.

As you will be able to see from the accompanying photo, the whole of the scale is fixed and in full view, and a pointer runs along it in a horizontal line.

The relative positions of the pointer can be seen at once, and I consider this a most important point and one which, I believe, constructors in general will greatly appreciate. A further excellent feature is that the

STRAIGHT LINE READINGS!



Messrs. Wilkins and Wright's new "Utility" tuning dial.

scale can easily be removed for individual calibration. The dial costs 7s. 6d. complete with escutcheon, is extremely well made, and has a beautifully smooth action.

I shall be surprised if it does not prove one of the most popular lines of the season, for it constitutes novelty backed up by sound utility.

Manufacturers and traders are invited to submit radio apparatus of any kind for review purposes. All examinations and tests are carried out in the "P.W." Technical Department with the strictest of impartiality, under the personal supervision of the Technical Editor. We should like to point out that we prefer to receive production samples picked from stock, and that we cannot in any circumstances undertake to return them, as it is our practice thoroughly to dissect much of the gear in the course of our investigations! And readers should note that the subsequent reports appearing on this page are intended as guides to buyers, and are, therefore, framed up in a readily readable manner, free from technicalities unnecessary for that immediate purpose.

Whatever set you possess, an Ever Ready Battery will power it most economically, most satisfactorily and for a longer time; Ever Ready Batteries are made to fit and power exactly every wireless set made. And every Ever Ready Battery is guaranteed satisfactory by the makers of batteries for the past 30 years.

**CHEAPER TO USE
BETTER QUALITY
GREATER VOLUME
LONGER LIFE**



EVER

**WIRELESS
DRY
BATTERIES**

READY

THE BATTERY YOU WILL ULTIMATELY USE

THE EVER READY CO. (Great Britain) Ltd. HERCULES PLACE
HOLLOWAY, LONDON, N.7.

KIT KRITICISMS

THIS WEEK: "Thirty-Three" Music Magnet

The Osram

By Mr. PETER SIMPLE.

I DON'T mind confessing that it was with some misgiving that I embarked upon the construction and test of the latest addition to the now famous Music Magnet series offered to home-constructors by the General Electric Company.

One of the chief reasons for putting kit sets on the market—or so I have always understood—is to enable radio enthusiasts to get the very best receivers at a price below commercially-built sets of similar layout.

Concerning Components.

The "Thirty-Three" is not a cheap set; £9 9s. is the amount asked for the complete kit, including, of course, the cabinet, loudspeaker, valves and royalties. I felt, therefore, that this Music Magnet would have to be something very special if it were to justify itself for being more expensive than the majority of constructors' kits.

When I unpacked the kit, I found that I was not to be disappointed as far as the components were concerned.

Each separate part of this receiver, from chassis to coil unit, is so substantially built as to be almost an engineering job!

The most thorough screening of every component is provided for, and there is certainly no skimping of quality in this respect.

Nothing Left To Chance.

A special word of praise is due to the construction chart. I have yet to find a chart more carefully thought out than that which accompanies the Music Magnet. Nothing is left to chance; every component is numbered, even down to the fixing screws, which are contained in separate envelopes.

The double wiring diagram which by an ingenious arrangement shows the wiring above and below the baseboard simultaneously, is a masterpiece of ingenuity, while the useful rule at the bottom of the chart—giving the exact length of each connecting wire—is a luxury which will earn the thanks of many an inexperienced constructor.

I reckon that, with the aid of this chart, anyone should be able to have the Music Magnet ready for action in two and a half hours. It is literally impossible to go wrong!

As with several other kits, the valve panel is supplied already wired, which simplifies construction, even if it does not tend to give a complete insight into set construction.

The circuit, as you can see from the diagram here, employs screened-grid valves for both H.F. amplification and detection, and there is transformer-coupled power output.

The condensers are ganged to provide single-knob tuning, and the only other controls on the panel are the wave-change switch and the volume control which incorporates reaction. The on-off switch is at the back of the cabinet.

A fuse is also incorporated in the high-tension circuit.

The receiver is entirely self-contained in a pleasant-looking cabinet which houses the loudspeaker and the batteries. Both aerial and earth terminals are easily accessible.

I had the Music Magnet on test for two consecutive evenings, and it is in the matter of performance that this set really excels.

The manufacturers claim great things for their receiver. Actually it behaved even better than they claimed!

On the long waves alone I was able to

secure eleven stations before midnight, and two more after Daventry and Radio Paris had gone to bed—a truly remarkable result without taking into consideration the unsatisfactory conditions under which I am compelled to listen.

The medium waves were no less profitable, and although the two transmitters at Brookmans Park claimed rather a large number of degrees on the dial, I was able at the first attempt to log more than a dozen broadcasters at excellent strength.

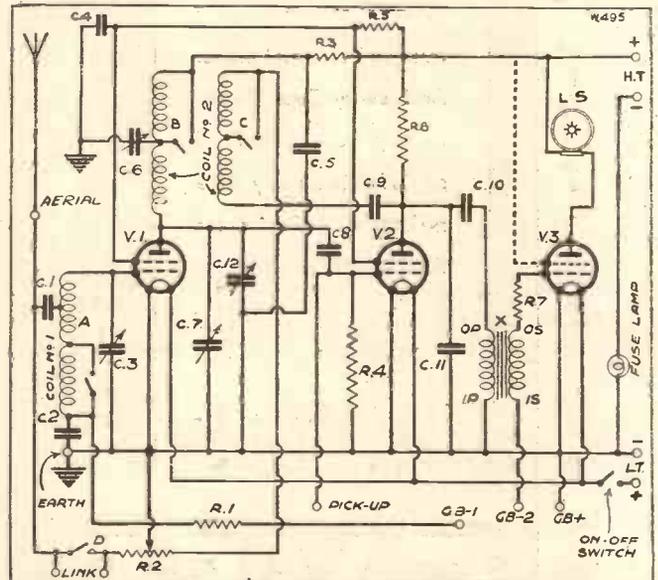
Ideal For Long Distances.

This means that the Music Magnet is the ideal receiver both for the long-distance man and for the stay-at-home listener, for not only does it offer a command of most of the Europeans at good volume, but it also provides most excellent loudspeaker quality on the English stations.

The speaker incorporated with the kit has a most pleasing tone.

The Music Magnet, by the way, is

A SCREENED-GRID DETECTOR VALVE



The circuit of the Osram Music Magnet Kit Set has many novel features. As indicated, a Pentode valve can be used for output if desired.

very kind to the H.T. battery. I found that the consumption never exceeded 9 milliamps.

I have tried hard to find some point on which I might offer direct criticism. Better performance could not be desired from any receiver; the building instructions could not be clearer. But I did find that the fixing of some of the components presented one or two awkward moments. I actually had to leave one screw out of the set altogether because it was quite impossible to get the fixing holes in correct alignment!

No Complaints At All.

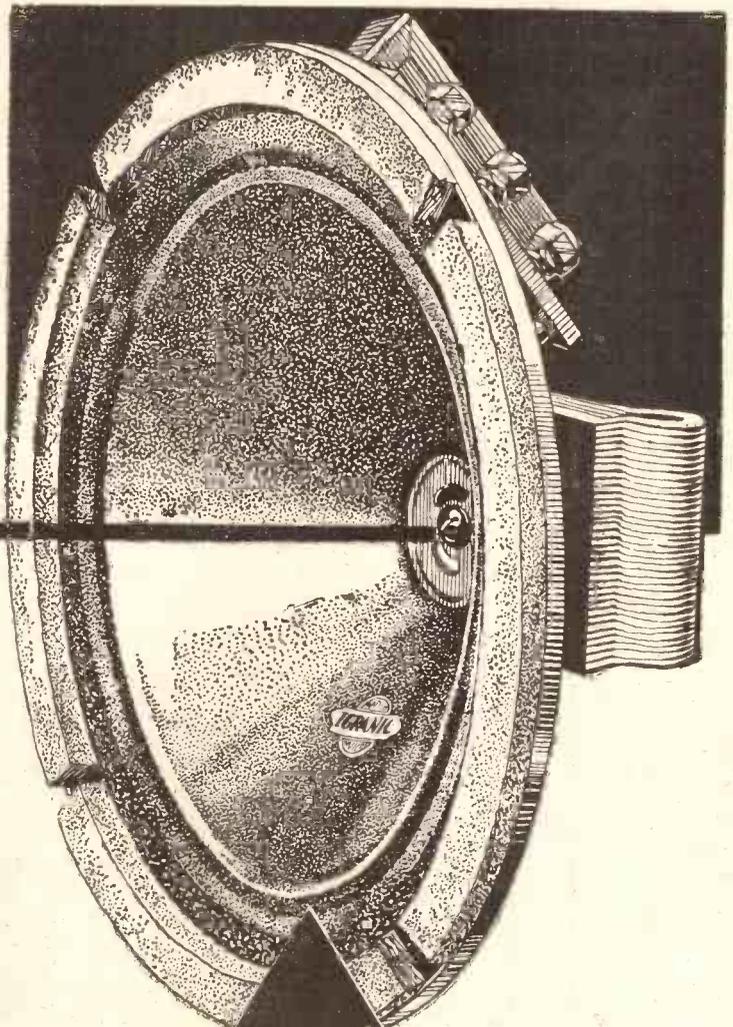
For the rest, I can find no complaint, and all my fears as to the wisdom of putting a more expensive kit on the market were laid at rest as soon as I had built the set.

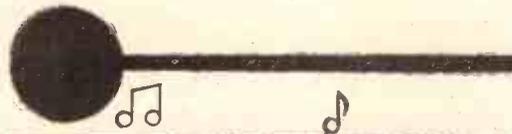
The Osram "Thirty-Three," pleasing in appearance, interesting to build, simple in operation, and remarkable in performance, has made for itself a place among the very best of kit sets.

YOU CANNOT GO WRONG!

Every component of the Osram Music Magnet—from cabinet to safety fuse—is contained in a separate box, clearly marked so that the inexpert constructor cannot possibly mistake a ganged condenser for a transformer, or a valve holder for a coil unit!







EVERY NOTE



IN THE REGISTER



COMES THROUGH



FAITHFULLY



VIVIDLY



AND TRUE

32/6

IGRANIC
D.9.

From the top register down to the deep bass of the drum the Igranitic D.9 delivers every note with its true tonal value. Stations which were once mere murmurings come in at full volume—Igranitic D.9 widens the scope of your set. Let your dealer demonstrate that the Igranitic D.9 permanent magnet moving-coil loud-speaker at 32/6 is the best value money can buy.

Write for Catalogue R.189.
Igranitic Electric Co., Ltd., 149 Queen Victoria Street, E.C.4

**NEW TYPE PERMANENT MAGNET
MOVING COIL
LOUD SPEAKER**

MORE ABOUT OUR TRUE-VIEWS

Some fascinating details concerning the taking of our new stereoscopic pictures.

By G. V. DOWDING, Associate I.E.E.

SEVERAL correspondents have remarked upon the granular effect to be seen in our new stereoscopic pictures. Some have likened it to seeing scenes through frosted glass. It is due to the "Screen" which forms an integral part in the process of printing pictures.

Thousands of Points.

All photographs published in periodicals are printed from "blocks" of metal, the

stereoscopic photo, and we employ all three. The simplest is to use a special camera having two lenses. It is in effect two cameras coupled together. The lenses are eye-width apart.

When a "True-View" of a fairly large object, such as a complete radio set, is required, no difficulties are presented for the object would naturally be photographed few feet away from the camera. But a close-up of a smaller article, such as a

from it, and remembering that the camera is a substitute for your eyes you can clearly see that the component would be too close for comfortable viewing. The stereoscopic effect would be exaggerated.

The problem can be solved by placing the article further from the camera and enlarging the resulting picture afterwards.

Use of Single Lens.

Alternatively, recourse may be made to either of the other methods of taking stereoscopic pictures, both of which demand the use of only an ordinary single lens camera.

The first is to take one ordinary photo of the object, and then to move the camera very carefully a little to the one side and take another picture. The distance the camera is moved determines the stereoscopic effect. With a close-up of the nature mentioned above, the movement may be as small as one inch or less.

Anything above that may produce curious distortion.

Instead of moving the camera the object itself can be turned round slightly. You can gauge the required movement by placing the object a convenient distance from the eyes, first looking at it steadily with the left eye and then with the right. You then turn it so that you can see as much of, say, a projection on its right side with the left eye as you can with the right eye.

Having memorised the movement you proceed to take the two photos.

The more distant two-lenses method and subsequent enlarging is probably simpler in the long run, and it is this method which we shall no doubt standardise for our "close-ups."

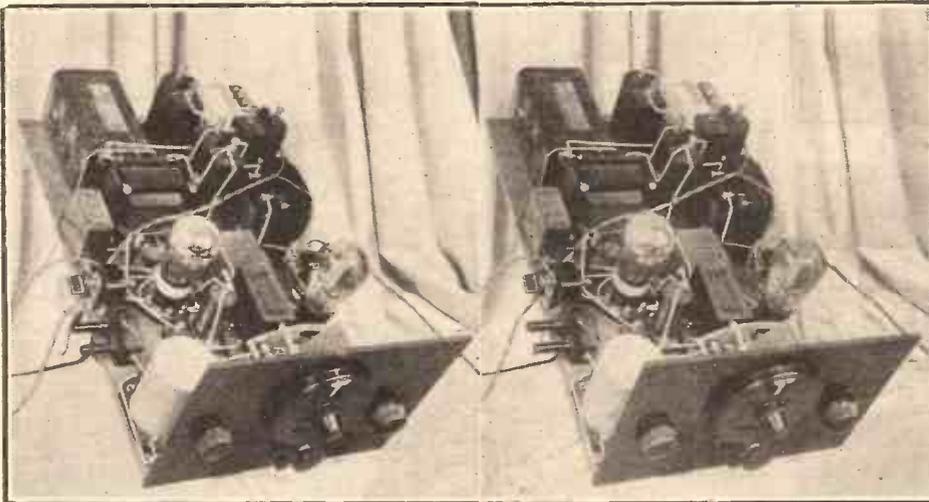
Concerning Distance.

Perhaps you don't realise it, but normal stereoscopic vision deteriorates rapidly over distances. You don't see a distant hill or building stereoscopically, but only in two dimensions.

In taking stereoscopic photos of mountains an ordinary camera is employed and two pictures are taken at widely separated points.

Stereoscopic photos of the moon are obtained by exposing plates at different times of the year, when the moon has turned round.

A FINE TRUE-VIEW OF THE "FLEX-FEED"



This set, which was described in our last issue, lends itself most admirably to our new True-View method of depiction. Its depth cannot be accommodated in two dimensions,

surfaces of which are studded with thousands of points. So you can say that for all intents and purposes a printed photo consists of a mass of full stops arranged in a certain orderly assembly!

With "coarse" screen reproduction the dots are large and clearly visible to the naked eye; obviously, the finer the screen the smaller the dots. We use a fairly fine screen for our stereoscopic pictures, but even so, with the magnification given by a viewer the granulation becomes evident, although more as a kind of luminosity than as a stippling.

Three Different Methods.

However, we are continuing our experiments with the object of reducing it. At the present moment I am trying the effect of employing different screens for the True-View sections.

It is all most fascinating. Not the least interesting part of the business is taking the stereoscopic pictures. Here, too, with the assistance of our staff photographer, we have experimented widely and some of the results of this have already been brought to our readers' notice.

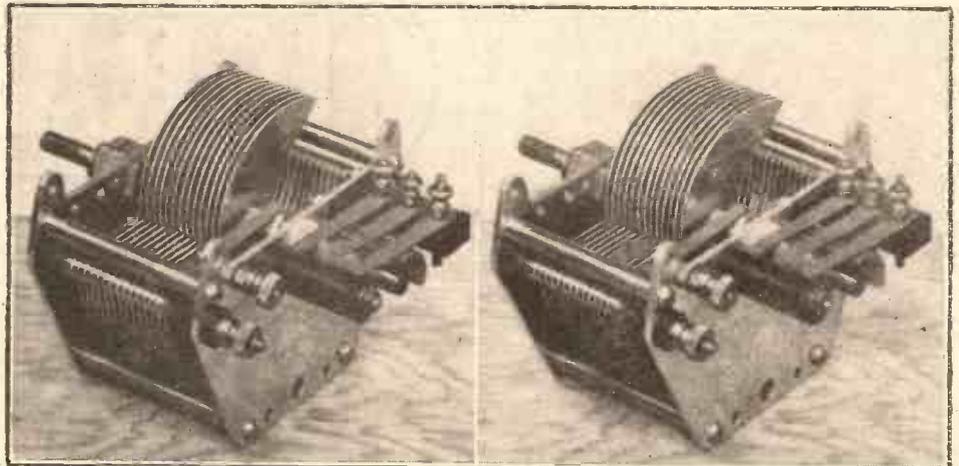
There are three ways of taking a

condenser or transformer, requires different treatment.

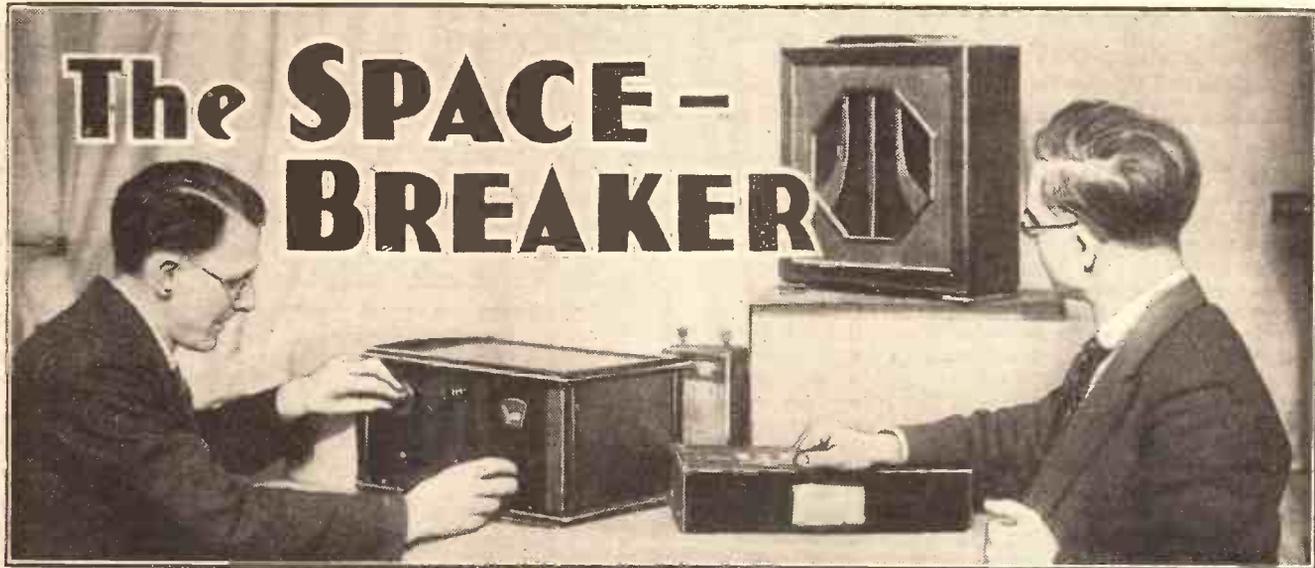
An Exaggerated Effect.

If the camera were focussed on it in the ordinary way it would be only a foot or less

SEE AN "EXTENSER" IN THREE DIMENSIONS



An excellent three-dimension representation of a Cyldon Extenser—seen through a viewer it stands out in bold relief, and all its constructional details can be clearly appreciated.



The SPACE-BREAKER

TWO S.G. H.F. stages! The very sound of it gives a thrill to the enthusiastic constructor.

What thoughts of far-off stations it conjures up; what impressions of power! It suggests the spanning of almost limitless distances.

"A set well worth building up," is the general verdict. "Something to be proud of." And why not? Is not pride of achievement one of the greatest attractions of home construction?

Thrill in Every Step.

To make up a set capable of putting any continental station going on the 'speaker, to watch each little mechanical detail with precision, to put every lead in place with care, to adjust and tune in with skill—there's a thrill in every step.

And when you've finished you have a set that is second to none. You have a receiver with a degree of selectivity and a performance equal to the most expensive and elaborate commercial instruments.

A fine receiver for the long-distance listener, and one which, because of its single-knob tuning, is also a set that can be handled by anyone. It employs two S.G. H.F. stages, a detector and output stage and will give powerful reproduction of the most distant continental stations.

Right up-to-the-minute and "as modern as they make 'em"—single knob tuning controlling a power that is little short of marvellous.

The "Space-Breaker" is a set that the experienced constructor will revel in. Have a look at the presentation blue print (you'll find it inserted in

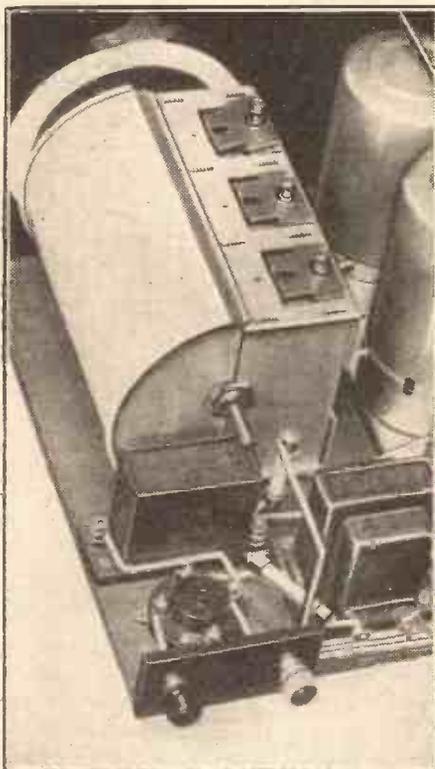
this issue), and you can see the features for yourself.

No Elaborate Screens.

The first thing that will strike you is that the set is surprisingly compact and simple, and this is largely due to the absence of elaborate screens. It is not even necessary to cover the baseboard with copper foil.

This great simplification is made possible by the particular coils and ganged condenser that are used. These are themselves completely screened, and each section of the ganged condenser is separated by a screen from its neighbour.

(Continued on next page.)



ONE-KNOB TUNING

By means of the triple-gang condenser the set is tuned with one knob, and trimmers on the top of the condenser ensure that each section tunes accurately.

- 1 20,000-ohm resistance (Dubilier 1-watt type or Graham Farish).
- 1 100,000-ohm resistance (Dubilier 1-watt type or Graham Farish).
- 1 H.F. choke (Igranic, Telsen, Lewcos, Lissen, Ready Radio, Goltone, Wearite, Tunewell, etc.).
- 1 00015-mfd. differential condenser (Telsen Ready Radio, Igranic, Lotus, J.B.).

COMPONENTS YOU NEED

- 1 3-gang coil unit (Colvern KGO-KGO-KGR).
- 1 3-gang variable condenser, 0005-mfd. (Utility, type W314/3).
- 4 4-pin valve holders (Lissen, W.B., Lotus, Ready Radio, Benjamin, Telsen, Bulgin, etc.).
- 1 10,000-ohm potentiometer (Watmel, Wearite, Tunewell, Colvern, Lewcos, etc.).
- 1 3-point push-pull switch (Ready Radio, Lissen, Tunewell, Telsen, W.B., Bulgin, Peto-Scott, Wearite, etc.).
- 4 1-mfd. non-inductive fixed condensers (Dubilier).
- 1 2-mfd. fixed condenser (Telsen, Dubilier, T.C.C., Ferranti, Igranic, etc.).
- 1 0001-mfd. fixed condenser (Dubilier)
- 1 0003-mfd. fixed condenser (Dubilier)
- 1 0005-mfd. fixed condenser (type 665.)
- 2 2-meg. grid leaks (Lissen, with wire ends, Igranic, etc.).
- 4 1000-ohm resistances (Graham Farish, or Dubilier 1-watt type).
- 2 50,000-ohm resistances (Colvern strip type).

- 1 9 in. x 1/8 in. extension rod (Wearite).
- 1 1 1/2 in. reducing connector 1/4 in. to 1/8 in. (Wearite).
- 1 Bracket (see text).
- 1 Panel, 14 in. x 7 in.
- 4 Terminals (Bulgin, Belling-Lee, Igranic, Clix, Eelex, etc.).
- 2 Terminal strips, 3 in. x 1 1/2 in.
- 1 Baseboard, 14 in. x 10 in.

ACCESSORIES TO USE

LOUDSPEAKER.—Celestion, Lissen, H.M.V., Marconiphone, Epoch, B.T.H., Lanchester, R & A, Ormond, Blue Spot, Cossor, Ferranti, Atlas, Igranic.

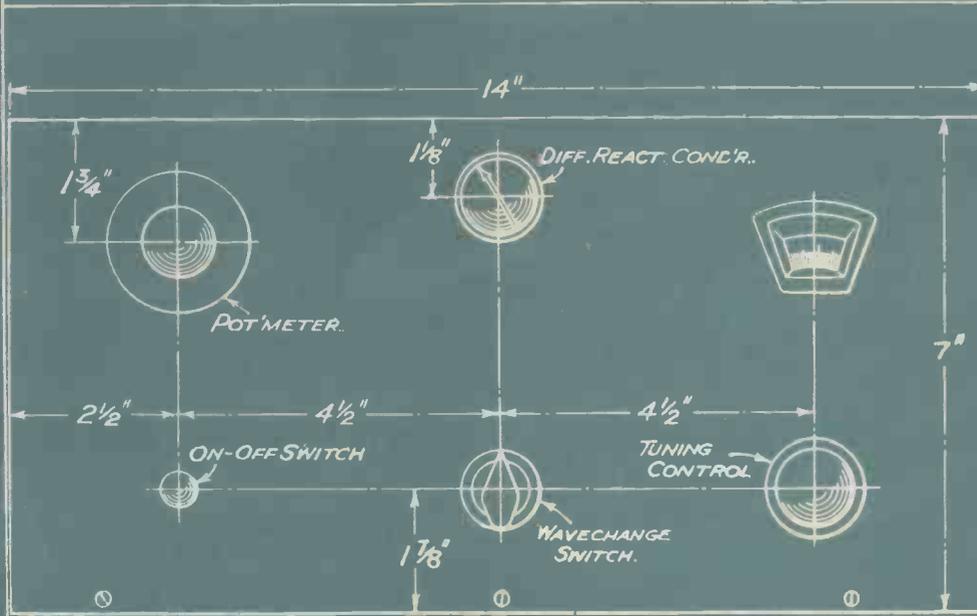
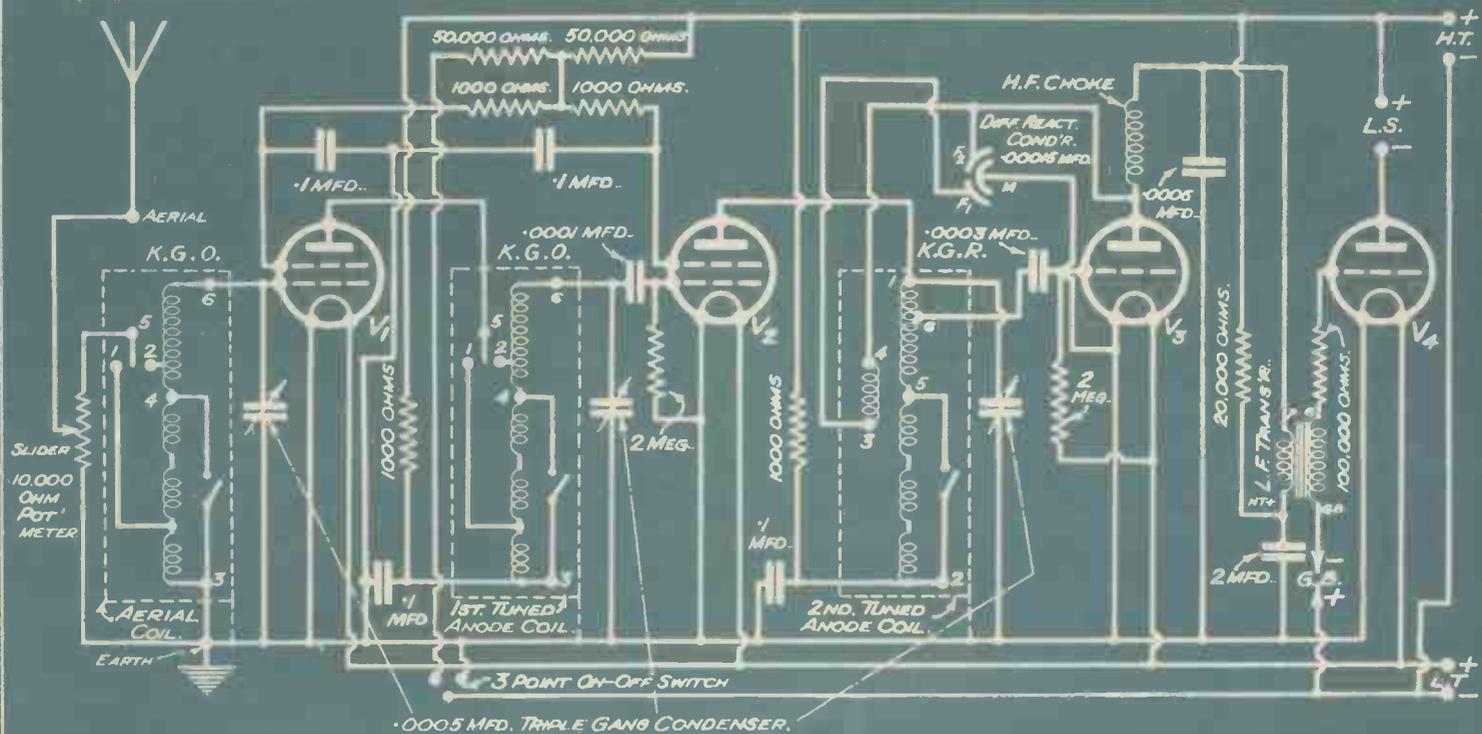
BATTERIES.—L.T.: 2-volt. 30 amp. (Exide, Ediswan, Lissen, Pertrix, Oldham, Ever Ready).

H.T.: 120-150-volts large capacity. (Lissen, Pertrix, Drydex, Ediswan, Siemens, Ever Ready).

G.B. To suit output valve. (Ever Ready, etc.).

MAINS UNIT.—To give 20 milliamps at 150 volts. (Atlas, Heayberd, Tunewell, R.I., Formo.)

RECOMMENDED AERIAL AND EARTH EQUIPMENT.—Electron "Superial" Graham Farish "FILT" earthing device.



PANEL LAYOUT.

P.W. Blue Print No. 62. The "Space-Breaker." Price 6d.

COMPONENTS AND MATERIALS.

- 1 Panel, 14 in. x 7 in.
- 1 Cabinet to fit, with baseboard 10 in. deep.
- 1 Triple gang .0005-mfd. condenser with disc drive, and minimum trimmers.
- 1 Three-coil gang assembly containing 2 Colvern KGO and 1 KGR coils.
- 1 Wire wound potentiometer, 10,000 ohms.
- 1 L.F. transformer.
- 1 .0001-.00015-mfd. differential reaction condenser.
- 1 H.F. choke (flat type).
- 4 Four-pin valveholders.
- 4 1,000-ohm resistances.
- 1 20,000-ohm resistance.
- 2 50,000-ohm resistances.
- 1 100,000-ohm resistance.
- 2 2-meg. leaks.
- 1 .0001-mfd. fixed condenser.
- 1 .0003-mfd. fixed condenser.
- 1 .0005-mfd. fixed condenser.
- 4 .1-mfd. non-inductive condensers.
- 1 2-mfd. fixed condenser.
- 1 3-point on-off push-pull switch.
- 2 Terminal strips, 3 in. x 2 in.
- 4 Indicating terminals.
- Extension rod for reaction condenser $\frac{1}{4}$ in. thick, 8 $\frac{1}{2}$ in. long and bush for panel mounting.
- Collar, 1 $\frac{1}{2}$ in. long with $\frac{1}{4}$ in. and $\frac{1}{8}$ in. holes.
- Metal bracket, 6 in. high, drilled for reaction condenser spindle.
- 18 gauge wire and sleeving for connections, flex, battery plugs, screws, etc.

THE "SPACE-BREAKER"

(Continued from page 88.)

before leaving it we will just briefly mention one or two items that you must not overlook.

The bracket for the reaction condenser should be drilled so that the condenser's

The local stations will come in loudly even when the trimmers on the gang condenser are not set correctly, so you should tune in to a weak transmission near the lower end of the dial. Now, with a wooden-handled screw driver or preferably a piece of wood shaped like a screw driver at one end, adjust the trimmers.

Attend completely to one at a time,

find it necessary to make use of the reaction control to bring in distant transmissions, but occasionally it will help to separate stations that are close together if you reduce volume a bit with the volume control and bring it up again with reaction.

The reason why the selectivity is increased is simply because the application of reaction to the detector's tuned circuit reduces its damping. At the same time reaction will increase volume, but this is kept down to desirable limits by the use of the volume control.

Normally the volume control should be left set at maximum, and reaction should not be employed to increase volume unless it is too small with the volume control in its normal position—namely at maximum volume.

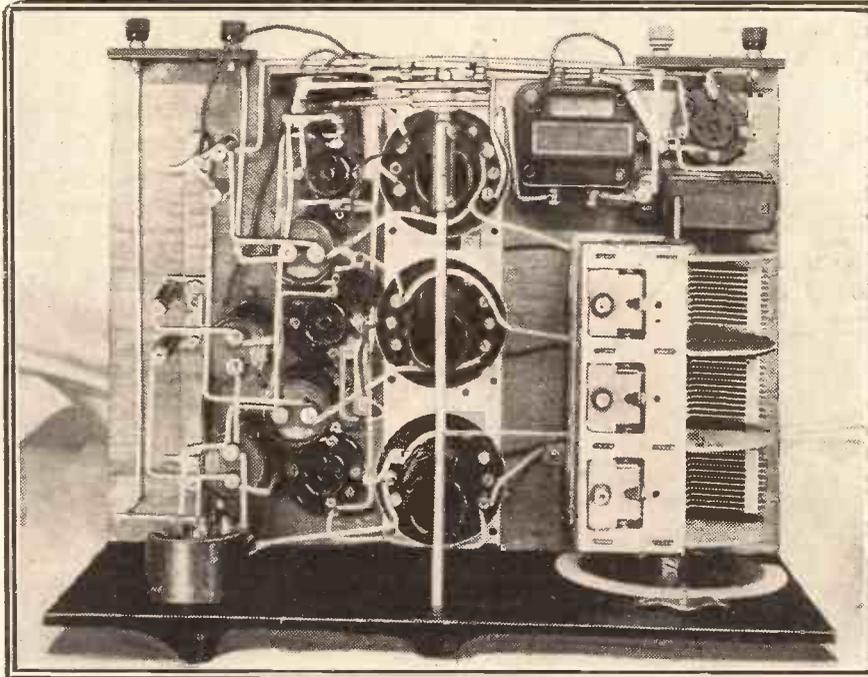
Less Accurate Trimming.

To go over to long waves is merely a matter of turning the wave-change switch to the opposite position. The trimmers remain adjusted for the long waves because the coils are matched, and also partly because the tuning on the long-waves is broader and trimming therefore requires to be less accurately done for this band.

In the list of suitable valves the makes mentioned are suitable for economical battery working; larger valves would require super-capacity batteries capable of giving a really large number of milliamps.

With a mains unit such valves as the Mazda P.220A., Mullard P.M.202, Marconi or Osram P.2, Cossor 230X.P., Six-Sixty 220 S.P., Tungram S.P.230, Lissen P.X. 220A., Eta B.W.602, etc., can be employed.

THE LAYOUT FOR THE SET IS SMALL



Compactness and inexpensiveness for the wonderful results obtainable are two of the features of the receiver. But complications in the construction are avoided in spite of the small size.

spindle comes exactly opposite the bushed hole in the panel.

Three-Point Essential.

A three-point on-off switch is imperative because of the potentiometer type of H.T. supply to the screening-grids of the H.F. valves. A two-point is absolutely useless.

No battery terminals are employed, flex leads being attached direct to various points in the set at one end, and at the other to the batteries themselves.

And now we must pass on to the time when the set is completed and ready to be put into commission. We will assume you have put the valves in place, the cans on the coils, and connected up speaker, batteries, aerial and earth.

To start off, set the volume-control slider to maximum, namely, turned as far as it will go in a clockwise direction. Also set reaction at zero, that is, turned as far as it will go in an anti-clockwise direction.

Next turn the wave-change switch over for medium waves, and then there is only one thing left to do before switching on. It is to set the trimmers on the gang condenser so that their capacity can be increased or decreased.

Adjusting the Trimmers.

This is done by screwing them right down as far as they will go, and then unscrewing them by one turn. That accomplished, you can switch on, having seen that the flex leads are connected to the anode terminals on the S.G. valves.

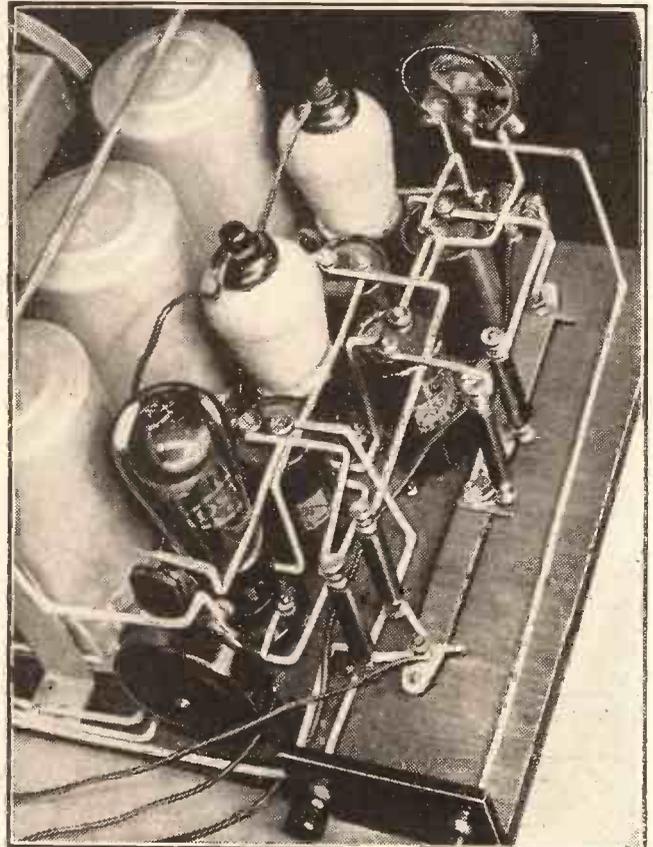
slowly turning it in either direction until the station comes in loudest. When you have dealt with all three, see if you can increase volume by moving the main dial.

Long and Short.

Should you find that one trimmer is at its best when screwed right down and the other two are at some intermediate position, you should unscrew them all a bit, retune on the main knob and then readjust the trimmers. Similarly, if one has to be completely unscrewed for best results when the others are about half capacity, you should screw them all up a bit, readjust on the main knob and then set the trimmers finally.

Once this adjustment of the trimmers has been carefully carried out, the set is ready for use on both long and medium wave-bands. You will seldom

ROWS OF EFFICIENCY



The high efficiency of the set is largely due to the three screened coils and the S.G. valves with which they work. Note the "line" formation of the coils and the valves.

Use your own hands, save pounds & get a better set!



YOU CANT GO WRONG - YOU ARE TOLD WHAT TO DO WITH EVERY SINGLE NUT & SCREW!

INCLUDING METALLISED S.G. VALVE HIGH MU DETECTOR & ECONOMY POWER PENTODE

This is the only kit you can build yourself employing such HIGH POWER VALVES

89%

INCLUDING VALVES CABINET AND LOUDSPEAKER

£6.5



There never has been the equal of this set within the range of the home constructor - this new Lissen Skyscraper is the only one on the market that you can build yourself, employing Metallised Screened Grid, High Mu Detector and Economy Power Pentode Valves. No factory - however well-equipped - can build a better receiver. No manufacturer, however large, can produce a receiver whose results will surpass those you will get from the Lissen Skyscraper you build yourself. It is the only battery set that can deliver such power - yet the H.T. current consumption is far less than that of the average commercially-designed 3-valve set.

Yet the Lissen Skyscraper is made simple for you to build. Elaborate care has been taken to ensure your success by giving - in the Skyscraper Constructional Chart - such detailed instructions and such profuse illustrations that everybody, with no technical knowledge or skill at all, can build it quickly and with complete certainty of success.

You buy the Lissen Skyscraper Kit complete with valves - a Lissen Metallised S.G., a High-Mu Detector, and a Lissen Economy Power Pentode Valve - and the price is only 89/6. Or you can buy the Lissen Walnut Consolette Skyscraper Cabinet and Loudspeaker combined as illustrated. It holds all batteries, and accumulator and loudspeaker as well. It makes everything self-contained. A special Pentode Matched Balanced-armature Loud-

speaker of great power is supplied with the cabinet and the price of the Skyscraper Kit complete with valves and this cabinet and loudspeaker is only £6 5s

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ON VIEW

AT

MANCHESTER RADIO EXHIBITION

SEPT. 28—OCT. 8

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WESTINGHOUSE METAL RECTIFIERS

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82, York Road, King's Cross, London, N.1.



COUPON

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82, York Road, King's Cross, London, N.1.
Please send me full particulars of the new rectifiers. I enclose 3d. in stamps.

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A NEW DESIGN

MODEL NO. 229. Radio Cabinet, 3' 4" high X 1' 10" wide X 17 2" deep. Baseboard 18" X 10". Will accommodate any type of set with baseboard this size or smaller. Baffle Board and Silk for Front included.

Osborn Super-Acoustic Baffle Board prevents 90% Speaker worry. Any size hole cut FREE. 18 X 18, 31 X 24 X 24, 5/-; 30 X 30, 8/-; 36 X 36, 11/3. Carr. paid U.K. Send for Sample.

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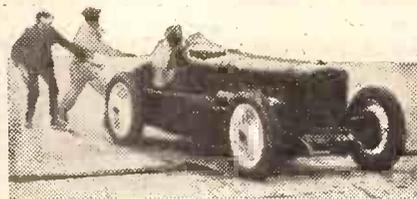
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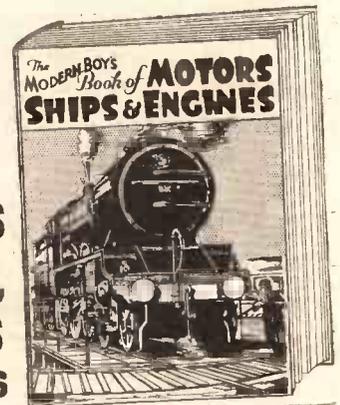
STAND 45
Northern National
RADIO
EXHIBITION
CITY HALL,
MANCHESTER,
SEPT. 28—OCT. 8.

The Romance of Man's Mastery of Speed!



A Good Send-off!

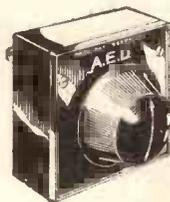
Away goes Mr. Kaye Don, the world-famous racing motorist in a 150 m.p.h. car tuned-up for an attack on a speed record. Mr. Don is one of the team of experts who have written the intensely interesting articles, full of the romance of man's Mastery of Speed on Land and Water, which appear in The MODERN BOY'S BOOK OF MOTORS, SHIPS and ENGINES. This magnificent NEW book is crowded with hundreds of fascinating pictures, and well-written articles which tell of great achievements in things mechanical. It also contains four coloured plates.



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PRICE
16/6

OSRAM 2-VOLT SCREEN-GRID BATTERY VALVES with the WEMBLEY FILAMENT

VS.2 (Metallized or Clear) PRICE 16/6

A new variable mu. valve with outstanding characteristics—long range, improved selectivity, adequate volume control, with only a 9-volt grid bias battery.

MUTUAL CONDUCTANCE 1.25 ma/volt at Ea 150, Esg 70, Eg. 0.
 at Eg-9 0.05 ma/volt

S.22 (Metallized or Clear) PRICE 16/6

The high slope screen grid valve to improve the reception of any three valve Kit set. Replace your old screen-grid valve with an OSRAM S.22.—A tonic to any set with single stage screen-grid.

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S.21 (Metallized or Clear) PRICE 16/6

The screen-grid valve with new automatic OSRAM cushion springing and special non-microphonic construction. Designed for range with stability. A sensitive detector valve with entire absence of microphonics.

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OSRAM 2-volt Valves with the WEMBLEY FILAMENT

PRICES

		PRICE
VS.2	Variable Mu. Screen Grid	16/6
S.22	High slope Screen Grid	16/6
S.21	Medium slope Screen Grid	16/6
H.2	High amplification Det. and RC.	7/6
HL.2	The non-microphonic Detector	7/6
LP.2	L.F. and Small Power	8/9
P.2	Super Power	12/6
PT.2	Economy Power Pentode	17/6

The OSRAM VS.2, S.22, S.21, H.2, HL.2 can be supplied either metallized or clear.

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Write for the OSRAM Wireless Guide (1932 Edition) Sent Post Free on request.

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EXTRA QUALITY WITHOUT EXTRA COST

THE MIRROR OF THE B.B.C.

By O. H. M.

THE BATTLE OF THE TALKS

PLYMOUTH'S PROBLEM—EXPANSION OF BROADCASTING HOUSE—A. J. ALAN FOR THE CHILDREN'S HOUR.

I HEAR most amusing accounts of the effort within the B.B.C. to make "Talks," as a whole, more palatable to the listening public. The present argument is between those who believe that they will secure this result by separating "Talks" from entertainment and those who advocate making "Talks," as such, entirely subsidiary to the general entertainment function of broadcasting.

I am bound to say that it is a good sign that the competition now is directed towards meeting the view of the average intelligent person instead of suggesting that the view should be more in the interests of "uplift."

Whatever happens about the present controversy I am sure that in the end re-merging is inevitable. Who will swallow who? My money is on Siepmann.

The Problem of Plymouth.

The B.B.C. has been very well advised in avoiding the suggestion made in certain quarters that the "original" work at Plymouth should cease with the introduction of the Scottish National wavelength of 288.5 metres on or about October 2nd. I know the arguments that were advanced on behalf of the proposal to suspend the "Children's Hour" and the local news at Plymouth.

It was argued by these that the introduction of the new transmitter in Scotland would so restrict the service area of the Plymouth station working on the same wavelength that it was useless to try to continue it. Fortunately, however, wiser counsels have prevailed and it will be left to Plymouth listeners to decide for themselves whether it is worth while continuing their local services. Incidentally, even if the pessimists are right it need not be more than a suspension. Much depends on Madrid.

Expansion of Broadcasting House.

Some of my less-informed friends have been complaining about the failure of the B.B.C. to recognise the inevitability of expansion. It so happens that the matter is well in hand. I know for a fact that new properties have been taken over and will be re-conditioned without delay.

The Money Situation.

Economical administration and the careful husbanding of financial resources have been characteristic of B.B.C. policy, and I am not surprised that there is a suggestion that this is ministering to successive raids by the Treasury. The truth, however, is that if B.B.C. finances were not so ably handled by the "Big Three of Money," Sir John Reith, Mr. Harold Brown, and Mr. Thomas Lochhead, there would have been long ago such grave dissatisfaction at the Post Office and the Treasury as to make inevitable a raid on a disastrous scale.

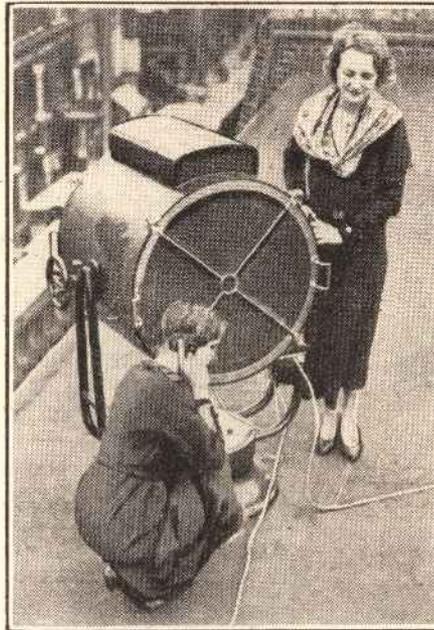
Children's Hour Features.

The Prince of Broadcast Story-tellers—A. J. Alan—is busy with the finishing touches of a new yarn which will be

included in the evening programmes within the next few weeks. Meanwhile, I understand that "A. J." is making his first appearance in the Children's Hour programmes about the middle of next month, when he will describe the adventures of "Percy the Prawn."

The B.B.C. is well aware of the fact that since John Kettelwell took it over the

BIG BEN'S DOUBLE



This giant loudspeaker, weighing six cwt. and mounted in a searchlight case, has been installed on a Tottenham Court Road roof by the Marconi-Phone Co., to relay the chimes of Big Ben to the West End.

5.15 p.m. period makes as wide an appeal to grown-ups as it does to the youngsters, so that it will be of general interest to learn that on Friday, October 7th, Commander Stephen King-Hall will broadcast his "Here and There" talk from Geneva, and that Big Chief Os-ke-non-ton ("Running Deer") will sing in the studio the same day.

I hear that Sir Frederic Cowen and Dr. Adrian Boult and the B.B.C. Orchestra have agreed to "do something" for the Children's Hour in the near future.

Northern Proms.

Thanks to the initiative of Mr. Alfred Barber, the leader of the famous Hallé Orchestra, Liverpool is to have a season of Promenade Concerts similar to that given two years ago.

The concerts are being held at the Philharmonic Hall, on Saturday evenings; and on October 8th northern listeners will hear part of the opening programme between 8 and 9.15 p.m. Mr. Barber will himself conduct the Philharmonic Light Orchestra, which is good news for listeners, because he is becoming almost as well known a conductor as he is a fine violinist; on several occasions he has directed the Hallé Orchestra in his capacity of deputy conductor, notably when Sir Hamilton Harty has been playing the pianoforte part in Constant Lambert's "The Rio Grande."

Mr. Barber is also the conductor of the Bridlington Orchestra which frequently broadcasts from the Royal Princes Parade during the summer. The opening Promenade Concert will be on October 8th.

Wales, Look You!

There is no doubt that the majority of Englishmen regard the annual National Eisteddfod of Wales as something quite different to what it actually is in the lives of all true sons and daughters of the Principality.

As a festival it attracts big crowds from all over Wales, but it is as an outlet of real talent, an opportunity for progress and, more often than not, an important stepping stone from a small village in a small country into the more envious places of the big world that Welshmen regard these competitions in music, speech and writing.

THE LISTENER'S NOTEBOOK

A rapid review of some of the recent radio programmes.

EIFFEL TOWER offered something unique when the Symphony Orchestra, under the direction of M. Flament, gave a concert entirely devoted to the works of the Bach family. In addition to the familiar compositions of the great John Sebastian, there were a variety of musical gems by Johann Christian Bach, Friedman Bach, Johann Christoph Friedrich Bach, Johann Ernst Bach, and C. Ph. Emmanuel Bach.

The whole concert lasted ninety minutes, and as the only attractive English alternative was a radio play to which I had listened the previous evening, I don't think it was quite as mad as it first seemed to stick the whole ninety minutes out!

A Tiresome Habit.

This practice of repeating an item the following evening on another wavelength

is often tiresome, though I must confess there have been times when I have welcomed it. By the way, I've just returned from a stay in the East Midlands, where the set I used just refused to do anything but distort the National programmes, whereas London and Midland Regional fare was as perfectly received as anyone could wish for. Here was an occasion when I was glad of the repeat performance!

Not Quite Pointless.

Another station which seemed to find favour with this particular set was Poste Parisien, to which I was forced to listen. There is no doubt that the prodigious use that Continental stations make of gramophone records isn't altogether pointless. For instance, there were frequent occasions when it was impossible not to believe

(Continued on page 111.)

Graham Farish says:-

“DON'T WORRY!

Your set's all right”

All these little troubles are due to a faulty earth. You've made the set carefully but neglected the vital point, the only direct connection to the station—the earth.

Take my advice, fit a Filt to-day—the results will astonish you!

Is your own set giving you the best? You don't know its possibilities until you try a Filt—spend half-a-crown on Filt and give your set a chance.



Simply bury the copper receptacle containing the wonderful Filt chemical, which at once begins to spread through the earth, attracting moisture and making a PERMANENT highly conductive area to the depth of several feet. Filt keeps moist and highly conductive. It spreads like a tentacle, earthing your set perfectly and giving you every cunce of power, range and purity, no matter what set you use.

GRAHAM FARISH

FILT

PERCOLATIVE EARTH

Get a Filt to-day from the nearest radio dealer or direct (post free) from the sole manufacturers

**Graham Farish Ltd.,
181, Masons Hill,
Bromley, Kent.**



THE DIARY OF A WIRELESS OPERATOR AT SEA



A Week in Melbourne—Bound for Tasmania—Farewell.

MELBOURNE, JANUARY 30TH, 1919.—During our seven days' stay in Melbourne, our Captain was much fêted in consequence of his recent imprisonment in Germany. When he went out, people would insist on shaking hands with him and asking him to dinner. Poor chap! He was about fed up with it.

Compared with our brief stay in Fremantle, we did not enjoy ourselves half so much whilst at Melbourne. However, we eventually received fresh orders, and are now en route for Hobart, Tasmania.

"Do You Like Omar?"

HOBART, TASMANIA.—Barnes Bay. We have been anchored in this lovely bay for more than five days, and a more charming place it would be hard to find in any part of the world, for we are completely surrounded by high hills, topped with pines and luxurious vegetation. The water of the bay is smooth and placid, the entrance to the sea being some miles away, screened by many twists and turns in the land.

We spend our days like lotus eaters—fishing, taking photographs and, not so enjoyable, being disinfected. The last occupation is far from pleasant, for we have to be sprayed with sulphate of zinc each day owing to the influenza epidemic, which has already reached Australia, but so far has not penetrated to Tasmania.

In the mornings we take out a small boat and spend the day fishing among the small islands with which the bay abounds. Our fishing is usually rewarded with baskets full of small ground sharks. Tranquillity is the keynote of the bay.

The other day the Captain gave a small dinner party in honour of the nursing staff at the quarantine station. During the meal the conversation turned to poetry, and while the merits of various poets were being discussed the Captain began to open a bottle of wine. Suddenly he turned to one of the nurses and said:

"Do you like Omar Khayyam?"

She replied: "No, thank you. I am a teetotaller!"

* * *

We left Hobart on the 14th February, 1919, and arrived in Adelaide exactly four days later. On March 3rd we reached Albany and left on the 5th and with full bunkers commenced our homeward journey via South Africa.

Durban Days.

DURBAN, MARCH 22ND, 1919.—Our voyage here from Australia was not particularly exciting. Eighteen days at sea isn't much compared to the long voyages of old sailing ship days, but all the same it's sufficiently monotonous. Wireless work,

RADIO WITH THE ARMY



The Navy and Merchant Service are not the only ones who take advantage of the rapid communication obtained with radio, for the Army consider it as their most vital communication link.

however, was more interesting than ever.

I picked up the stations at Penang and Sumatra working ships a little over 2,000 miles away, and there were lots of signals from the Australian stations and, a few days later, from Mauritius and South Africa.

We anchored at the Bluff Coaling Pier, Durban, about seven one evening, and went ashore for the first time. I found Durban a delightful spot.

Of all the Dominion ports I have ever been to I like Durban the best. The first Sunday after our arrival was quite exciting, for at about 10 o'clock all our deck hands—about fifty all told—lined up in a row and delivered an ultimatum to the captain to the effect that they were tired of work and wanted to go home to Bombay. (I ought to explain that our deck hands are lascars.)

The ringleader was one of the quartermasters, and this particular son of a gun had encouraged his companions to go on strike. None of them would listen to arguments or threats.

One man, however, eventually declared himself ready to resume work, whereat the ringleader slashed his face open with a razor. At this piece of dirty work the captain lost the remaining rags of his temper and so far forgot himself as to curse the quartermaster in true sea style.

Mutiny on Board!

Calling the chief officer, he ordered the man to be put in irons; but directly the chief produced the handcuffs there was a combined rush and, with a most fiendish yell, the crew went quite dotty. The captain called all the officers together and then we sailed in. The crew produced serviceable sticks from apparently nowhere, and one "kalassi" caught the old man a whack across the head. Two more dragged the second engineer into the scuppers and appeared anxious to explore his anatomy with a razor, while a third rammed a chopstick into my solar plexus. Whcreat I took no further interest in the affair.

However, the fight was short-lived and with the arrival of the police and a little more blood-letting, the uninjured were led off to prison, where they were eventually rewarded with "three months' hard."

APRIL 14TH.—This evening we are about 700 miles south of the Canary Islands. Sierra Leone is far behind, and we are almost home again.

A little while ago a message came through from the Azores wireless station warning all shipping to keep a look out for an aeroplane which left St. Johns on Sunday bound for England, but which has been missed for many hours, so we conclude that the Atlantic flight has begun. Altogether, it was a busy evening in the wireless room—I picked up calls from Dakar, Las Palmas, Teneriffe, Azores, St. Vincent, Gibraltar, Dakar, Port Etienns, Lisbon, Paris, Nantes, Fernando-Norhona (in Brazil), Malta, and a host of others.

I think I shall end this diary here, for this is my last trip, and in a day or two I shall be back again in England experiencing, I gather, considerable difficulty in finding a niche in the post-war Old Country.

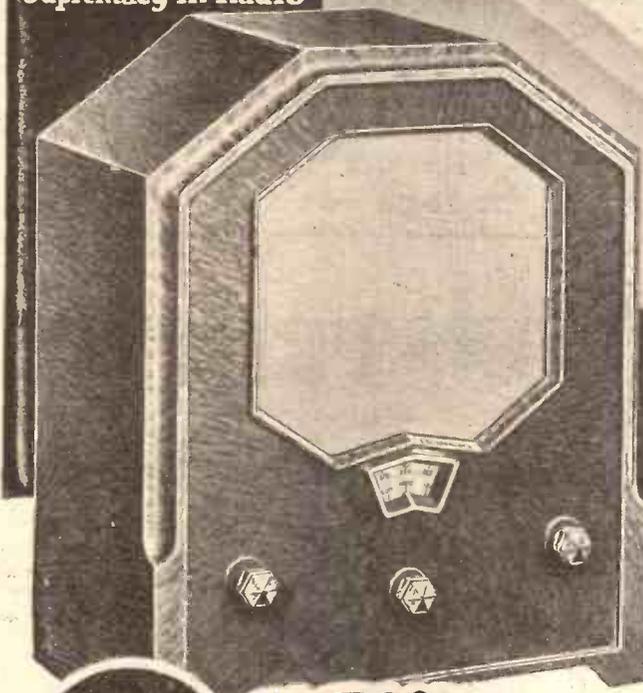
Well, the last three years have been quite amusing, sometimes exciting, and definitely worth while.

To-day I gave my cabin-boy an old pair of trousers, some small silver, and my good wishes for his future. He accepted the first two with small gratitude, and was quite indifferent to my good wishes!

And so ends the last of these diary jottings which I have kept more or less regularly since I joined the ship. It is, I think, a fairly faithful record of our voyages, our friends, and our adventures. To them and the ship, good luck!

G.E.C.
Radio
Supremacy in Radio

**POINTS THAT HAVE
SOLD THOUSANDS—**



- 2 OSRAM
SCREEN-GRID VALVES**
- ENTIRELY SELF-CONTAINED
WITH ACCOMMODATION
FOR BATTERIES**
- HANDSOME ONE-PIECE
BAKELITE CABINET**
- SINGLE KNOB TUNING**

ALL FOR 9 GNS.

Complete with cabinet, built-in loud speaker
and OSRAM VALVES

HIRE PURCHASE—Deposit £1 and 12 monthly payments of 15/-

SPECIAL FEATURES

- 1** A complete table model receiver with built-in loud speaker.
- 2** Batteries housed inside cabinet—no external battery connections.
- 3** Two metallised OSRAM screen-grid valves and latest type OSRAM power output valve.
- 4** Screen-grid detector gives great sensitivity.
- 5** Tuning by one knob only.
- 6** New magnetic loud speaker chassis with floating cone ensures highest quality reproduction.
- 7** Unit assemblies make home construction the essence of simplicity.
- 8** Latest OSRAM valves (battery type) with the Wembley filament.
- 9** Handsome one-piece cabinet in moulded Bakelite—walnut graining.

MADE IN
ENGLAND

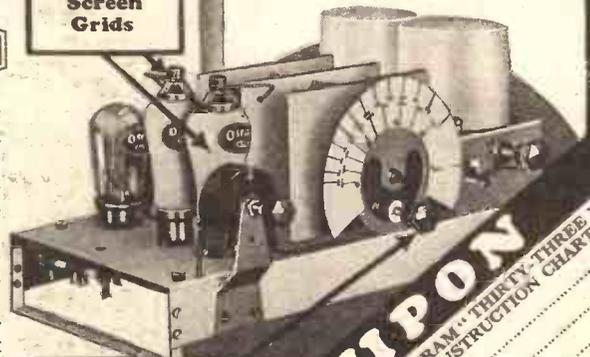
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Wireless Dealers

Osram
THIRTY-THREE
MUSIC MAGNET

**3
OSRAM
VALVES
Two
Screen
Grids**

**WRITE for the OSRAM
"THIRTY-THREE" Con-
structor's Instruction Chart.**
It is crammed full of useful
hints and tips. The clear in-
structions will convince you
that this is the world's best
circuit and assembly kit.

This extremely efficient and reliable Kit set instantly fires the imagination of everyone who is looking for a first-class receiver that will satisfy modern ideals of performance and appearance. It has no competitor in its class. Cheaper sets—yes! But the OSRAM "THIRTY-THREE" is built up to a standard and not down to a price. The policy of sound engineering construction has always been placed first in designing all models of OSRAM Music Magnets. Already it has resulted in the selling of thousands of OSRAM "THIRTY-THREE" Kits.



**ONE KNOB
ONLY FOR
TUNING**

COUPON
Please send me the OSRAM "THIRTY-THREE"
MUSIC MAGNET INSTRUCTION CHART
Name:
Address:
The General Electric Co. Ltd.
Magnet House,
Kingsway,
London,
W.C.2.

A SIMPLE STEP FROM CHART TO SET

P.W. Cut out and paste on postcard, or enclose in unscaled envelope. Halfpenny postage in either case.

Advt. of The General Electric Co. Ltd., Magnet House, Kingsway, London, W.C.2.

There's
sure to be
something
you need
in the

SPECIAL ARTICLES

for

The Gramophone Enthusiast
 The Long-Distance Listener
 The Set Builder
 The Home Handyman
 The Technically Minded
 The "S.T." Fan

in fact — for YOU!

WIRELESS CONSTRUCTOR

October number — price sixpence — on sale everywhere

An up-to-date receiver—built on the ever-popular "Detector and 2 Low-Frequency" arrangement—is presented under the title of

The "DOUBLE-TUNE" THREE



Designed and described by
VICTOR KING

There are the usual brilliant articles by

JOHN SCOTT-TAGGART

A.M.I.E.E. F. Inst. Ist

who contributes, in this number:—

"RADIO OF TO-DAY"

"FROM MY ARMCHAIR"

"VARIOUS MUSINGS ON THE VARIABLE-MU"

And other intriguing contributions include:—

YOU NEED S.G.'S FOR DISTANCE

by Herbert K. Simpson

THE PROS AND CONS OF TONE CORRECTION

THE GERMAN NEWS BULLETIN

A PRACTICAL MAN'S CORNER

THE MONTH ON SHORT WAVES

etc., etc., etc.



A NEW SET.. OR A RENEWED SET *at a fraction of the cost*

Perhaps your radio reception is on the downward path. Fewer stations; less volume; worse tone. Your set is not to blame. Your set is as up-to-date to-day as it was a year ago. It's your valves; they are not pulling their weight.

Renew your set throughout with Tungram Valves. Make it as good or even better than when you bought it or built it. More stations; increased volume; perfect tone. But it must be Tungram! For this reason: Tungram Valves are the most efficient that modern science has so far produced. Tungram Valves are used by 61 British Set Manufacturers. But they cost very much less than the price you're used to paying. You cannot get Tungram quality in any other valve even by paying twice the Tungram price!

Insist on Tungram. Don't be put off. Go to a Tungram dealer; take nothing but Tungram!

RENEW YOUR SET WITH

TUNGSRAM

If in difficulty write for literature and for the name of your nearest Tungram dealer to

Tungram Electric Lamp Works-(Gt. Britain) Ltd.,
Radio Dept., S.T.3, Commerce House, 72, Oxford St., London, W.1

BARIUM VALVES

RECEIVERS OF RENOWN



THE CLARKE'S "ATLAS" TWO-VALVE A.C. RECEIVER—MODEL R.A.2.

No. 3

OF all the hundreds of all-electric radio receivers that were exhibited at the recent Radio Show, there were surprisingly few of the comparatively cheap, self-contained, two-valve variety. There were super-hets., radio-grams, fours and threes on almost every stand in the building, but two's—?

Well, it's commendable that one firm at least among the many has seen fit to include a really attractive "two" in their new season's range. Indeed, the firm in question—Messrs. H. Clarke & Company, of Manchester, whose name requires no introduction as the makers of high-class components and mains units—have made their entry into the commercial set market with nothing but two's!

Realising An Ideal.

After all, however much we may be in sympathy with the idea of all-electrically-operated sets, it isn't everybody in these not-too-easy times that can run to 15 or 20 guineas, not even for the realisation of an ideal.

But the introduction of entirely self-

TECHNICAL SPECIFICATION

CIRCUIT DETAILS: Detector and L.F. for operation on A.C. mains, 200-250 volts, 40/120 cycles.

CONTROL ARRANGEMENTS: Central knob is for tuning. Right-hand knob controls reaction. Wave-changing is effected by rotating the knob on the left-hand side. The mains on-off switch is conveniently located at the back of the instrument.

SPECIAL FEATURES:

- (1) Simplicity of operation.
- (2) Provision for pick-up.
- (3) Sockets for external loudspeaker.
- (4) Compactness.

PRICE: 10 guineas complete with valves and royalty.

MAKERS: H. CLARKE & CO. (Manchester), LTD., Atlas Works, Eastnor Street, Old Trafford, Manchester.

contained two's, which, in point of fact, are very little behind three's of the ordinary battery-operated class, at prices around 10 guineas, does tend to change the whole complexion on the matter, and it brings nearer the day when all-electric radio will be within the reach of all.

The range of "two's." that have just been produced by Messrs. Clarke includes one for battery operation, one for D.C. mains, and one for A.C. supplies.

It is with the latter that we are concerned in this present review, a model of which has been submitted for our usual test and report.

The Clarke's "Atlas" two-valve A.C. receiver is a self-contained all-electric design incorporating an "Atlas" energised moving-coil loudspeaker. Fundamentally, the circuit employed is more or less a straightforward detector and L.F. arrangement, but the whole set has been thought out and designed in a way which stamps it modern in every sense of the word.

Alternative Aerials.

For instance, the instrument is provided with alternative aerial connections by means of which it is possible to adapt the set for almost any modern regional requirements. These are in addition to the provision for mains aerial connection, which, incidentally, renders the design of interest to all those who are unable to erect an external aerial of any description.

The design also provides for the use of a pick-up, and sockets are available at the back for the connection of an external loudspeaker.

In appearance, the new "Atlas" A.C. Two is very pleasing. The cabinet-work is good, and the operation of the set is simplicity itself.

Our practical tests with this new two-valver have been particularly extensive, and our report is based upon experiences under three widely differing circumstances.

In the first case, the set was subjected in the usual meter tests in the laboratory at Tallis House, and it was every bit up to the standard that is set for A.C. two-valvers.

Most Gratifying.

The second test was conducted on an aerial in a locality approximately 15 miles south-west of Brookmans Park, and the results were gratifying in the extreme. We are not going to say that it brought in every station in Europe, but who, in any case, would expect it to?

But even if it is not reasonable to expect a quart-out of a pint jug, at least we can say that this model gives a very full measure as far as the pint is concerned!

Our tests showed that it was definitely possible to receive good alternative programmes on the broadcast waves while the local stations were working, while on the long waves no less than seven stations

were received on the loudspeaker, which must necessarily be regarded as an extraordinarily good performance for any two-valve arrangement.

As a further, and final, test, the set was taken to a district which will be of interest to all our northern readers. The exact locality was between 25 and 30 miles north-west of the Northern Regional station, where the set again put up a surprisingly good performance for a two-valver. The Northern, Scottish and London Regional stations, in addition to Stuttgart, Toulouse, Stockholm, Radio-Paris and Daventry 5 X X, were all received at good strength and without interference.

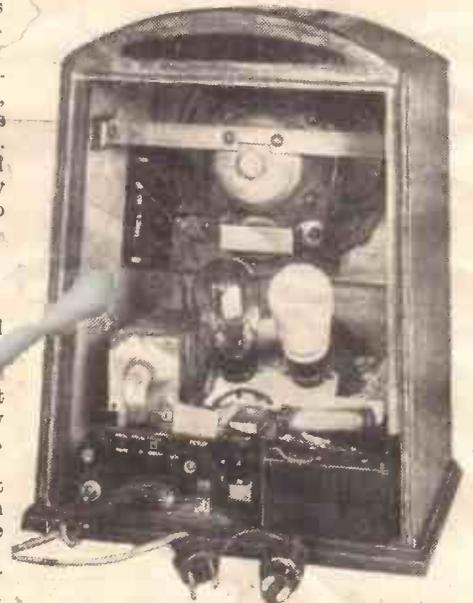
An Excellent Proposition.

As for reproduction, the quality and performance of the new "Atlas" moving-coil loudspeaker which is incorporated leave nothing to be desired.

Summed up, we are of the opinion that this new receiver represents an excellent proposition for all those who are on A.C. mains, and we feel that it is a valuable contribution to a field which, up to the present, has not in our opinion been adequately covered.

(Continued on page 102.)

INSIDE INFORMATION!



This neat-looking interior gives an excellent idea of the high standard of workmanship that is to be found in the new "Atlas" two-valve A.C. receiver.



Don't blame the loud speaker if the Power Valve is inefficient

Clarion Power and Super Power Valves are designed to give pure, undistorted output sufficient to operate a Moving Coil Loud Speaker, and do so with a minimum of current consumption.

If you are not satisfied with your loud speaker performance, fit a Clarion Power or Super Power Valve and note the difference: increased volume, better quality-reproduction as it *ought* to be.

Ask your dealer for Clarion Valves. There is a type for every stage, and Clarion Valves cost *less*.

PRICES From **5/6**

2-volt BATTERY VALVES.

- H2 HIGH FREQUENCY or DETECTOR, and
- HL2 DETECTOR AND L.F. AMPLIFIER **5/6**
- LP2 LOUDSPEAKER POWER VALVE **6/9**
- P2 SUPER POWER and
- PX2 HYPER POWER **8/6**
- SG2 SCREENED GRID H.F. **12/6**

Also A.C. Mains Indirectly Heated and Rectifying Valves.

Write for Free Leaflet.

CLARION RADIO VALVE CO.,
TYBURN ROAD, ERDINGTON,
BIRMINGHAM.
7, Duke Street, Adelphi, W.C.2.
LONDON.



Holdens

CLARION
ALL-BRITISH NON-MICROPHONIC
RADIO VALVES

STUDY AT HOME

YOU CAN HAVE A COLLEGE TRAINING IN ALMOST ANY CAREER FOR A FEW SHILLINGS MONTHLY

IN YOUR SPARE TIME

LET ME BE YOUR FATHER

Unless you are in touch with all branches of industry, you cannot see the possibilities of employment, but with our gigantic organisation we are in touch with every sphere of activity and we know that in many trades and professions there are more vacancies than there are trained men to fill them.



J.H. Bennett

WE DO NOT PROFESS TO ACT AS AN EMPLOYMENT AGENCY, BUT WE CERTAINLY ARE IN A POSITION TO GIVE FATHERLY ADVICE ON ALL CAREERS AND THE POSSIBILITY OF EMPLOYMENT THEREIN.

WE teach by post all branches of the following vocations and specialise in all examinations connected therewith. Our advice is always Free.

THE MOST SUCCESSFUL AND MOST PROGRESSIVE CORRESPONDENCE COLLEGE IN THE WORLD

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- Aviation Engineering
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- Book-keeping, Accountancy and Modern Business Methods
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- Chemistry
- Civil Engineering
- Civil Service
- All Commercial subjects
- Commercial Art
- Concrete & Structural Engineering
- Draughtsmanship. All branches
- Engineering. All branches, subjects and examinations
- General Education
- Heating and Ventilating
- Insurance
- Mathematics
- Matriculation
- Metallurgy
- Mining, all subjects
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- Motor Engineering
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- Naval Architecture
- Pattern Making
- Police. Special Course
- Preceptors, College of
- Pumps and Pumping Machinery
- Radio Reception
- Road-Making and Maintenance
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- Sanitation
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- Structural Engineering
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- Telephony and Telegraphy
- Transport
- Weights and Measures "Insp."
- Wireless Telegraphy and Telephony
- Works Managers

IF YOU DO NOT SEE YOUR OWN REQUIREMENTS ABOVE, WRITE TO US ON ANY SUBJECT

DO NOT DELAY—
THERE MAY BE CHANCES FOR YOU TO-DAY FOR WHICH YOU MAY BE TOO LATE TO-MORROW. EVERY DAY COUNTS IN A MAN'S CAREER.

IT COSTS NOTHING TO ENQUIRE.
WE TEACH BY POST IN ALL PARTS OF THE WORLD.

Also ask for Our New Book (FREE OF CHARGE).

THE HUMAN MACHINE
Secrets of Success.

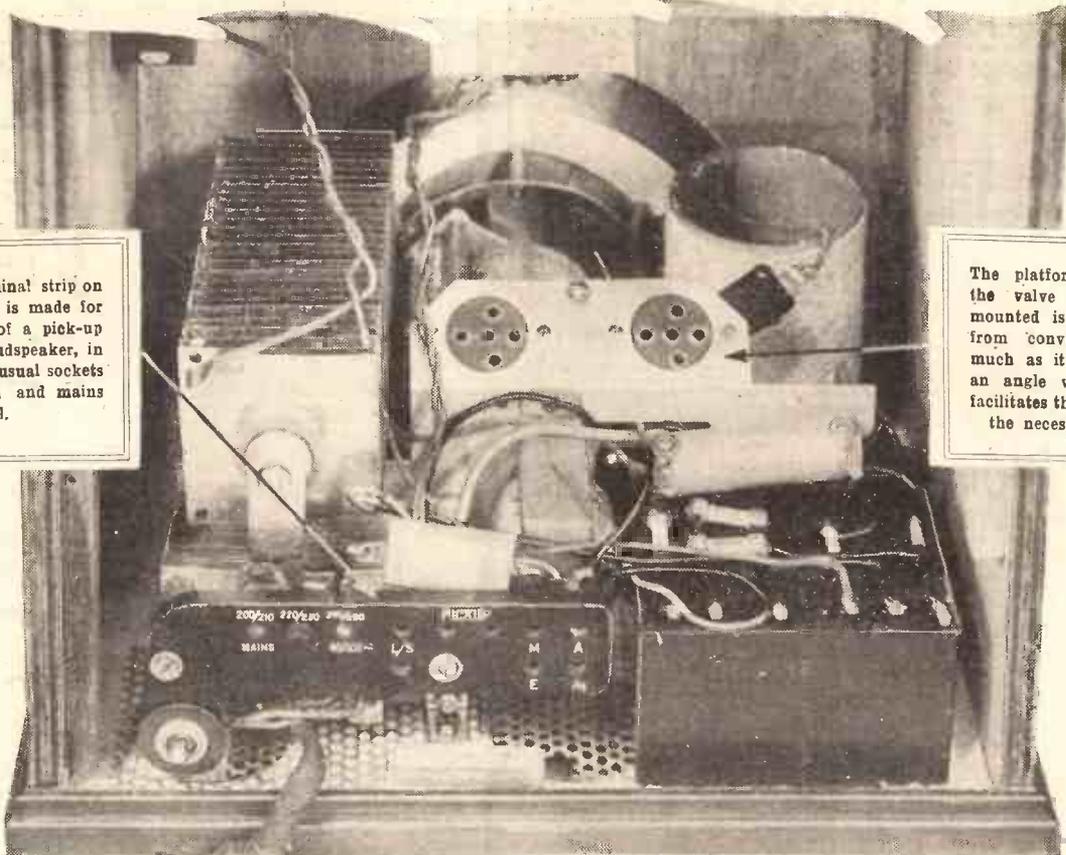
Note Address Carefully:
THE BENNETT COLLEGE LTD.,
(Dept. 106),
SHEFFIELD.



Dept. 106

THE CLARKE'S "ATLAS" TWO-VALVE A.C. RECEIVER—(Continued from page 44.)

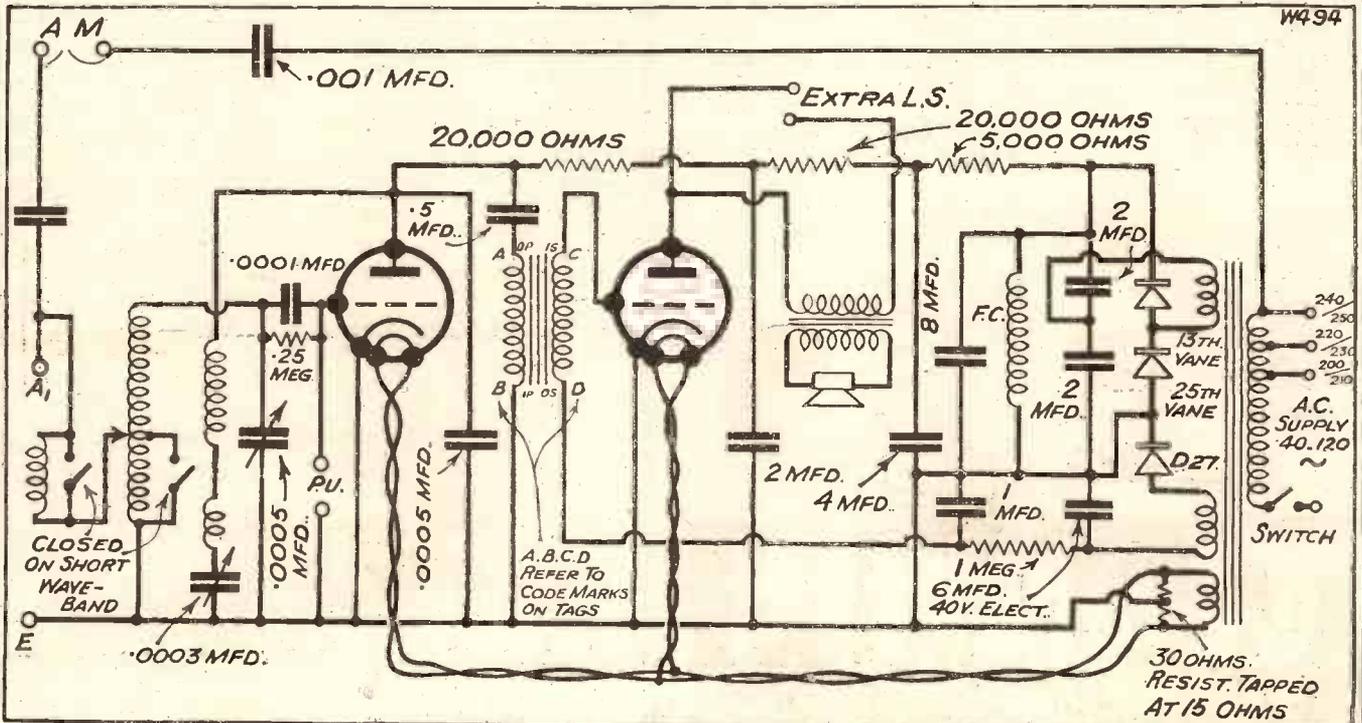
DOWN AMONG THE DETAILS!



This is the terminal strip on which provision is made for the connection of a pick-up and external loudspeaker, in addition to the usual sockets for aerial, earth and mains aerial.

The platform on which the valve holders are mounted is a departure from convention, inasmuch as it is secured at an angle which greatly facilitates the insertion of the necessary valves.

A CIRCUIT FOR MODERN REGIONAL REQUIREMENTS



The circuit of this new A.C. two-valver is based upon essentially modern principles. In addition to alternative aerial tappings, provision is made for a mains aerial, for a gramophone pick-up and for the connection of an extra loudspeaker.

Direct Radio

**159
BORO
HIGH
STREET**

THE SPACE-BREAKER

	£	s.	d.
1 Panel 14 X 7 in., drilled to spec.	4	6	
1 Baseboard, 14 X 10 in.	1	0	
1 J.B. Unitune 3-gang cond. with disc drive	7	0	
1 Colvern 3-coil assembly, 2 KGO. 1 KGR	8	6	
1 Colvern pot. type M.T. 10,000-ohm	4	6	
1 R.I. Dux L.F. transformer	6	9	
1 R.R. .0005 diff. reaction condenser	2	0	
1 R.R. Standard H.F. choke	1	6	
4 4-pin valve holders	2	0	
4 Dubilier 1,000-ohm resistances, wire ends	4	0	
1 Dubilier 20,000-ohm resistance, wire ends	1	0	
2 Colvern 50,000 strip resistances	4	6	
1 Graham-Farish 100,000-ohm resistance	1	6	
2 Graham-Farish 2-meg. grid leaks, Ohmite	3	0	
1 T.C.C. .0001-mfd. type S condenser	1	3	
1 T.C.C. .0003-mfd. type S condenser	1	3	
1 T.C.C. .0005-mfd. type S condenser	1	3	
4 Dubilier type g200 1-mfd. condensers	8	0	
1 T.C.C. 2-mfd. condenser type 50	3	10	
1 R.R. 3-point wave-change switch	1	6	
2 Terminal strips, 3 X 2, drilled	1	9	
4 Belling-Lee terminals	1	6	
1 Extension rod, 8 1/2 X 1/2 in., with bush	1	10	
1 Ebonite collar, 1 1/2 in. long, with grub screws, 1/8 in. and 1/4 in. holes	1	0	
1 6-in. metal reaction condenser bracket	1	9	
2 Coils Glazite	1	0	
Flex, screws, etc.	1	0	
4 Valves: 2 P.M. 12A, P.M.I.H.L., P.M. 2A	2	8	9
1 "159" special walnut cabinet	17	6	
	£9	2	5

ACCESSORIES:

1 Epoch 20th Century M C Speaker	£1	15	0
1 Siemens Standard H.T.	13	6	
1 " G.B. 9-volt	1	0	
1 Oldham 0-50 L.T. Accumulator	9	0	

KIT (less valves and cabinet)	£5.16.2
No. 1 or deposit of 10/8 and 11 further payments of	10.8
KIT (with valves less cabinet)	£8.4.11
No. 2 or deposit of 15/1 and 11 further payments of	15.1
KIT (with valves and cabinet)	£9.2.5
No. 3 or deposit of 16/9 and 11 further payments of	16.9

L.G. 2 KITS

	As specified
KIT No. 1 (less Valves and Cabinet)	£2.1.10
KIT No. 2 (with Valves less Cab'net)	£2.17.7
KIT No. 3 (with Valves and Cabinet)	£3.11.7
or deposit of 8/- and 9 further payments of	8/-

FLEX-FEED A.G.2

	As specified
KIT (less valves and cabinet)	£6.16.6
No. 1 or 12/6 down and 11 monthly payments of	12.6
KIT (with valves less cabinet)	£8.5.0
No. 2 or 15/- down and 11 monthly payments of	15.0
KIT (with valves and cabinet)	£9.0.0
No. 3 or 16/6 down and 11 monthly payments of	16.6
KIT No. 4 Complete Kit, with Valves, specially designed Veneered Walnut Console Cabinet and R. & A. Bantam Moving Coil Speaker	£10.17.6
Or initial deposit of £1 and 11 further payments of	£1.0.0

TELSEN Kits to Manufacturers' Specification.
 Ajax Three Kit, £3/1/6. Deposit 10/- and 9 monthly payments of 7/6.
 Ajax Three Valve Kit, £4/4/3. Deposit 10/- and 11 monthly payments of 7/6.
 Ajax Three Valve Cabinet Kit, £4/15/-. Deposit 15/- and 11 monthly payments of 8/6.
 Jupiter Three Kit, £3/17/-. Deposit 10/- and 10 monthly payments of 7/6.

"RADIO FOR THE MILLION" Stationmaster Three Sealed Kits.
 Battery Model "A" with Table type Cabinet and Valves, £5/11/-. Deposit 15/- and 11 monthly payments of 10/-.
 Battery Model "B" with Console type Cabinet, Valves and Celestion Speaker, £7/10/-. Deposit 20/- and 11 monthly payments of 13/-.
 A.C. Model "C" with Walnut Console Cabinet, Mains Valves and Magnavox Moving-coil Speaker, £14/1/-.
 Deposit 35/- and 11 monthly payments of 25/-.
 A.O. Model "D" Chassis only with Mains Valves, £10/10/-. Deposit 30/- and 11 monthly payments of 18/6.
 Instruction book free with each Kit.

NEW COSSOR MELODY MAKERS.
 All Mains Kit No. 337 with Mains Valves, Speaker and Handsome Console Cabinet, £11/15/-. Deposit 25/- and 11 monthly payments of 21/-.
 Battery Kit No. 335 with new High-efficiency Valves, Speaker and Console Cabinet, £7/17/6. Deposit 17/6 and 11 monthly payments of 13/6.

READY RADIO KITS.
 Meteor S.G.3 Kit (with valves), £5/7/6, or 10 monthly payments of 12/6. Cabinet Model (as above with Cabinet and Moving-coil Speaker), £6/17/6, or 12 monthly payments of 17/-.
 303 Kit (with valves), £3/10/0, or 7 monthly payments of 11/9. Cabinet Model (as above with Cabinet and Moving-coil Speaker), £6/17/6, or 10 monthly payments of 16/-.

GENERAL ACCESSORIES.

Mains Units	£	s.	d.
Atlas A.C. 244			
H.T. only	2	19	6
Atlas A.K. 260			
H.T. and L.T.	4	10	0
Atlas D.C. 15/25			
H.T. only	1	19	6
Pick-up			
Bowyer - Lowe			
A.E.D. Mark III	1	10	0

Pick-up Volume Control

Bowyer - Lowe			
A.E.D. log law	8	6	

Moving-coil Speakers

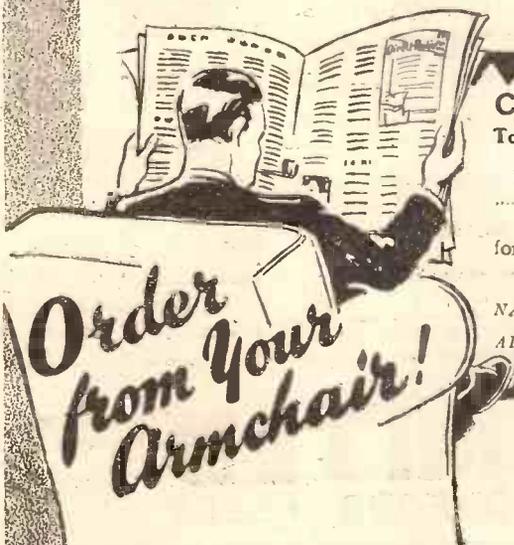
R. & A. "Bantam"	1	7	6
R. & A. "Challenger"	1	15	0
R. & A. "Victor"	3	10	0

All including input transformers. Our special "Soundex" Speaker Cabinet in polished veneered Walnut can be supplied at £1/5/0 extra.

Gramo motor, Collaro spring type B30. 1 12 0

Gramo motor, Collaro induction type. 2 10 0

Oldham H.T. accumulator, 120 volts, 5,500 m/A. hour capacity, £4/1/0, or 7/6 down and 11 monthly payments of 7/6.



CASH, C.O.D. AND EASY PAYMENT ORDER FORM

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Please dispatch to me at once the following goods.....

for which (a) I enclose
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NAME.....

ADDRESS..... Popular Wireless, 24/9/32.

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We specialise in Radio for Export. Goods to your exact specification are very carefully packed and insured, all charges forward. Terms: Cash with order or deposit 1/3rd with order, balance C.O.D.



RADIO TUTORIAL

All Editorial communications should be addressed to the Editor, POPULAR WIRELESS, Tallis House, Tallis Street, London, E.C.4.

The Editor will be pleased to consider articles and photographs dealing with all subjects appertaining to wireless work. The Editor cannot accept responsibility for manuscripts or photos. Every care will be taken to return MSS. not accepted for publication. A stamped and addressed envelope must be sent with every article. All inquiries concerning advertising rates, etc., to be addressed to the Sole Agents, Messrs. John H. Lile, Ltd., 4, Ludgate Circus, London, E.C.4.

The constructional articles which appear from time to time in this journal are the outcome of research and experimental work carried out with a view to improving the technique of wireless reception. As much of the information given in the columns of this paper concerns the most recent developments in the radio world, some of the arrangements and specialities described may be the subjects of Letters Patent, and the amateur and the trader would be well advised to obtain permission of the patentees to use the patents before doing so.

QUESTIONS AND ANSWERS

HOURS OF THE SHORT-WAVERS.

"INTERESTED" (Blackpool).—"Since becoming interested in the short-wave stations I have often been confused by the times quoted for these stations to begin and end

their programmes. What, for example, does '20.30' mean?

"I got caught over an American station in this way, the time given for the programme being printed as 'Daily 20.00—20.15'. And apparently other people are satisfied, so I suppose it is some time code that I do not follow and which other people can.

"If you could make this clear I should be greatly obliged, as without an explanation the

lists of times, etc., are meaningless in many cases."

To save the necessity of constantly repeating "a.m." and "p.m.," a 24-hour notation is often used instead. In it there are always four figures quoted, the first two being the hour, and the latter two the number of minutes. Thus, noon and 12.15 p.m. would be represented respectively by 12.00 and 12.15. Ten o'clock in the morning would be 10.00 and 2 o'clock in the morning 02.00.

This is straightforward enough, but when we come to the afternoon times the hours look a little unfamiliar at first. Thus, 12 p.m., 1 p.m., 2 p.m. and 3 p.m. are respectively 12.00, 13.00, 14.00 and 15.00. (There is no need for the "p.m.," you see, as in the small hours 1 o'clock, 2 o'clock, etc., are represented by 01.00, 02.00, etc.).

(Continued on page 106.)

DO YOU KNOW—

the Answers to the following Questions?

There is no "catch" in them, they are just interesting points that crop up in discussions on radio topics. If you like to try to answer them, you can compare your own solutions with those that appear on a following page of this number of "P.W."

- (1) How many watts are equivalent to one horse-power?
- (2) What voltage, approximately, would be necessary to "flash over" between two sharp points, placed 10 inches apart, in air?
- (3) Why does a condenser shunted across a loudspeaker have the effect of lowering the tone?
- (4) Should the adjustment of a differential reaction condenser affect tuning?

COLVERN -T.D.COIL

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

TYPE T.D., an entirely new COLVERN COIL, designed to give super selectivity on both long and broadcast wave-bands.

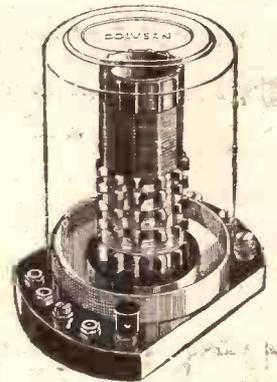
The coil is completely screened, giving a very neat appearance, and incorporates tapped aerial coupling and reaction, while the four alternative aerial tappings are arranged as sockets with a wander plug.

The first two tappings give aerial couplings similar to those normally employed but with greatly increased selectivity.

Nos. 4 and 5 give a high degree of selectivity with weak aerial coupling—suitable for use in a "swamp" area.

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

SPECIFIED FOR THE "SPACE-BREAKER."
 One 3-Gang COIL UNIT (KGO, KGO, KGR) 28/6 set.
 Two 50,000-ohm RESISTANCES - - - - 2/3 each.

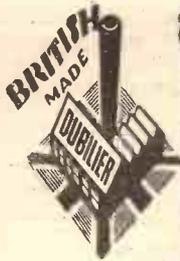


TYPE T.D.
PRICE 8/6

Our 1933 Booklet
 Radio List No. 10
 is now available
 and free on request.

COLVERN LIMITED

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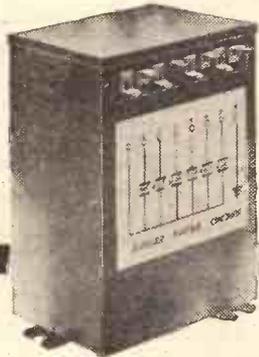


Type BB.
From
1/9 to 5/6

Type 9200
From
2/- to 3/9



Type BS.
From 2/- to 5/-



Condenser
Blocks
From 2/6
to 35/-



Type LEC.
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**FROM A
.09 μ f. at 1/9
TO
CONDENSER
BLOCKS at 35/-**

THERE'S A SIZE AND TYPE
FOR EVERY NEED IN THE
RANGE OF

DUBILIER PAPER CONDENSERS

Whatever kind of Condenser you require, you can safely ask for Dubilier. You know you will receive a Condenser which will give you real service—you know that the money you have spent, whether a small or large amount, is a real investment.

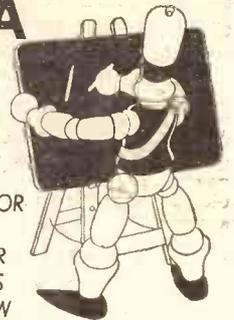
Why risk unknown condensers when, for no extra cost, you can get DUBILIER DEPENDABILITY.

DUBILIER CONDENSER CO. (1925) LTD.
Ducon Works, Victoria Road, North Acton, W.3

Have you seen the new Dubilier Components Booklet, "Choosing Your Condensers and Resistances"? Ask your dealer for a copy or write direct to us.

FACTS YOU SHOULD KNOW...

About the MAZDA A.C. RANGE



LOOK FOR
"EDDY"
IN YOUR
DEALER'S
WINDOW



EDISWAN RADIO

100% BRITISH
Designed by
British Engineers

The amazing

MAZDA THE BRITISH VALVES

There are three brand new and outstanding valves in the Mazda A.C. range.

THE AC/SI VM. A sensitive variable-mu screened grid valve, specially suitable for mains operated transportable sets.

THE AC/SI VM. A super-sensitive variable-mu screened grid valve designed specially for circuits employing grid bias volume control. Cross-modulation in the H.F. stages is reduced to a negligible amount by its use.

THE PP 3/250. A large output power valve requiring only a moderate anode voltage, which will deliver ample volume to large moving-coil speakers.

Full details of these and other useful Mazda A.C. types will be found in the Mazda catalogue, sent FREE on request.

Mazda Valves are fitted by all the leading receiver manufacturers. All good radio dealers stock them.

Full sized constructional models (Battery or A.C. Mains) of the "Sunday Express" S.G.2 Radiogram, specifying Mazda Radio Valves, are obtainable at W. H. Smith's bookstalls and radio dealers, price 1/-.

V.166



The Edison Swan Electric Co. Ltd.
155 Charing Cross Rd. London, W.C.2

Mazda Radio Valves are manufactured for The British Thomson-Houston Co. Ltd., London and Rugby.

RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 104.)

It is easy enough to understand at a glance if we remember that the larger hour-figures are instantly translatable into "p.m." times by deducting 12 from them; thus, 22:00 is equivalent to 10 p.m., and 23.15 becomes 11.15 p.m.

In the case of the times quoted it will be seen that 20.00-20.15 is simply 10.00 to 10.15 p.m.

CONSTRUCTION OF A MODERATOR COIL.

In response to a large number of requests for the construction particulars of a Moderator coil the following details are given for readers who wish to make their own. The construction is quite straightforward, and even a novice should find little or no difficulty in following this abbreviated account.

The basis of the coil is one of those handy little formers obtainable for a few pence at almost any radio dealers, and known as a "P.W.' Coil Quoit." The wire to be wound on this is No. 30 D.S.C., of which only a few pennyworth will be required, as there are only thirty-five turns in the complete coil.

First fix the wire to the former by passing it through a small hole provided near the end of the coil quoit. Leave 8-10 inches of wire projecting, for finishing off and wiring.

The idea is to construct a 35-turn coil, with tapings at the 21st and 27th turns.

When the wire has been fixed to the coil quoit, as mentioned, wind on 21 turns, neatly and side by side. Do not break the wire here, but holding it firmly in tension, twist a fairly large loop in it, to serve as a tapping point.

Leave this loop sticking out from the coil and carry on with the winding in the same direction as before, for another 6 turns. Again, do not break the wire, but make a second tapping like the first.

Then complete the coil by winding in the same direction another 8 turns. That makes 35 turns in all, so finish off by keeping the winding tightly in tension while the wire is cut about a foot from the last turn. Subsequently passing this end through little holes in the former, and drawing tight to fix the winding. Scrape off the insulation from

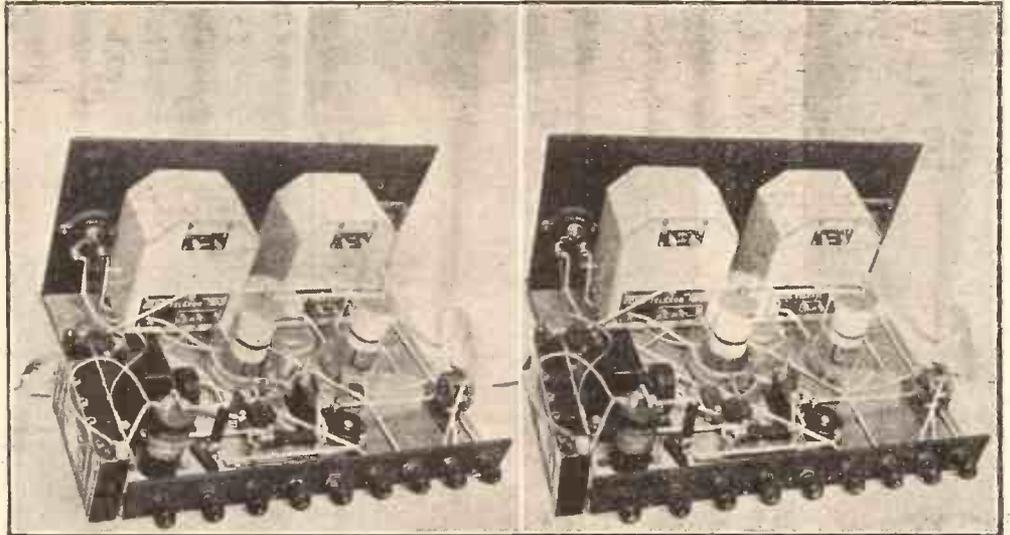
the tapping loops and the coil is ready for mounting.

DOES THE S.G. NEED GRID BIAS?

B. S. (Sheringham, Norfolk).—"Finding a P.M.1 H.L. ideal for detector, I thought I would replace the S.G. with a P.M.12 A. valve. At first this was very disappointing, but then I was told that this type does not have to use any grid bias. I tried this, by taking the G.B. battery out and connecting the two leads to it by a bridge of wire, and it certainly

(Continued on page 108.)

A TRUE-VIEW OF THE "LONG-RANGE" THREE

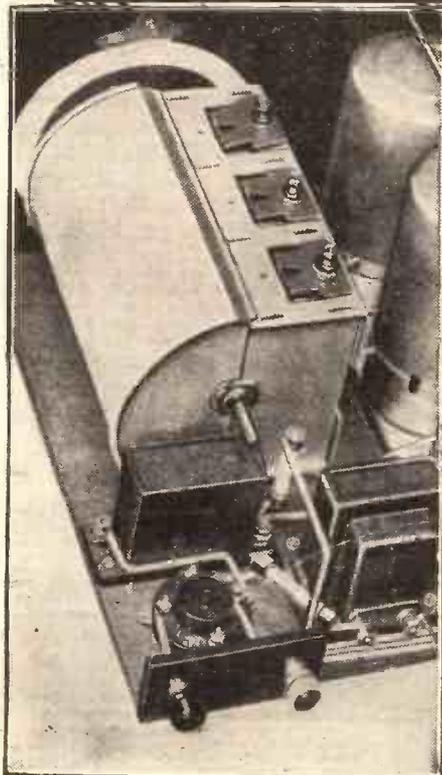


Here is a "three-dimension" picture of one of the fine sets that were described in "P.W.'s" great Gift Book last week. It should be viewed stereoscopically, and for those who missed the original fascinating articles we shall describe, in these columns next week "How to Make a 'P.W.' True-Viewer for 6d."

Utility

TUNES THE

SPACE-BREAKER



For this fine four-valver the designer specifies a Utility 3-ganged condenser. Therefore trust the designer, he knows, and insist on being supplied with a Utility W314/3, the condenser that is permanently matched.

W314/3 COMPLETE WITH DIAL

27'6

Have you had a copy of our new catalogue which features the finest range of variable condensers available.

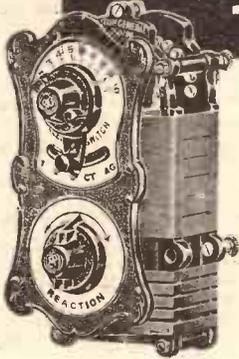
FROM YOUR DEALER OR POST FREE FROM THE MAKERS.

WILKINS & WRIGHT LTD., UTILITY WORKS, HOLYHEAD ROAD, BIRMINGHAM

AGENTS.—London: E. R. Morton, Ltd., 22, Bartlett's Buildings, Holborn Circus, E.C.4. Scottish: E. B. Hammond, 113, Vincent Street, Glasgow. Lancashire and Cheshire: J. R. Lister, 83, Old Road, Blackley, Manchester. Westmorland, Cumberland, Durham, North-umberland, Yorkshire and Derbyshire: H. C. Rawson, Ltd., 100, London Road, Sheffield. Lawrence Fraser, Chelsea House, Lansdown Road, Bath.

The famous

BRITISH GENERAL TUNING UNIT



now reduced to 10'6

By reason of increased demand and enlarged production we are able this season to offer our well-known Tuning Unit at 10/6 instead of 14/6 as before. This Unit effectively replaces plug-in coils and covers the entire wave-band, from 200-2,000 metres. Easy fixing; simple tuning. Full instructions supplied with every model.

From all dealers or direct from the manufacturers—

WRITE FOR FULL LIST OF B.G. GUARANTEED COMPONENTS POST FREE.

BRITISH GENERAL MANUFACTURING Co., Ltd.
Brockley Works, London, S.E.4.

No Chatter

No Scratching—No Case Resonance

with the All-British



Clarion Pick-up



PRICE 21/-

Handsome finished in Walnut Bakelite

The all-British Clarion Pick-up is amazing in its realism. The entire absence of extraneous noises ensures smoothness of tone which provides an added joy from your records. This model is fitted to the famous Clarion Radio-gram. Can be fitted to any gramophone in five minutes.

Ask your dealer to let you see and hear the wonderful range of Clarion roo-per-cent British-made Radio instruments. Table Model, Console Model, Radio-gramophone, Radio-gramophone with Automatic Record Changer.

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FLUXITE
INDISPENSABLE TO EVERY RADIO ENTHUSIAST
IT SIMPLIFIES ALL SOLDERING

"We're Fluxite and Solder, the reliable pair, Famous for Soldering—known everywhere! Now here is a statement—bound to come true, If you'll invite US to come and help YOU!"

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

All Hardware and Ironmongery Stores sell Fluxite in tins, 8d., 1/4 and 2/8.

ANOTHER USE FOR FLUXITE
Hardening Tools and Case Hardening. Ask for Leaflet on improved method.

NEW "JUNIOR" SIZE 4d. per tin.

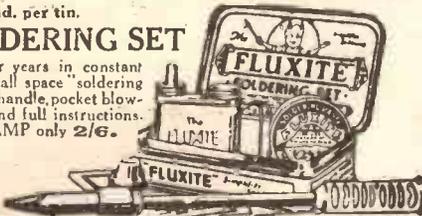
FLUXITE SOLDERING SET

Simple to use and lasts for years in constant use. Contains special "small space" soldering iron with non-heating metal handle, pocket blow-lamp, Fluxite, Solder, etc., and full instructions. COMPLETE, 7/6, or LAMP only 2/6.

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ROTHERHITHE, S.E.15



ALL MECHANICS WILL HAVE

FLUXITE

IT SIMPLIFIES ALL SOLDERING

Are your RAZOR and BEARD good friends?

Even with a keen razor, hot water and a good brush you have no guarantee of a comfortable and efficient shave without the lubricant that really softens the beard. Combining two different soaps into a smooth beautiful emollient and soothing cream



PARKE-DAVIS Shaving Cream

gives a new pleasure to shaving. It makes your razor and beard good friends.— Prove this with the liberal seven-shave tube that we will send free for the asking on the coupon.

EUTHYMOL (Dept. 125W) 50, Beak St., London, W.1
Please send FREE sample tube Shaving Cream.

Name

Address

(Use block letters please)

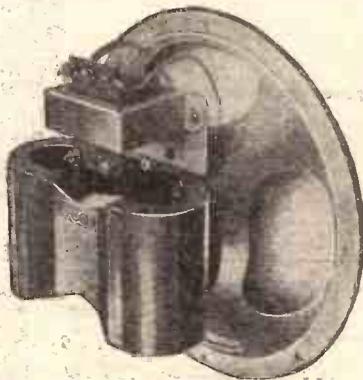
EPOCH

ARE NOT ORDINARY MOVING COIL SPEAKERS

Backed by years of experience and research, ahead of other makes, each model of Epoch Speakers is definitely superior to others in its price class.

Take, for example, the
New Edition

20th Century Model P.M.M.C. LOUDSPEAKER



It looks almost identical, with many others selling at higher, or even at lower prices, but examine it more closely. Note that it has a cobalt steel (not chrome or tungsten steel) magnet, an aluminium (heavy gauge) frame (not iron), an 8 in. diaphragm (not 7 in. or 6 in. or 5 in.); a specially impregnated coil system (not just shellacked or varnished wire), a specially moulded cone (not ordinary paper or buckram), an input transformer with 5 scientifically graded ratios—altogether a superior specification. Now compare its performance, not only with speakers in its own price, but with those costing pounds more, and you will note a perfection far above its own class for tone, accuracy and sensitivity—

A MASTER
SPEAKER AT
A PRICE
WITHIN THE
REACH OF ALL

35'

Complete with 5-ratio Transformer. Or in handsome, polished, solid oak cabinet, 47/6

ASK YOUR DEALER FOR IT.

Write for full particulars or call for a demonstration.

EPOCH RADIO MANUFACTURING CO., LTD.,
Exmouth House, Exmouth St., London, E.C.1
(at the junction of Rosebery Avenue and Farringdon Road).

'Phone: Clerkenwell 6666.

RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 106.)

gave a tremendous boost to the results. Is it O.K. to go on using it this way?"

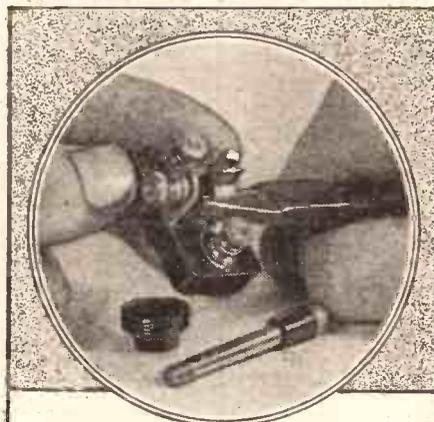
Yes. In the case of the P.M. 12A, the maker's recommend that no grid bias should be used, so you have done correctly in dispensing with it.

Your alterations—removing the battery and joining together the two joints to which it was connected—are quite in order.

USING A PENTODE.

T. R. F. (Leominster).—"My first pentode went west after such a brief life that I was advised to use a protective circuit across the choke, the extra circuit consisting of a 25,000-ohm resistance in series with a .01-mfd. fixed condenser. The resistance is one of the adjustable type, and I notice that when I

WHAT'S WRONG ?



Switch springs occasionally give rise to clicking noises and poor reception owing to long use or to misuse.

Even a first-quality switch may develop this fault after very long service, but it is easily put right by strengthening the spring.

Sometimes this can be done by the fingers, but it may be necessary to use pliers, as shown.

adjust this towards the all-out position the tone appears to alter and the 'brilliance' of the pentode does not seem to be quite so noticeable.

"Is this all right? I ask not because I mind the effect, for, as a matter of fact, I am still hankering more after adequate bass notes than after the high stuff. But, as no mention was made of tone control, when I tried this stunt it comes as a bit of a surprise to find that I get such a control, and I am wondering if there is anything wrong?"

No, there is nothing wrong. The arrangement described will affect the tone by enabling the condenser to act as a by-pass for the higher frequencies. The effect is then to make the bass more noticeable, but actually there is no increase in bass, but only a

decrease in the upper frequencies, giving the illusion of more bass in the reproduction.

CONNECTIONS FOR PARALLEL FEED FOR L.F. TRANSFORMER.

F. C. (Cousdon Common, Surrey).—"I hope you will be able to help me out with this parallel feeding for L.F. transformer, for

THE ANSWERS

TO THE QUESTIONS ASKED ON
PAGE 104 ARE GIVEN BELOW.

- (1) 746 watts (i.e. .746 kw.) = 1 horse power.
- (2) Approximately 100,000 volts are required to do this.
- (3) Because its impedance at the high frequencies (high notes) is lower than its impedance at low frequencies (low notes). It therefore tends to by-pass the high notes, which do not then so markedly affect the loudspeaker.
- (4) No. One of the advantages of differential reaction connections is that they do not affect tuning as did the methods formerly in favour.

DID YOU KNOW THEM ALL ?

I am getting into a desperate muddle with it.

"You see, I don't pretend to know a lot about wireless, being a bit short of spare time to read it up as I should like to. But I have got kind of interested in parallel feed. The normal connections for my transformer are in accordance with the following:

"H.T. terminal to the H.T. plus 1 terminal of battery. P, terminal to the H.F. choke; G, terminal to the grid terminal of the following valve holder: G.B. terminal to G.B. negative 1 flexible.

"Perhaps I should explain that the other end of the H.F. choke goes to moving vanes of the differential reaction condenser, and also to the plate terminal of the detector.

"What are the alterations (in words) to put that arrangement over to parallel feed?"

What you will have to do is to undo all the connections to the L.F. transformer. Then join a 25,000 or 30,000 resistance between battery plus 1 and the end of the H.F. choke that is vacant, owing to your having removed the primary connection from it.

Join one side of a 1-mfd. condenser to the junction between the H.F. choke and the new resistance. And then connect the other side of this condenser to the P. terminal of the transformer.

Connect its G. terminal to the grid of the valve, as before, and finally bring the flexible lead from the G.B. Battery (G.B.—1) to the vacant terminals on the L.F. transformer.

When this has been done you are correctly connected for parallel feeding.

THE LONG RANGE THREE.

In the list of components for The Long Range Three (described in P.W.'s Free Book last week) the "2 screen coils" listed on page 9 should be of different Goltone types—one GGC for aerial coil, and one GGR for anode coil.

THE NEW TELSEN COMPONENTS.

We have received a number of new Telsen components, including their screened coil and intervalve coupling unit, and test reports of these will appear in POPULAR WIRELESS as soon as can be arranged.

Meanwhile, it should be noted that, with few exceptions, they have all been tried in the "P.W." Research Dept. already, and found to be perfectly efficient.

"P.W." PANELS. No. 90. BELGRADE.

The Yugo-Slavian capital transmits its programmes on a wavelength of 430.4 metres, on a power of 2.5 kilowatts.

Belgrade, the capital, is 1,055 miles from London. The name is pronounced "Beograd."

Sometimes a metronome is used in the intervals, beating 60 times per second. Belgrade's "Good-night" is given as "Laku Noc."

DARIO PRICE REDUCTIONS & NEW RANGE



Fit Dario Valves in your receiver and its sensitivity, range and volume will increase enormously. Do not tolerate valve deterioration. Why let those worn-out valves spoil your reception when, at such a little cost, you can restore the original sensitivity and purity of your set with Dario Valves. You will be amazed at the improvement.

FREE.—Write to us now and we will send you free the Dario Booklet which illustrates the full Dario range of valves together with slopes and all technical information. If you are in doubt as to the valves you should be using in your receiver, write to us for a **Free Valve enquiry coupon**, and we shall be pleased to tell you the correct valves for your set.

DARIO 2-VOLT.	
DARIO Screenodion Bivolt	12/6
DARIO Screenodion Variable-Mu	13/6
DARIO Universal Bivolt reduced to	5/-
DARIO Super H.F. Bivolt reduced to	5/-
DARIO Detector Bivolt (non-microphonic) to	5/-
DARIO Super Detector Bivolt reduced from	6/6 to 5/-
DARIO Super Power Bivolt reduced to	6/6
DARIO Hyper Power Bivolt reduced to	7/-
DARIO Polyodion (multi-grid)	12/6

DARIO A.C. MAINS VALVES (I.H.).	
DARIO A.C. Screenodion	13/6
DARIO A.C. Super Screenodion (Steep slope)	13/6
DARIO A.C. Variable-Mu Screenodion	13/6
DARIO A.C. Super Detector reduced to	9/6
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DARIO A.C. Super Power	10/-
DARIO A.C. Polyodion (multi-grid)	13/6

DARIO D.C. MAINS VALVE 20-VOLT (I.H.).	
DARIO D.C. Screenodion	15/-
DARIO D.C. Super Detector	11/6
DARIO D.C. Super Power	12/6
DARIO D.C. Polyodion (multi-grid)	15/6

FULL-WAVE RECTIFYING TUBES (4-VOLT A.C.).	
DARIO F.W.1 (2x250 v-60 m.a.)	9/-
DARIO F.W.2 (2x350 v-120 m.a.)	11/-
DARIO F.W.3 (2x500 v-120 m.a.)	14/-

Also the usual 4-volt battery range.

IMPEX ELECTRICAL LTD., 538, High Rd., Leytonstone, London, E. 11

DARIO VALVES FOR-PROGRESS, EFFICIENCY, ECONOMY

New—Simpler—Greater EFFICIENCY
with the **FORMO** complete

Triple Gang complete with Aerial and pair of Band Pass Coils on aluminium base; all perfectly matched and switches ganged.

46/6

Dual Gang with pair of dual range coils (Aerial and H.F.) similarly mounted and matched. **33/6**

For full details get the Formo catalogue of new ideas—better components. If unobtainable locally, send name and address of your nearest dealer to:—



BAND PASS TUNER

Formo Combined Condenser and Coil Assemblies have reached the culminating point in selectivity, and have created a revolution in simplicity of set construction. A performance utterly superior to any hitherto experienced—all switches are ganged and the complete assembly matched with the utmost precision. A high maximum and a low minimum capacity are attained with the condenser trimmers at zero.

The FORMO CO.
GROWN WORKS, REGENT'S PARK, SOUTHAMPTON.
London: 23, Golden Square, Piccadilly, W.1.

Here's Value!

The New



GROSVENOR Pedestal CABINET

Modern and attractive in design this handsome cabinet will accommodate all-mains or battery-driven sets with speaker. The "Grosvenor" cabinet incorporates the high quality workmanship and materials associated with all "Camco" cabinets. Price **80/-**

For further particulars of this and other "Camco" cabinets send for your FREE copy of the new "Camco" catalogue.

CARRINGTON MFG. Co. Ltd.
Showrooms:
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SEND THIS COUPON NOW FOR FREE 24 pp. CATALOGUE

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NAME.....
ADDRESS.....
.....P.W.

TRADE JOTTINGS

By G. T. KELSEY

A WELL-PRODUCED leaflet describing the Climax range of all-electric radio-gramophones and radio receivers for A.C. or D.C. mains has just been published by Climax Radio Electric, Ltd., Haverstock Works, Parkhill Road, Hampstead, London, N.W.3.

The leaflet is one that should be carefully considered by all who are contemplating the purchase of an all-electric radio, and copies can be obtained from Climax Radio Electric, Ltd., at the above address.

Those "Golden" Valves.

The research staff of the Mullard Company has been at it again! This time they have produced a range of "golden" valves to replace the zinc metallised ones.

The Mullard people claim that this new form of coating gives a more perfect screening effect, since the new combination of metals employed (one of which is copper) adheres better to the glass.

Our own tests have not yet been completed, but these new valves are certainly much more attractive in appearance. The term "golden valves" seems to open up all sorts of interesting possibilities for clever advertising slogans, and if they manage to eclipse their previous efforts in this direction I will take my hat off to them.

Useful Information.

The appendix to the new season's catalogue that has just been produced by Messrs. Bulgin is one of the most commendable trade efforts that I have seen for some time. It consists of 28 pages packed full of really useful information, and the diagrams contained in it are excellent.

I imagine that there will be a rush on this new Bulgin 80-page effort, and you would therefore be well advised to make early application for a copy. The catalogue itself is well worth having, even were it not for the useful appendix.

Address your applications to A. F. Bulgin & Co., Ltd., Abbey Road, Barking, Essex.

"Flick-and-it's-gone" Tuning!

If you are interested in *real* selectivity (and who isn't, these days?), you would serve a useful purpose by making application to the British General Manufacturing Co., Ltd., for a copy of their new component catalogue. It contains full details of their new 4 K.C. band-pass filter coils, which are eminently suitable for ganged circuits.

Copies of this new B.G. production can be obtained from their Head Office and Works, Brockley Works, Tyrwhitt Road, London, S.E.4.

Putting Back High Notes.

A comprehensive table from which you can tell at a glance the inductance, the D.C. resistance, and the maximum current rating for any of the famous Varley range of low-frequency chokes is one of the useful features of a new catalogue that has just been produced by this firm.

It also contains details of their latest production, the new Rectatone Transformer, a coupling unit that has been specially designed to employ a non-linear characteristic.

This new transformer which can be used in all the usual methods of coupling, is claimed to have a curve that is straight from 50 to 1,000 cycles, after which it rises steadily reaching a peak at approximately 4,500 cycles. A characteristic of this nature is just the thing that is wanted for modern requirements, since it will tend to compensate the loss of high notes due to the use of ultra-selective tuning circuits.

The new Varley catalogue is very well produced, and you can obtain a copy free of charge by making application to Kingsway House, 103, Kingsway, London, W.C.2.

H.T. From An Accumulator.

All those readers who are faced with H.T. difficulties will be interested in a new leaflet that has just been produced by The Electro Dynamic Construction Co., Ltd., to describe their Electro Dynamic H.T. converter.

The Electro Dynamic converter works from a 2-, 4-, or 6-volt accumulator, and it gives an output of 150 volts 15 milliamperes, or 150 volts 30 milliamperes, according to the model you require.

You can obtain further details of this interesting scheme by writing to the Electro

HOW IS YOUR SET GOING NOW?

Perhaps your switching doesn't work properly? Or some mysterious noise has appeared and is spoiling your radio reception? Or one of the batteries seems to run down much faster than formerly?

Whatever your radio problem may be, remember that the Technical Query Department is thoroughly equipped to assist our readers, and offers its unrivalled service. Full details, including scales of charges, can be obtained direct from the Technical Query Dept., POPULAR WIRELESS, The Fleetway House, Farringdon Street, London, E.C.4.

A postcard will do. On receipt of this an Application Form will be sent to you post free immediately. This application will place you under no obligation whatever, but, having the form, you will know exactly what information we require to have before us in order to solve your problems.

LONDON READERS. PLEASE NOTE: Inquiries should NOT be made by phone or in person at Fleetway House or Tallis House.

Dynamic Construction Co., Ltd., Devonshire Grove, London, S.E.15.

For Super-het. Enthusiasts.

Are you interested in super-hets.? If so, you can usefully occupy a few moments of your time by sending to Messrs. Wright & Weaire for a copy of their new catalogue.

It contains details of oscillator coils and band filters for almost every conceivable circuit arrangement. It also describes all the other components in the popular Wearite range.

Address your applications to Messrs. Wright & Weaire, Ltd., 740, High Road, Tottenham, London, N.17.

The Milnes Unit.

In a report concerning the Milnes H.T. Unit we said that this interesting and useful device embodies plates of the "Edison type."

The Milnes Radio Co. say " . . . the plates used in the Milnes Unit are Alkum type and British made. We may also add that the Alkum plate was the pioneer and was a Swedish invention, and the Edison plate is really an offshoot, although slightly different from the former. We may also say that the Edison plate would not be suitable for embodying in the Milnes Unit for various reasons."



WILLS'S CAPSTAN CIGARETTES

*They
suit
everyone*

10 for 6^d.

20 for 11^d/₂.

THE LISTENER'S NOTEBOOK

(Continued from page 94.)

that I was listening to the natural human voice.

Scorning the Question.

The enunciation of some of the singers—and there was a goodly sprinkling of English songs—was perfect. One can't say nearly as much of a number of singers appearing before the "mike" this side of the Channel.

They seem to scorn this important question of enunciation, and as long as they continue to do so, I shall plump more and more for gramophone records in preference to the real thing.

Though there was much to be enjoyed in the French programmes (three one-act plays on a Sunday evening made me long for the Continental Sunday) I must confess I was irritated by those constantly recurring advertisements butting in all too frequently to dissipate the atmosphere produced by what had gone before. Mercifully we are spared that in England!

Defraying the Cost.

After the Entr'acte it takes far too much time to settle down again and recapture the spirit of the first half of the programme. But when I called to mind that these advertisements defray the cost (besides interrupt the course) of the programmes, my annoyance wasn't so profound, and I had to admit it was good business on the part of the French Broadcasting authorities.

At the same time, I am surprised that French listeners are so tolerant. To one who listens to these advertisements only occasionally, the annoyance isn't so great, but to listen to the same stuff night after night (for they are always cleverly sandwiched) is, I should have thought, enough to cause a revolution.

But the fact that the practice is now a long-standing one only proves that French listeners are either resigned to it, or they like it. And for the same reason, French business houses must find it pays to advertise, otherwise they would discontinue it.

Strong Opposition.

However, I hope that the B.B.C. finances will never be so strained that the practice has to be introduced to Broadcasting House.

America is, of course, famous for its system of commercialised radio. We had samples of it earlier in the year when we were privileged to hear one or two relays from across the broad Atlantic.

But there, too, there is strong opposition to it, and a certain doctor is at this very moment launching a vigorous campaign against it.

Lamentable Transmissions.

"Within the last few years," he says, "broadcasting stations have so debased themselves as to deserve no more respect than a common pedlar. Most transmissions have but one object, namely, that of emptying the pockets of those who listen to them. These transmissions are lamentable and unworthy of a civilised nation."

When we read such a denunciation as this, we must recognise that, whatever irritation we suffer at the hands of the B.B.C., we still have a system of broadcasting, honestly devised, honestly carried out, which never causes us to wonder what is behind it all.

New Times Sales Co

NEW 1933

RADIO

ON EASIEST OF EASY TERMS

QUICKEST DELIVERY

MANUFACTURERS' KITS

LISSEN "SKYSCRAPER 3." Chassis model with (Lissen) S.G., Detector and Pentode valves. Cash Price, £4/9/6. Balance in 11 monthly payments of 8/3 only Carriage Paid. **8/3**

COSSOR MELODY MAKER. Model 335. Complete with Valves, Speaker and Cabinet. Employs Cossor Variable-Mu S.G. H.F. stage, Detector and Power. Cash Price £7/17/6. Balance in 11 monthly payments of 14/10 Carriage Paid. **10/-** order

SLEKTUN SCOUT S.G. 3.—S.G., Detector and Power. Pilot Author Kit "A" (less valves and cabinet). Cash or C.O.D. £4/8/6. Carriage Paid. Balance in 11 monthly instalments of 8/1. **8/1** order

ACCESSORIES

COLLARO ELECTRIC GRAMPHONE UNIT. For A.C. Mains. Complete with 12" Plush Covered Turntable; Combined Tone Arm, Pick-Up and Volume Control; Automatic Stop: all built into one easily mounted unit. Cash Price £4/0/0. Carriage Paid. Balance in 11 monthly payments of 7/4. **7/4** order

B.T.H. SENIOR PICK-UP, complete with Arm and Base. Cash Price £2/2/0. Carriage Paid. Balance in 11 monthly payments of 3/10. **3/10** order

GARRARD INDUCTION GRAMPHONE MOTOR. For A.C. Mains. With Model 202. Mounted on 12-in. Nickel Motor Plate with fully automatic electric starting and stopping switch. Cash Price, £2/10/0. Carriage Paid. Balance in 11 monthly payments of 4/7. **4/7** order

FIRST WITH EASY TERMS in 1924 and Still leading

BIGGEST STOCKS

Strictest Privacy Guaranteed

R & A "VICTOR" PERMANENT MAGNET MOVING-COIL SPEAKER DE LUXE. With 6-ratio input transformer and protecting grill. Cash Price £3/10/0. Balance in 11 monthly payments of 6/5. **6/5** order

R & A "BANTAM" PERMANENT MAGNET MOVING-COIL SPEAKER. With 3-ratio input transformer. Cash Price £1/7/6. Balance in 5 monthly payments of 5/- **5/-** order

BLUE SPOT SPEAKER UNIT AND CHASSIS, Type 100U. Cash Price £1/19/6. Balance in 7 monthly payments of 5/5. **5/5** order

W.B. PERMANENT MAGNET MOVING-COIL SPEAKER, Type P.M.4. Complete with Transformer. Cash Price £2/2/0. Balance in 7 monthly payments of 5/9. **5/9** order

EPOCH "20 C" PERMANENT MAGNET MOVING-COIL SPEAKER. With 3-ratio input transformer. This speaker will handle up to 5 watts. Cash Price £1/15/0. Balance in 5 monthly payments of 6/6. **6/6** order

EPOCH MM. PERMANENT MAGNET MOVING-COIL SPEAKER with 5-ratio input transformer. Cash Price £1/7/6. Balance in 5 monthly payments of 5/- **5/-** order

ATLAS A.C. ELIMINATOR, Type A.G.244. Three tappings, S.G., Detector and Power. Output, 120 volts at 20 m.a. Cash Price £2/19/6. Balance in 11 monthly payments of 5/6. **5/6** order

All Goods Carriage Paid.

Any items advertised in this journal sent C.O.D. If value over 10/- sent all C.O.D. charges paid.

To NEW TIMES SALES CO. 56, Ludgate Hill, London, E.C.4.

Please send me (a) 1933 Lists

(b).....for which I enclose first payment of £.....s.....d.....

Name.....

Address.....

P.W. 24/9/32

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Sit down and think this over. We believe that our 200-page handbook, "ENGINEERING OPPORTUNITIES," will show you the way to well-paid, permanent and progressive employment. In any case, the handbook costs nothing, and it will at least show you various surprising possibilities about which at present you know nothing. Can you, can any man, who cares a hoot about his future, afford to allow this opportunity for a worth-while job to pass unheeded? Think it over. Can you? We want you to read "ENGINEERING OPPORTUNITIES." Among other things it gives details of all recognised Examinations (A.M.Iust.C.E., A.M.I.Mech.E., I.E.E., G.P.O., etc.), outlines modern home-study courses in all branches of Civil, Mech., Elec., Motor, Radio, Aero and Talkie Engineering, and explains the unique advantages of our Employment Department. The book is quite free. Send a post-card for your copy NOW. We promise that it will be a moment of your time well spent.

THE BRITISH INSTITUTE OF ENGINEERING TECHNOLOGY 401, Shakespeare House, 29/31, Oxford St., London, W.1

PLEASE be sure to mention "POPULAR WIRELESS" when communicating with Advertisers. THANKS!

SHORT-WAVE BARGAIN!

SHORT-WAVE PLUG-IN COILS, Nos. 2-9 TURNS

8" AIR DIELECTRIC STANDARD SIZE 4 for 2/4, 8 for 4/6, all EACH Post Paid. The set of Usual eight covers whole Price S.W. range. Base-1/6 board Coil Holders 4d.



SCIENTIFIC SUPPLY STORES DEPT. P.W., 126, NEWINGTON CAUSEWAY ELEPHANT & CASTLE, LONDON Phone: Hop 4177

10,000 GRAMO-MOTORS FROM STOCK

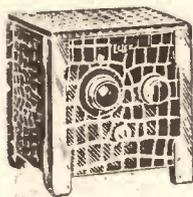
BIG CASH DISCOUNT ALLOWED Make a Gramophone or Radiogram Order loose kits and assemble them at home. Get for 3d. our new 64-page catalogue with scale drawings and instructions how to make them. We sell motors from 7/6. tone-arms, soundboxes, 1/6, pick-ups, big volume horns, loudspeakers, radio kits, complete receiving sets, gramophones, radiograms. Established 1905. THE REGENT FITTINGS CO., P.W. 120 OLD STREET, LONDON, E.C.1.



LOOK at THESE EELEX ACCESSORIES

EELEX SHORT-WAVE CONVERTER

Increase the range and selectivity of your present set by fitting an Eelex Short-Wave Converter. With this instrument fitted to your set it is possible for stations on the ultra Short-Wave bands to be tuned-in. No complicated adjustments to be made; just connect to the aerial and earth terminals of your present set. Price 60/- (with valve). All Mains 65/- (without valve). Two valve 85/- (without valves)



EELEX FRAME AERIAL

A frame aerial at an amazingly low price. This aerial was especially designed for use with Super-het. receivers, but can also be used with or without centre tap. "The Eelex Frame Aerial has a definite minimum silent point.

Price 20/-



EELEX TESTING PRODS

Amateurs need not risk burning out valves when looking for faults. The Eelex Testing Prods are an insurance policy in themselves. Red and black insulated handles.

Price per pair 3/6



FOR QUALITY and FINISH INSIST UPON EELEX

Write for list A.24.

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Eelex House, 118, Bunhill Row, London, E.C.1

Phone: Metropolitan 0314/5/6.

TECHNICAL NOTES

Some diverse and informative jottings about interesting aspects of radio technique.

By Dr. J. H. T. ROBERTS, F. Inst. P.

Metallising Valves.

A READER was asking me recently why the silvering was put on the inside of a valve, and also what was the object of the metal covering used on the outside of certain types of valves.

I thought everyone knew in these days the reason at any rate of the silvering inside. Actually, the silvering is not done on purpose; it is the accidental result of the evaporation of a small quantity of magnesium in the process of finally evacuating the valve.

When the valve is connected to the pumps in the process of manufacture the air is drawn out to as low a vacuum as is conveniently possible, and then a high-frequency coil is brought in proximity to the valve, with the result that powerful H.F. currents, or eddy currents, are set up in the electrodes of the valve, which are thereby raised to a high temperature.

This releases any occluded gases remaining in the metal, and when the temperature becomes high enough a small piece of magnesium, which has been previously fixed to the electrode system, is melted and volatilised.

The vapour of the magnesium has the property of absorbing the remaining traces of gas in the valve and holding them prisoner, as it were, even after the vapour has condensed on the inside of the glass bulb in the form of the familiar silver-like mirror. This process is known as "gettering," and the magnesium is called the "getter," which, as you may easily judge, is a term hailing from the other side of the Atlantic.

Shielding the Bulb.

As regards the metallising on the outside of certain valves, this is for the purpose of electrical shielding and to prevent stray electrification. It is usually done by coating the outside of the bulb first of all with a special varnish, after which the metal, in a very finely divided state, is sprayed upon the varnish. The metallised coating is, of course, continued to a point which is adapted ultimately to be connected to earth.

Detector, the Culprit.

Distortion may occur from a great variety of causes, but many listeners overlook the fact that a conventional grid-leak detector in the ordinary way acts not only as a rectifier, but also to some extent as an L.F. amplifier, and so it can quite easily cause distortion unless proper precautions are taken.

These precautions relate more particularly to the values of the grid leak and the condenser, which often must be modified from the conventional 2 megohms and .0003 microfarad respectively. The distortion, which so often arises from unsuitable values of grid leak and condenser,

(Continued on next page.)

There is NO SUBSTITUTE for SECCOTINE

The World's Strongest Adhesive.

—proved to be TWICE AS STRONG as any other.

Obtainable at all good Stationers, Ironmongers and General Stores. In Tubes 4d., 6d. and 9d. MADE BY BRITISH WORKPEOPLE. Look for the name on tube and carton.

Write for booklet describing many amazing uses. Dept X., McCaw, Stevenson & Orr Ltd., Belfast

There is only ONE SECCOTINE

EASY PAYMENTS

"There's no place like HOLMES."

The first firm to supply Wireless parts, on easy payments. Eight years advertiser in "Popular Wireless." Thousands of satisfied customers.

		Monthly Deposit Payments	
LISSEN SKYSCRAPER KIT	89/6	8/3	11 of 8/3
TELSEN AJAX 3 KIT	61/6	6/9	9 of 6/9
R.R. 303 KIT with Valves	70/-	7/9	9 of 7/9
COSSOR KIT 334	£67/6	10/-	11 of 11/10
EXIDE H.T. Accum. 120v.	£3	6/-	9 of 6/8
BLUE SPOT 66R & CHASSIS	£22/6	5/6	9 of 4/6
BLUE SPOT 100U	39/6	5/8	7 of 5/4
CELESTION M.C. Speaker	47/6	5/3	9 of 5/3
EPOCH 20th CENTURY M.C.	35/-	4/10	7 of 4/10

Parts for any Kit Set. Any make of Speaker. New Goods Obtained for Every Order.

Send us a list of the parts you require and the payments that will suit your convenience, and we will send you a definite quotation. Anything Wireless.

H. W. HOLMES, 29, FOLEY STREET, Great Portland Street, London, W.1.

Phone: Museum 1414.

DUAL RANGE COIL

A really efficient substitute for Plug-in Coils 2/6 post free.

DX COILS - LONDON, E.S.

KAY'S CABINETS

THE "LEADER" Radiogram Cabinet



in polished Oak, 39" high, 24" wide, 19" deep. For panels 18" x 7" or suitable vignette provided free.

30/- DIRECT FROM FACTORY.

There is a Cabinet to meet your needs in our Illustrated Lists of 60 CABINETS Post Free

H. KAY, Cabinet Manufacturer, Mount Pleasant Road, London, N.17.

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TAYLEX WET H.T. BATTERIES

Give long service, improved volume and tone, very economical.

Replacements for Taylex or Standard batteries at low prices; details post free; also Bargain List Radio Kits and parts at lowest prices.

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Minimum Space Accepted:
Half-an-inch 15/-

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Telephone: City 7261

TECHNICAL NOTES

(Continued from previous page.)

can sometimes be got rid of by changing to 1 megohm and .002 microfarad instead of the above-mentioned values.

Shunting Upper Audio's.

The grid condenser, especially if of unduly large capacity, tends to shunt the higher audio-frequencies, and if the capacity of the grid condenser is reduced you will sometimes get an improvement in quality which more than counterbalances any slight loss of efficiency.

Power-Grid Working.

Where there is a large amount of high-frequency amplification before the detector, you may, of course, make drastic changes

ORDER YOURS!

NEXT WEEK'S "P.W."

with

FULL-SIZE

1".

BLUE PRINT

of

THE "APEX"

FREE! FREE! FREE!

Details of a really wonderful set

Presented with next week's POPULAR WIRELESS Usual price. 3d. Thursday

in values of grid leak and condenser, and go in for what is loosely called "power-grid" detection, which I mentioned before in these Notes.

Here the values of grid leak and condenser being, say, one-third of the usual value at .001 microfarad and the grid leak down to a quarter or even one-tenth of the conventional value, say, a quarter megohm, or in exceptional cases even 100,000 ohms. The valve should be of the medium-impedance type, capable of avoiding distortion with 120 to 150 volts on the anode.

Watch Your Transformer.

Another point, and often quite an important one, to bear in mind when using power-grid detection is that the anode current may be quite high, as much as 5 milliamps, and therefore you should see that the primary of the following low-frequency transformer is capable of carrying this current without any serious variation in its inductance. Some smallish transformers would be so nearly saturated with this current as to be quite unsuitable.

(Continued on next page.)

GRIP

Here are some tests with various well-known types of wander plugs. Starting from a small socket, each plug was pushed into progressively larger sockets until no contact was made, the force needed to remove the plug from each size of socket being measured in ounces.

In each case the "Bowspring" showed itself the better plug. Here is an example.

Socket diameter.	Grip of Bowspring	Grip of typical "split-pin" Plug.
.127"	65 oz.	20 oz.
.133"	36 oz.	2 oz.
.134"	28 oz.	No contact

The "Bowspring" continued to make contact until a socket size of just over .144" was reached.

The "Bowspring" gives strong pressure over a far wider range of diameters than any plug we have so far tested.



Strong spring and wide self-adjustment. Side entry, with Belling-Lee patent grip for flex. 12 indications and 6 plain colours.

BELLING-LEE

Adot. of BELLING & LEE, Ltd., Cambridge Arterial Road, Enfield, Middlesex.

1 1/2 d

TUNEWELL VOLUME CONTROL
Increases power of reception. Losses much less than with ordinary types. Logarithmically wound with double-silk-covered wire. Paper laid between windings.
Type V. All sizes up to 50,000 ohms. 3/6. Sizes from 50,000 to 100,000 ohms, 7/6.
Type P. Variable Resistance or Potentiometer. Equal resistance between studs. Max. Dissipation 3 watts. 5/6.



TUNEWELL WIRE-WOUND ANODE RESISTANCES
All values from 10,000 to 100,000 ohms. 3/6 each.
Bakelite Holder (for vertical or horizontal mounting) 1/6.

TUNEWELL MAINS TRANSFORMER
Type MR 28/200
Price 25/-
SPECIFIED for the "FLEX-FEED TWO"

Post this Now!

TUNEWELL RADIO, LTD., 54, Station Rd., New Southgate, London, N.11

The NEW **TUNEWELL COMPONENTS** give you **SUPER-RADIO** at Lower Cost!

The standard of quality achieved by the new TUNEWELL Components has hitherto been approached only by the highest-priced products, but by careful design and lowering our profits, TUNEWELL have removed the old price-bar to Quality Radio. Send the coupon now for the TUNEWELL "Guide to Super-Radio"—an interesting folder you will keep for reference. It includes 8 Blue Prints (Band-Pass All-Mains 3, Kit Eliminator, etc.) and details of the new range of TUNEWELL Components.

8 FREE Blue Prints

To Tunewell Radio Ltd., 54, Station Rd., London, N.11.

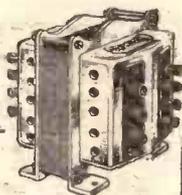
Name

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My nearest dealer is

P.6

Ideal for
the "P.W."
'Flex-Feed 2'



HEYBERD Mains Transformer—

If you want really first-class results from your Mains Transformer you must choose Heyberd. The cheapest quality Mains Equipment. The Transformer described below is specially suitable for the "Flex-Feed 2" Receiver. Designed to work in conjunction with Westinghouse Rectifiers H.T.6 or H.T.7. Extremely good voltage regulation. Negligible temperature rise when delivering maximum output. Specially constructed from finest materials. Special metal end-plates effectively screen the windings. Insulated terminals.

HEYBERD W.25 MAINS TRANSFORMER
Rectified Outputs:
175v. at 25 ma. or 200v. at 28 ma.
2 + 2v. 4 amps. for A.C. Valves.

PRICE - - 2/6

The complete range of Heyberd Mains Transformers and Mains Units are described, with diagrams, in the new Handbook.



Post Coupon

for Heyberd
handbook on
Mains Working

I enclose 3d. stamps for New Handbook of Mains Equipment. Packed with Technical Tips, Service Hints and diagrams

Mr. _____
Address _____

F.C. HEYBERD & Co.,
10 FINSBURY STREET, LONDON, E.C.2
One minute from Moorgate Stn

TECHNICAL NOTES

(Continued from previous page.)

"True-Views."

By now I expect most of you will have made up your True Viewer for looking at the stereoscopic pictures of receiver layouts in "P.W." I have—but, then I was in the secret before you were. Mr. G. V. Dowding, the Technical Editor of "P.W.," is always thinking up new ideas for the benefit of radio enthusiasts, and I must say I think this latest brainwave is one of his best.

At first you may think that it is merely applying an old principle to a new subject; but, even on that basis, it is something which has never been done before, and it is a particularly useful application of stereoscopy because it enables every reader of "P.W." to be in virtually the same position as though he had a made-up receiver in its various stages of construction actually on the table before his eyes. To be able to see the relative positions of the different components of the set and the layout of the wiring and so on in true perspective is enormously more advantageous than to have to pick it out laboriously from an ordinary flat picture—or even from a series of flat pictures.

Making the Pictures.

In addition to this, the actual technique is not nearly so simple as you might imagine. It is no ordinary job to take a proper pair of stereoscopic views of a technical subject, like a radio set, at close range. The distances and angles all have to be very carefully considered if the ultimate double picture is to stand out effectively in relief when viewed through a stereoscopic viewer.

More than this, when you remember that the gigantic avalanche of copies of "P.W." that must be printed each week, you will realise that allowance has to be made for this enormous duplication of the pictures. Another important factor in the scheme is the variation in the different viewers which different readers will use.

The scheme has to provide for all these different conditions, and yet has to be capable of giving to the veriest amateur, who makes up his True Viewer with nothing more than a pair of Woolworth's No. 8 long-sight spectacles, a realistic representation of the concrete article represented in the picture.

Simple and Cheap.

You will, of course, hear more in the next few weeks as to the developments of this True View system, which, in my opinion, is one of the most important developments in pictorial radio journalism. What I like best of all about it is its simplicity and inexpensiveness.

Selectivity Dodge.

Those of you who are troubled with Brookmans Park spreading over the dial will be interested in a little arrangement sent to me by a reader of these Notes, who is in the swamp area and cannot otherwise get sufficient selectivity, even with a screen-grid circuit.

He says he has tried a tapped coil and also band-pass tuning, but loses too much signal strength. The circuit arrangement he

(Continued on next page.)

An important announcement to



ALL RADIO CONSTRUCTORS

The prices of the famous W.B. VALVEHOLDERS and SWITCHES

HAVE NOT BEEN RAISED

These components, so characteristic of the best traditions in British manufacture, are so unique in quality, precision and reliability that, to-day, they are used in practically every leading experimental laboratory in Britain. Made by the makers of the W.B. Moving-Coil Speakers:



Write NOW for the new illustrated list (includes the new W.B. earthing switches, etc. introduced at Olympia).

Whiteley Electrical Radio Co., Ltd., Radio Works, Mansfield, Notts.

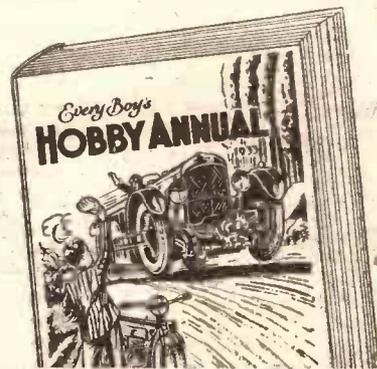
A Home-made Model SPEED-BOAT



Any fellow can easily build this nippy model speedboat by following the directions in the 1933 HOBBY ANNUAL—the book which tells you how to make things and how things work. Profusely illustrated, it contains interesting articles on stamp-collecting, railways, wireless, woodwork, ships, aeroplanes, motor-cars and so on. Make sure of a copy.

At all Newsagents

6/- net



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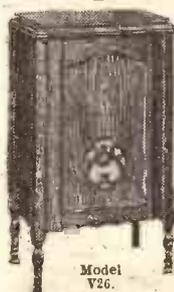
Whether you are already engaged in the radio industry and wish to improve yourself, or if you wish to obtain employment in this interesting profession, we can help you. Write now for Booklet describing our Home Study Course. Sent post free.

NORTHERN COUNTIES WIRELESS SCHOOL,
57, Guildhall Street, Preston.

LOUD SPEAKERS REPAIRED, 4/-

(Blue Spot a Specialty, 5/-)
Transformers 4/-. Headphones 4/-. all repairs magnified free. Eliminator Repairs quoted for. 24 Hours Service. Discount for Trade. Clerkwell 9069.
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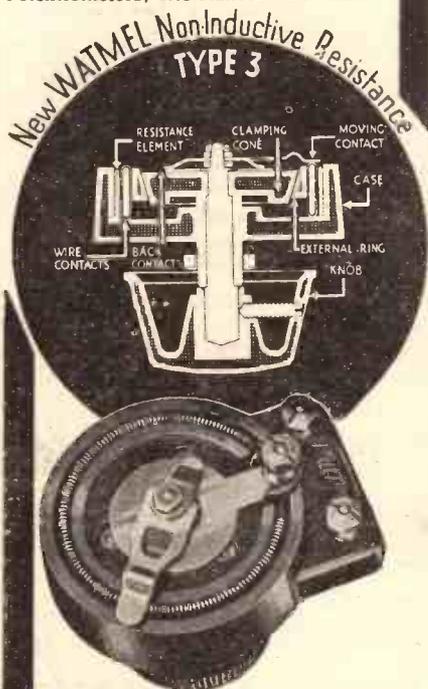
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If you have any difficulty in obtaining Watmel Components, WRITE DIRECT TO US.

TRADE ENQUIRIES INVITED

TECHNICAL NOTES

(Continued from previous page.)

describes is claimed to give an actual gain over the ordinary S.G. circuit.

The arrangement includes a coil of 32 turns of wire tuned by a .001-mfd. variable condenser coupled to the S.G. coil by means of a small coil of about 10 turns, this latter being adapted to rotate until the circuit commences to oscillate.

The aerial tuning coil is shielded from S.G. coil and is coupled to it only through the coupling coil mentioned. For long waves a coil of 115 turns on a 2½-in. former is coupled fairly closely to the L.W. coil and is earthed via the small coupling coil and a .04-mfd. condenser. The detector is tuned-grid.

Noises Off.

When you are troubled with noises in a set it is no use going to work to try to find the cause unless you do so methodically. Of course, if you are an expert, you may have

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a pretty shrewd idea of the cause of the noise and you may go to it right away. But for the great majority of amateurs it is very much better to set to work on a proper system. It not only saves time, but is much more satisfactory and effective in the end.

The first thing to do is to disconnect the aerial from the aerial terminal of the receiver. If this causes the noise to cease, you know at once that it is an extraneous disturbance which is being picked up by the aerial. If the disconnecting of the aerial does not stop the noise, or only reduces it, then try disconnecting the earth, instead of and also in addition to the aerial. This will show you very quickly if the trouble is coming from outside the receiver.

Mains Hum.

Generally the outside sources of disturbance are due either to mains (giving rise to mains hum) or to various types of electrical machinery, particularly machines which cause much sparking.

Interference due to the mains can often be got over by the simple process of reducing the coupling between the aerial and the first tuning circuit of the set, or by altering the position of the aerial.

(Continued on next page.)

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TECHNICAL NOTES

(Continued from previous page.)

Trimmer Condensers.

If you have a set with ganged high-frequency-tuned stages, you may find it a little troublesome to trim the condensers, but the job will be made very much easier if you use a milliammeter to help you; the instrument should be connected in the H.T. lead to the detector. If there is a decoupling circuit you should connect in the milliammeter on the battery side of that circuit.

The purpose of this milliammeter is, of course, to indicate the variations in the anode current, and in order to interpret the readings of the instrument you should bear in mind that with the anode-bend type of rectifier the anode current will reach a maximum when a station is accurately tuned in.

Using a Milliammeter.

Generally speaking, a milliammeter reading from 0 to 5 or 10 milliamps. will be suitable for the purpose; preferably one reading from 0 to 5, because in that case the scale will be wider.

The way to make the adjustment is as follows: First of all tune in a station somewhere near the middle of the scale, and get this accurately tuned, and then adjust the trimmers. Then go to a station, say at the lower end of the scale, and do the same thing again; this will necessitate a fresh slight adjustment.

Then the same thing again at the upper end of the scale with another slight adjustment. In this way you will be able to get a sort of average adjustment which will give you the best average results over the whole of the waveband.

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The well-known stars, Miss Elsie Carlisle and Mario de Pietro, provided the material for what turned out to be a most entertaining feature of the programme, and it was only with difficulty that the management could control the crowds who turned up in their thousands to see it!

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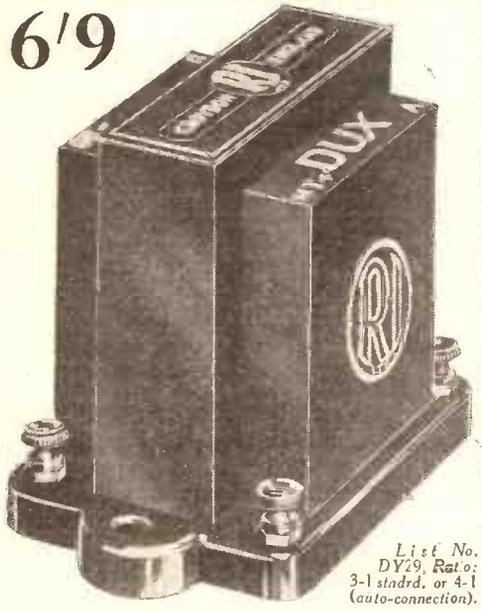
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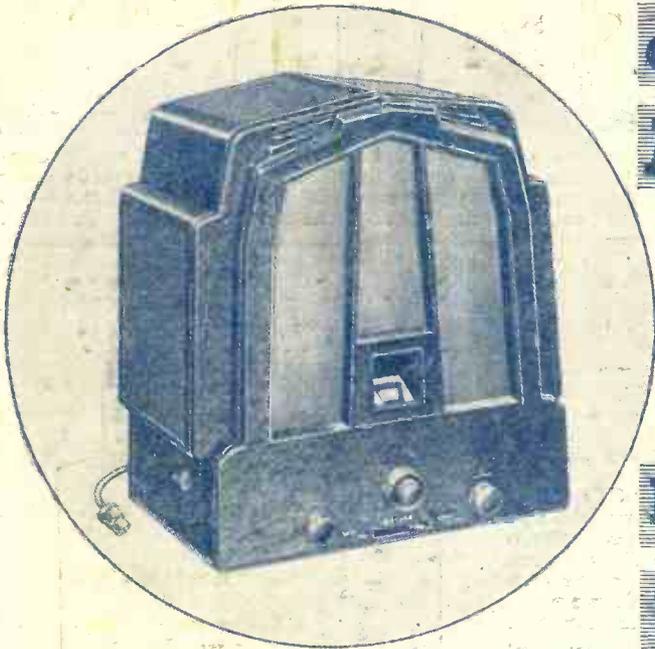
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