

LARGEST RADIO CIRCULATION IN THE WORLD

Popular Wireless

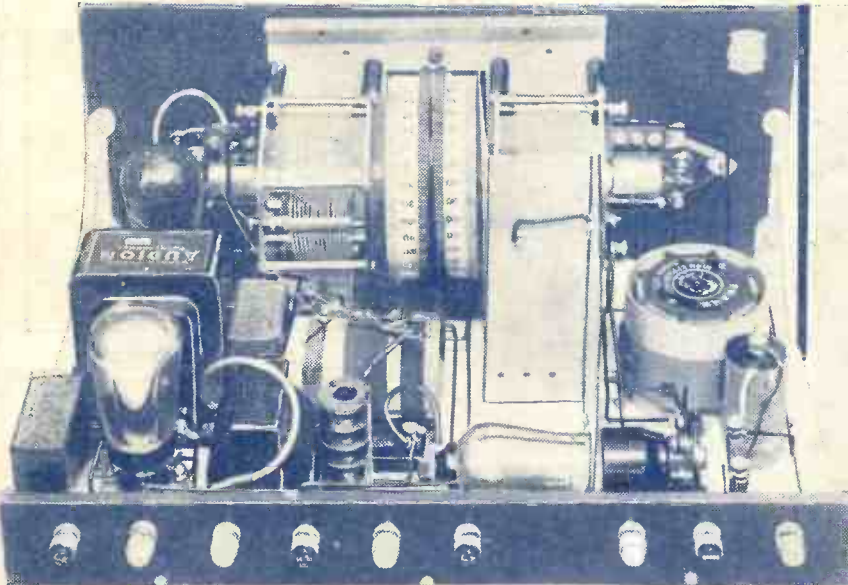
Every Thursday
PRICE
3d.

No. 493. Vol. XX.

INCORPORATING "WIRELESS"

November 14th, 1931.

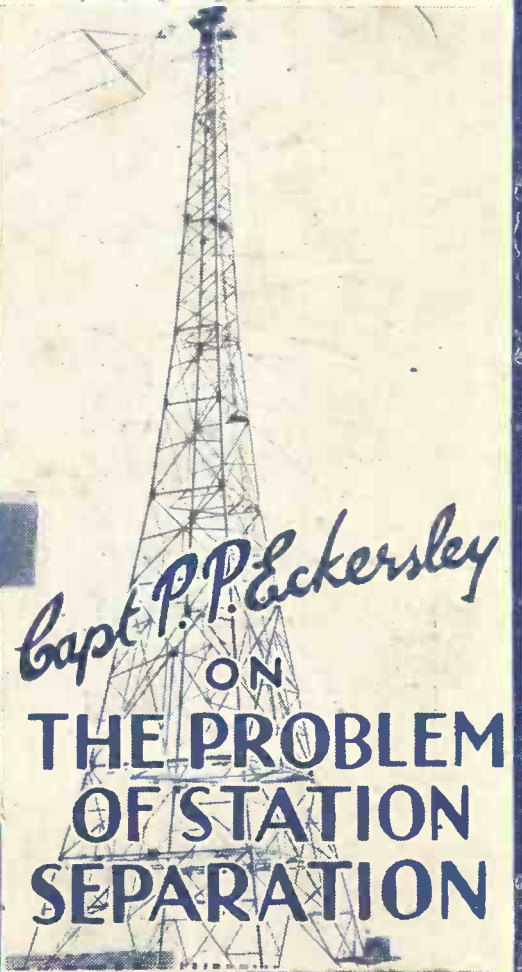
FEATURED THIS WEEK



The EXTENSER "DUAL-RANGER"

AND DON'T MISS:

"P.W.'s" NEW CABINET SCHEME
RADIO REHEARSALS NOTES FROM THE NORTH
MARCONI'S SHORT-WAVE EXPERIMENTS
THOSE METAL-COATED VALVES HOW YOUR SET WORKS



Capt. P. P. Eckersley
ON
THE PROBLEM
OF STATION
SEPARATION

Everything Radio from Ready Radio

See pages 615 and 617.

Advt.

The **NEW** **LEWCOS** **H.F. CHOKE** (Regd)



PRICE

2/6

Here is something new that will prove a boon to all radio constructors!

As a result of scientific research Lewcos have produced this low-priced H.F. CHOKE, on the same basis as all other Lewcos components—with the best materials by master craftsmen.

Its small size ($2\frac{1}{8}$ " long by $1\frac{3}{16}$ " width by $\frac{11}{16}$ " high) renders it particularly suitable for sets where space is of paramount importance.

A Lewcos P.J.3. Coil, Price 2/6, is specified for the EXTENSER DUAL-RANGER described in this issue.



LEWCOS RADIO PRODUCTS FOR BETTER RECEPTION

THE LONDON ELECTRIC WIRE COMPANY AND SMITHS LIMITED, CHURCH ROAD, LEYTON, LONDON, E.15

YEAR AFTER YEAR

the "Wireless World" Olympia Ballot confirms the claims made by Ferranti. For three years in succession the popular vote has awarded first place to the Ferranti Moving Coil Speaker.

Bearing in mind that the ballot embraces every leading British make, it will be admitted that the result speaks volumes for the speaker that speaks the truth.

1929

1930

1931



M1 Model £9:10:0
M2£5:10:0
M3£3:15:0

FERRANTI

FERRANTI LTD., HOLLINWOOD, Lancashire. LONDON: Bush House, Aldwych, W. C. 2.

Mullard

THE · MASTER · VALVE

The Mullard 2-volt range, already supreme in performance, now includes the P.M 202, a super-power valve specially designed to economise in low-tension current consumption. With its low filament consumption of only 0.2 amp.—no more than that of an ordinary power valve—it gives large volume and high quality reproduction. It is thus particularly suitable for use in the output stage of portables and small battery operated sets. Take advantage of the efficiency, and fit one in your receiver to-day.

Price **13/6**

MADE IN ENGLAND

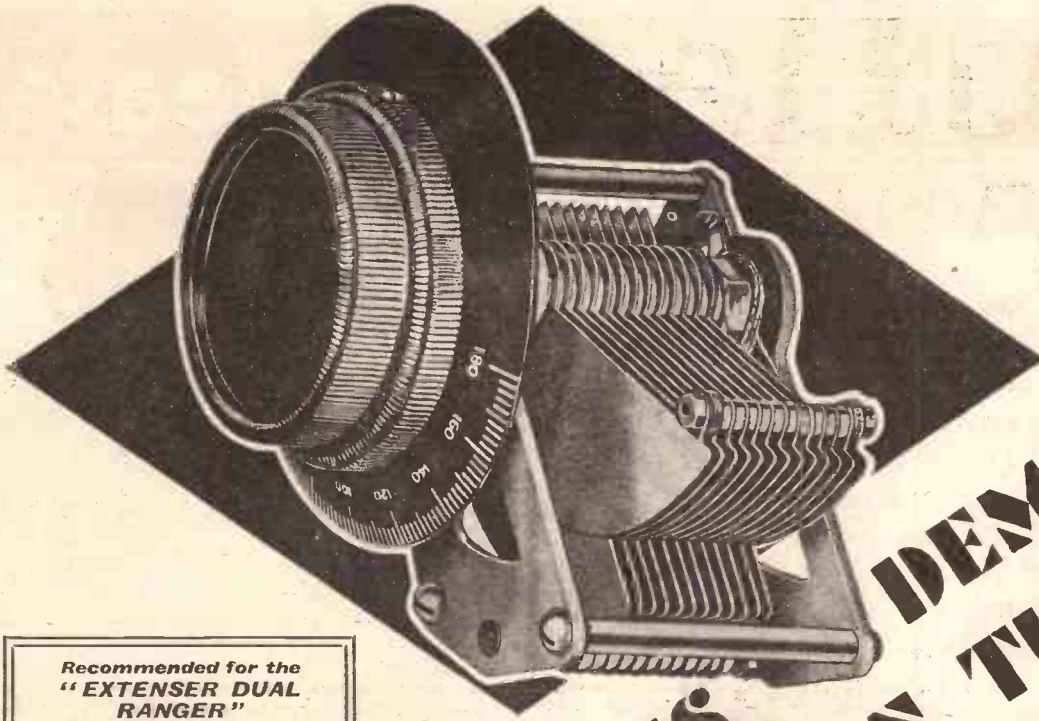
P M · · 2 0 2

**SUPER
POWER
OUTPUT**



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

arts



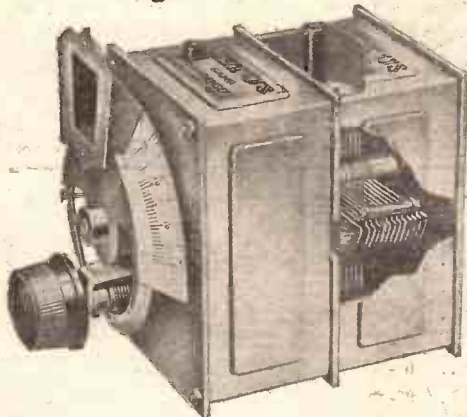
Recommended for the
**"EXTENSER DUAL
 RANGER"**
 described in this number.
 1 LOTUS L.F. Transformer
 2 LOTUS Valve Holders
 2 LOTUS H.F. Chokes
 1 LOTUS Differential Reaction
 Condenser
 1 LOTUS On-off Switch

**MODERN SETS
 DEMAND
 PRECISION TUNING**

**SLOW MOTION
 LOG CONDENSER**

6/6

·0003 & ·0005 CAP.



LOTUS Condensers afford the last word in precision tuning. Control is delightfully smooth and absolutely silent, while sturdy construction ensures a lasting accuracy and unfailing reliability. Ask or write to-day for your copy of the LOTUS Component Catalogue. It is full of interest to the home constructor.

SLOW MOTION LOG CONDENSER

Constructed throughout of aluminium; this Component is highly efficient, perfectly smooth and noiseless in operation. A ball drive integral vernier device is concealed in the spindle and both direct and slow drives are controlled by the double Knob-Dial supplied with the Condenser. With braided pigtail connection to rotor. Specially suitable for Super-Hets. The reduction gear is 7-1.

Capacities ·0003 Type SM/3
 and ·0005 Type SM/5 **6/6** EACH.

GANGED CONDENSERS

Specially heavy vanes and end-plates ensure a permanent accuracy of matching of 1% between units. Trimmers are accessibly placed and are easily adjusted by fingers or screw-driver. Each Unit is completely screened from the others, and pressed aluminium covers also protect the condensers from dust. These assemblies are smaller than most other gang condensers and are simple to assemble in all types of receivers.

2-GANG with Disc Drive
 Type DS/CH.2 **25/-**



RADIO COMPONENTS

LOTUS RADIO LTD., MILL LANE, LIVERPOOL.



Gifts That Always Please



Take this List when you go shopping!

British Gift Books for Boys and Girls of All Ages

THAT ever-perplexing question, "what to give," is easily solved if you give books this year; they are the best gifts and never fail to please. Here are the very best books for boys and girls of all ages—the pick of the Children's Annuals, packed with lively fun in picture and story. They are strongly bound in brightly coloured covers, and most of them contain beautiful coloured plates and many pages printed in colours. If you want a present that will thrill any boy or girl, and one that will keep them happy during the long winter days ahead, you cannot do better than to choose one or more of these famous All-British Annuals—on Sale at all Newsagents and Booksellers.

For Boys and Girls at School

CHUMS Annual	12/6
The MODERN BOY'S BOOK of AIRCRAFT	7/6
BOY'S CINEMA Annual	6/-
MODERN BOY'S Annual	6/-
CHAMPION Annual	6/-
HOBBY Annual	6/-
HOLIDAY Annual	6/-
The NEW ZOO Annual	6/-
SCHOOL FRIEND Annual	6/-
SCHOOLGIRL'S OWN Annual	6/-
BRITISH BOY'S Annual	5/-
BRITISH GIRL'S Annual	5/-
LITTLE FOLKS' Annual	5/-
GOLDEN Annual for Girls	4/6
POPULAR BOOK of GIRLS' STORIES	2/6
POPULAR BOOK of BOYS' STORIES	2/6

For Boys and Girls from 6 to 12 Years

PLAYBOX Annual	6/-
TIGER TIM'S Annual	6/-
PLAYTIME Annual	6/-
PUCK Annual	6/-
CASSELL'S CHILDREN'S Annual	5/-
BRUIN BOYS' Annual	3/6
Mrs. HIPPO'S Annual	3/6
RAINBOW Annual	3/6
BUBBLES Annual	3/6

For Very Little Children

CHICKS' OWN Annual	3/6
BO-PEEP'S BUMPER BOOK	3/6
TINY TOTS Annual	2/6

For Older People

PICTURE SHOW Annual!	6/-
"BEST WAY" COOKERY Gift Book	4/6

Easy to Pack—Cheap to Post—Certain to Please.

FOR "MY
SCREEN GRID
FOUR"

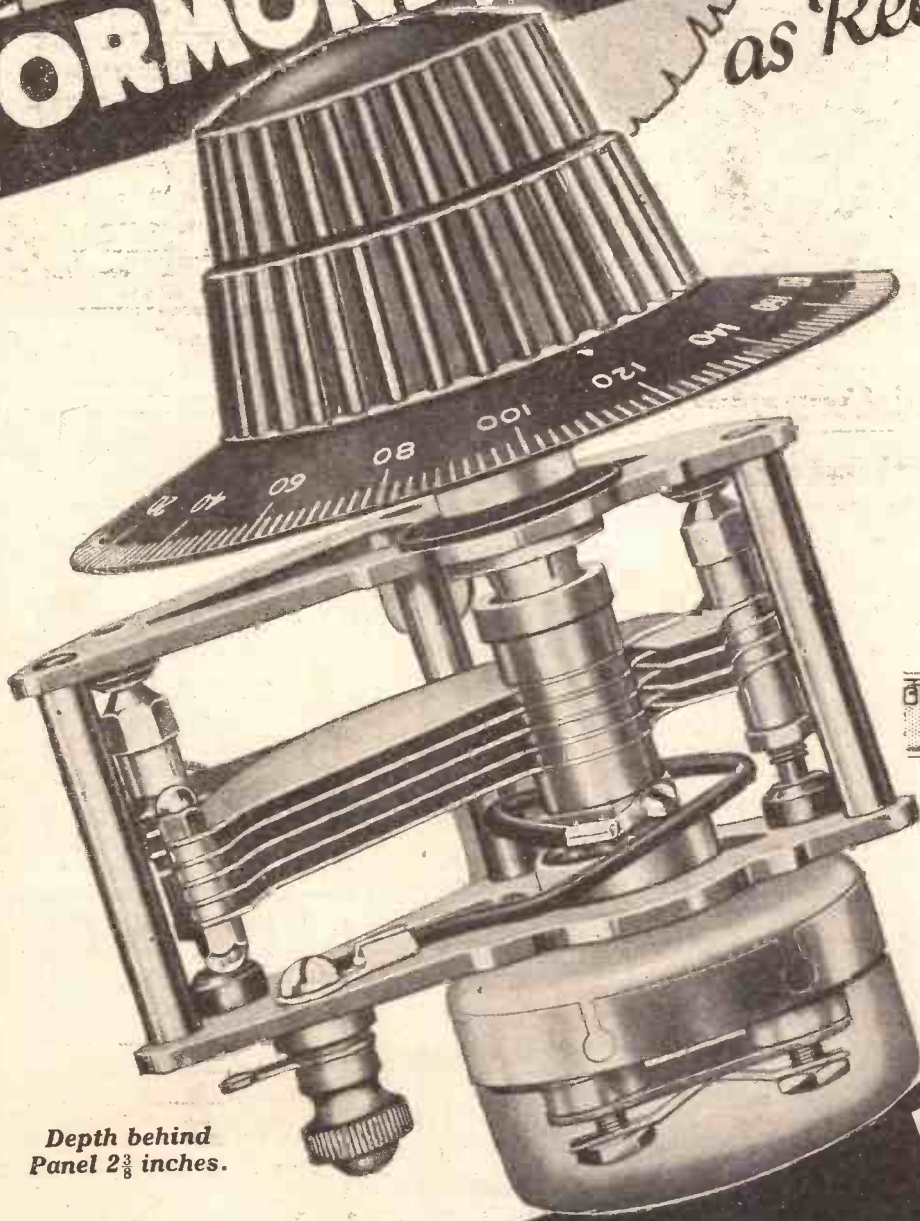
Use -

ORMOND

Small Log
Slow Motion

CONDENSERS

as Recommended



Depth behind
Panel 2 3/8 inches.

Ormond designed this condenser to follow the Logarithmic Law, and expressly for use where extremely high efficiency is required, though space is limited.

The whole construction is very robust. The bright brass vanes are perfectly rigid, and the heavily nickelled and polished skeleton end-plates ensure minimum eddy current losses. Special ball-bearings give a smooth action, facilitating precise tuning adjustments with noiseless operation. The moving vanes are connected to the frame, thus eliminating stray capacity effects.

Supplied complete with 3-inch Dial engraved 0 to 180 degrees, and Slow-Motion Control Knob (ratio approximately 55 to 1).

Cat. No. R/306. Capacity '00013.
Price 11/6.

Also supplied in capacities '00025, '00035, '0005, with or without slow-motion movement.



THE ORMOND ENGINEERING CO., LTD.
ORMOND HOUSE, ROSEBERY AVENUE,
LONDON, E.C.1.

Telephone: Clerkenwell 5334/5/6 & 9344/5/6.
Telegrams: "Ormondengi," Isling.

RIGID · ROBUST
ACCURATE !!

TELSEN

IMMEDIATE DELIVERY

**1932 CIRCUITS
MATCHED COMPONENTS**

CASH C.O.D. H.P. *usual*

Pilot Author's Kits are backed by Peto-Scott with twelve years' reputation for trustworthiness and fair dealing. Remember, there's no Kit like a Pilot.

SEALED

PILOT AUTHOR'S KITS

Pilot Author's Kits are exactly as specified. No substitute parts are employed and everything fits the Telsen Blueprint.

THE TELSEN 'CONQUEROR' THREE

KIT "A"

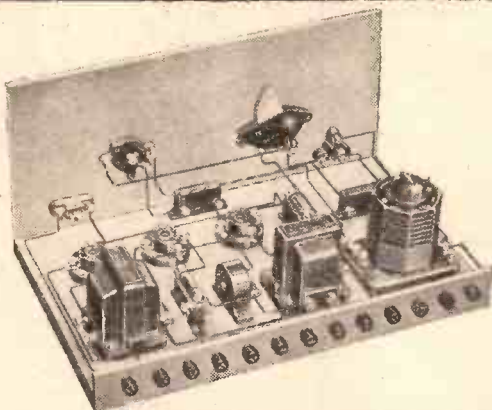
Author's Kit less valves and cabinet.

CASH or C.O.D.

39/9

or 9 monthly payments of 5/-

Kit contains all parts exactly as specified by Telsen. Also beautifully finished Oak panel ready drilled; aluminium finished baseboard with the position for all components correctly stencilled; ebonite terminal strips; Clix terminals; connecting wire and screws, nuts, bolts, etc.



KIT "B"

(with valves less cabinet).
Cash or C.O.D.

£3 : 7 : 3

or 12 monthly payments of 6/2.

KIT "C"

(with valves and cabinet).
Cash or C.O.D.

£4 : 4 : 9

or 12 monthly payments of 7/9.

Any parts supplied separately. If value over 10/-, sent Carriage Paid or C.O.D. We pay all post charges.

TELSEN 'COMMODORE' S.G. THREE

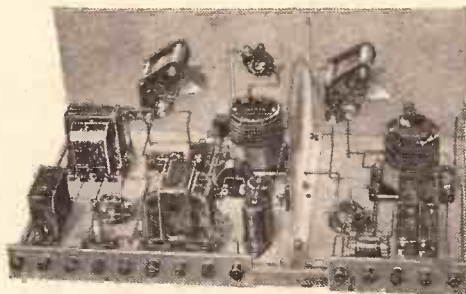
KIT "A"

Author's Kit less valves and cabinet.
CASH or C.O.D.

£4 : 5 : 5

or 12 monthly payments of 7/10

Kit contains all parts exactly as specified by Telsen. Also beautifully finished Oak panel ready drilled; aluminium finished baseboard and the position for all components correctly stencilled; ebonite terminal strips; Clix terminals; connecting wire and screws, nuts, bolts, etc.



KIT "B"

(with valves less cabinet).
Cash or C.O.D.

£6 : 7 : 5

or 12 monthly payments of 11/8.

KIT "C"

(with valves and cabinet).
Cash or C.O.D.

£7 : 4 : 11

or 12 monthly payments of 13/3.

Any parts supplied separately. If value over 10/-, sent Carriage Paid or C.O.D. We pay all post charges.

TRADE NOTE—Telsen 1932 Matched Component Kits are available to the Trade at attractive discounts. Send for terms.

SEND 3d. Postage for FREE TELSEN BLUEPRINT GIVING FULL LIST OF PARTS, DIAGRAMS AND LAYOUT OF ABOVE SETS.

PETO-SCOTT

PETO-SCOTT CO. LTD. Head Office: 77, CITY ROAD, LONDON, E.C.1. Clerkenwell 9408. 62, HIGH HOLBORN, LONDON, W.C.1. Chancery 8266. MANCHESTER: 33, WHITELOW ROAD, CHORLTON-CUM-HARDY. Phone: Chorlton-Cum-Hardy 2028. NEWCASTLE, STAFFS: 7, ALBANY ROAD.

THE TELSEN 'SONGSTER' TWO

Kit "A" Author's Kit less valves and cabinet.

£1 11 9

or 7 monthly payments of 5/-

THE TELSEN 'EMPIRE S.G.4'

Kit "A" Author's Kit less valves and cabinet.

£4 16 10

or 12 monthly payments of 8/10

Prices of Kit "B" and Kit "C" upon request.

Peto-Scott Cabinets for Telsen Kits



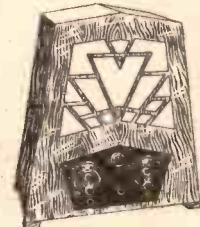
TABLE TYPE (with beautifully finished Oak Panel ready drilled).

'Conqueror' Three Model **17/6**

'Commodore' S.G. Three Model

CONSOLETTA TYPE.

(with beautifully finished Oak Panel ready drilled. Speaker Compartment takes up to 12" diameter cone).



'Conqueror' Three Model, 'Commodore' S.G. Three Model. **35/-**

Fitted Telsen L.S. Unit & Chassis 11/- Extra.

EXPRESS ORDER FORM

To PETO-SCOTT CO. LTD.

Please send me C.O.D./CASH/H.P.

for which I enclose
Cash/H.P. Deposit. £ s. d.

Name

Address

P.W 14/11/31

PILOT KITS

AUTHOR'S

- **EXTENSER DUAL-RANGER** £5.18.2
- **DUAL-RANGER** £3.19.0
- **MY S.G. FOUR . . . COMET 3** £4.0.0

KIT "A"

The No Substitute Kit
IMMEDIATE DELIVERY

CASH - C.O.D. - H.P. *as usual*

Any parts supplied separately if value over 10/- Sent C.O.D. - post charges paid.

"P.W." "FITZALL" CONSOLETTA CABINET
Supplied by **PETO-SCOTT**

ATLAS A.C. ELIMINATOR TYPE A.C.244. Three tappings, S.G. Detector, and Power. Output, 120 volts at 20 m/a. Cash Price, £2:19:6. Balance 11 monthly payments of 5/6.

With **5/6** Order

EXTENSER DUAL-RANGER

As described in this week's issue.

KIT "A"

Less Valves and Cabinet

CASH or C.O.D. **£5-18-2**

or 12 monthly payments of 10/10.

1 Baseboard, 16" x 10"	2	6	2 Sovereign H.F. chokes	7	0	
1 Panel, 16" x 7", ready drilled and slotted for casitechon	6	6	1 Graham Parish Audion L.F. transformer	5	6	
1 Cydon 0005-mfd. double drum-drive Extenser	1	19	6	1 Varley 50,000-ohm spaghetti resistance	1	6
1 0005-mfd. solid dielectric condenser	2	0	1 Lewcos 25,000-ohm spaghetti resistance	1	6	
1 On-off switch	1	0	1 Ferranti output choke type B8	7	0	
1 Telsen 0001-mfd. differential reaction condenser	2	0	2 Valve holders	1	0	
1 "P.W." Dual Range coil	10	6	1 W.B. valve holder, horizontal mounting	1	0	
1 002-mfd. max. compression condenser	1	6	1 Terminal strip, 16" x 2"	1	4	
1 T.C.G. 01-mfd. fixed condenser	3	0	9 Belling and Lee terminals	2	3	
1 Dubilier 0003-mfd. fixed condenser, type 670	1	0	5 Belling and Lee battery plugs	10	3	
1 001-mfd. fixed condenser	6	1	2 Buling erocodic clips	3	3	
2 Telsen 2-mfd. fixed condensers	6	0	1 Metal screen, 11 1/2" x 6"	2	3	
1 Peto-Scott P.J.3 coil	2	0	2 Peto-Scott panel brackets	1	6	
1 Peto-Scott coil quoit ready wound	2	0	1 Igramic Jack and plug, Type P.66	4	6	
1 Igramic 2-meg. grid leak	9		Kit "A" cash or C.O.D.	£5 18 2		

SPECIAL C.O.D. LINES

Pay the Postman. We pay post charges on orders value over 10/-.

1 Peto-Scott Consolette Cabinet	£1-17-6
1 Set of Osram Valves as specified	£1-19-0
1 Epoch J.I. Permanent Magnet Moving-Coil Speaker with 3-ratio input transformer	£2-5-0
1 Cydon 0005-mfd. double-drum drive Extenser type Ex 2T5	£1-10-6

AMPLION M.C.S. MOVING-COIL SPEAKER, permanent magnet, with output transformer. Complete. Cash Price, £3:7:6. Balance in 11 monthly payments of 6/2.

Send **6/2** only

EPOCH J.I. PERMANENT MAGNET MOVING-COIL SPEAKER, with multi-ratio input transformer. Cash Price, £2:5:0. Balance in 11 monthly payments of 4/2.

Send **4/2** only

EPOCH A2 PERMANENT MAGNET MOVING-COIL SPEAKER. Fitted with multi-ratio input transformer. Cash Price, £3:3:0. Balance in 11 monthly payments of 5/9.

Send **5/9** only

W.B. PERMANENT MAGNET MOVING-COIL SPEAKER P.M.3. Complete with 3-ratio input transformer. Cash Price, £2:12:6. Balance in 11 monthly payments of 4/10.

Send **4/10** only

ORMOND PERMANENT MAGNET MOVING-COIL CHASSIS (No. 464). With input transformer. Cash Price £3:5:0. Balance in 11 monthly payments of 5/11.

Send **5/11** only

BLUE SPOT PERMANENT MAGNET MOVING COIL SPEAKER. Complete with input transformer. Cash Price, £3:15:0. Balance in 11 monthly payments of 6/11.

Send **6/11** only

PILOT PERMANENT MOVING-COIL SPEAKER. With built-in unit designed and built specially for Peto-Scott by Epoch. A multi-ratio input transformer is included. In hand polished oak cabinet. Cash Price £3:15:0. Balance in 11 monthly payments of 6/11.

Send **6/11** only

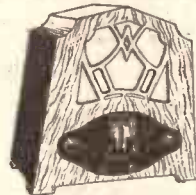
V3 RADIO FOR THE MILLION

10/- DOWN AND 11 MONTHLY PAYMENTS OF 10/10

Screened-grid, Detector and Power. With valves, less Cabinet. Cash Price **£5.17.6**

COSSOR 234 EMPIRE MELODY MAKER

Screened-grid, Detector and Power. With valves and cabinet. Cash Price **£6.15.0** 10/- Balance in 11 monthly payments of 12/6. With Order Finished Instrument. Royalties Paid. £7.10.0 Cash, or £2 deposit and 11 monthly payments of 11/-.



For the new "P.W." Cabinet scheme. Handsome polished solid oak cabinet vignetted to take the Extenser Dual-Ranger with Epoch J.I. Speaker.

CASH or C.O.D. 37/6

AS SPECIFIED FOR EXTENSER DUAL-RANGER

"P.W." DUAL-RANGER

As described Nov. 7th and Oct. 31st. KIT "A" Less Valves and Cabinet **£3-19-0**

or 12 monthly payments of 7/3 SPECIAL LINES SENT C.O.D.

We pay post charges on orders over 10/-

1 Oak Cabinet	17/6
3 Valves, as specified	39/-
2 Telsen (0005) Condensers with Slow-Motion Dials	14/-
Coil Equipment, comprising "P.W." and "M.W." Coil, Peto-Scott ready wound Coil Quits and P.J.3 Coil	17/-

MY S.G. FOUR

As described Nov. 7th. KIT "A" Less Valves and Cabinet **£5-6-10**

or 12 monthly payments of 9/10 SPECIAL LINES SENT C.O.D.

We pay post charges on orders over 10/-

1 Oak Cabinet	17/6
1 set of valves as specified	£2-7-6
Ebonite Panel 18 ins. x 7 ins. (Ready drilled)	5/6
Ormond Slow Motion Condenser Special Short-Wave type with dials, the pair	23/-
Igramic 5 meg. Volume Control	5/-
Atlas Short-Wave Coils, the set of 8, as specified	20/-

COMET THREE FOUNDATION CIRCUIT KIT "A" Less Valves and Cabinet **£4-0-0**

or 12 monthly payments of 7/4 SPECIAL LINES SENT C.O.D.

We pay post charges on orders over 10/-

1 Oak Cabinet	£1-0-0
1 Set of Mullard Valves	£1-7-6

EXPRESS ORDER FORM

To **PETO-SCOTT CO. LTD.**, Please send me **C.O.D., CASH/H.P.**

For which I enclose Cash/H.P. Deposit £ s. d.

Name

Address

P.W. 14/11/31.

PETO-SCOTT

PETO-SCOTT CO., LTD. Head Office: 77 CITY ROAD, LONDON, E.C.1. Clerkenwell 9406. 62 HIGH HOLBORN, LONDON, W.C.1. Chancery 8266. MANCHESTER: 33 WHITELOW ROAD, CHORLTON-CUM-HARDY. Phone: Chorlton-cum-Hardy 2028. NEWCASTLE, STAFFS. ALBANY RD. Phone: 67100

SEND 3^d POSTAGE FOR NEW CATALOGUE



Greater effective amplification ensures LONGER RANGE

COSSOR

215 S.G.

Cossor 215 S.G. 2 volts, .15 amp. Impedance 300,000. Amplification Factor 330. Mutual Conductance 1.1 m.a./v. Normal Working Anode Volts 120. Positive Voltage on Screen, 60-80.

Price - - **20/-**

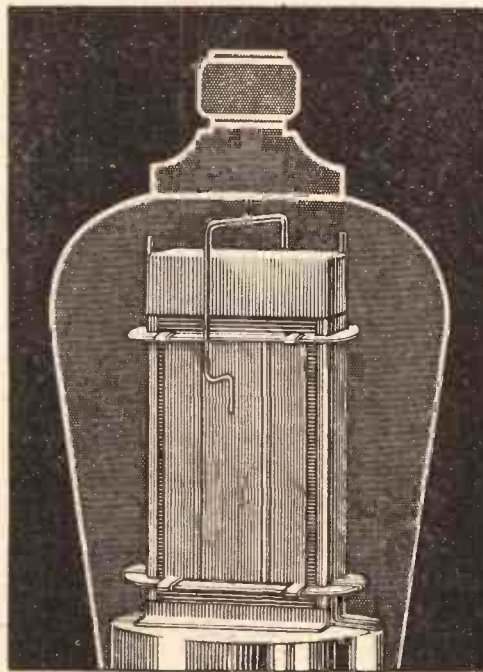
COSSOR

220 S.G.

Cossor 220 S.G. 2 volts, .2 amp. Impedance 200,000. Amplification Factor 320. Mutual Conductance 1.6 m.a./v. Normal Working Anode Volts 120. Positive Voltage on Screen, 60-80.

Price - - **20/-**

The above valves are available with plain or metallised bulbs.



DUE to their abnormally low inter-electrode capacity, which has been reduced to the order of .001 micro-microfarads — lower than that of any other S.G. Valve on the market — Cossor

Screened Valves permit exceptionally high effective amplification. As a result they effect a marked increase in the range of any Screened Grid Receiver in which they are used.

Other important constructional features in

these remarkably efficient valves ensure a considerable improvement in selectivity.

By equipping your S.G. Receiver with Cossor Screened Grid Valves, you can, at small cost, materi-

ally enhance its performance — hear more stations and sharpen up its tuning.

Cossor Screened Grid Valves are obtainable from your Radio Retailer in types to suit all Battery operated and A.C. Mains Receivers.

COSSOR

SCREENED GRID VALVES

BRITISH MADE

To A. C. COSSOR LTD., Melody Dept., Highbury Grove, London, N.5
 Please send me free of charge a copy of your 72-page Wireless Book "B.11."
 Name.....
 Address.....
 P.W. 14/11/31

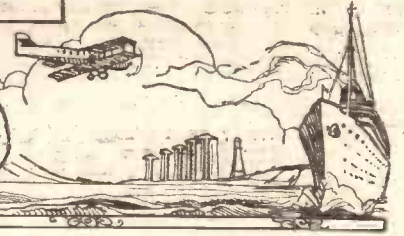
Popular Wireless

LARGEST NET SALES



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Chief Radio Consultant:
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THE "M.W." MAP
SHORT-WAVE NOTE
COWS, MILK AND MUSIC
THAT HEN COOP

RADIO NOTES & NEWS

SALVED FROM A GLACIER
FROM AUSTRALIA
SUNDAY PROGRAMMES
MATTER OF SPELLING

Have you THE Map?

I REFER, of course, to the wonderful map of the world's broadcasting stations which is being given away with this month's "Modern Wireless." There has never been anything like it in the annals of radio journalism, and I am told that before embarking on the task of making it those "M.W." people made inquiries in Germany and the U.S.A., and found that even those countries had shied at it. It's a map which one can examine with interest for hours, and which will be as useful to the explorer of Europe as to the long-distance enthusiast.

Graphic Survey of Broadcasting.

AS a graphic survey of the state of broadcasting, the "M.W." map is unique. Think what it shows! The position and wave-length of all stations (whether they are ordinary or short-wave or both), television stations, times at the various longitudes, the concentration of stations in various towns and areas, and a Code which enables you to find a given station at a glance. The whole is a triumph of staff work and cartography and a distinct score for British journalism. If you are so unlucky as to find "Modern Wireless" sold out, the map will cost you half-a-crown—and is cheap at that price. It is drawn on Mercator's projection, printed in two colours and measures 32 in. by 25 in.

In Aid of Sport.

MR. JOSEPH, of "Radio Instruments," has presented the Torquay United A.F.C. with a "Madrigal" wireless set worth £48 18s. to be raffled at Christmas in aid of the club's funds. The "R.I." agent in Torquay, Mr. Calder, of Saxley and Calder, Torquay, who is a keen supporter of the club, has promised to exchange the set for a battery-driven receiver of equal value if the winner is not blessed with electric-light mains in his house.

New Facility for the Blind.

ALREADY there is a "Wireless for the Blind" Fund, which aims at providing every blind person with a gift

receiver. Then, as you know, the Post Office issues free licences to the blind. And now a further advance in the amelioration of the lot of those unfortunates has been made by the publication of a B.B.C. pamphlet in Braille. But the pamphlet in question is entitled "The Modern State"; not the most interesting, surely, which could have been chosen. However, it is a beginning.

Short-Wave Note.

G. A. H. E. (Hull) having lived amongst the ultra-short waves for a couple of years now feels the urge to be what Dr. Johnson (the man whom the "Radio Times" called half mad) would have termed "clubbable." I answer his queries as follows:

For details of membership of the Radio Society of Great Britain, apply to 53, Victoria Street, London, S.W.1. As to the International Short-Wave Club, write to them at Klondyke, Ohio, U.S.A. More

things are wrought by clubs (and lunches) than this world dreams of—as Tennyson did not say.

Was Dr. Johnson Half Mad?

IN its note about Dr. Samuel Johnson apropos the celebrations of the lexicographer's birth at Lichfield, the "Radio Times" repeated (as its own) Macaulay's silly statement that Johnson was half mad for the greater part of his life. The Mayor of Lichfield protested against this during his broadcast, I remember. I now observe that the "Radio Times" has fallen upon a listener who queried the truth of the allegation, and takes cover under Macaulay's booming prose.

Was Macaulay Wholly Just?

THERE was too much boom in some of that prose and too little truth. The "Radio Times" could not have chosen a weaker reed in this instance on which to lean. I recommend those responsible to read Lamb's essay on "The Sanity of True Genius," and in all cases to quote their authority when they have flown to the writings of other men for aid. Macaulay was too fluent and cocksure to be a sound judge of men, and there can be no doubt that he was prone to exaggeration.

Cows, Milk, and Music.

NOW, to the classics! Some time ago I ventured, perhaps rashly, to contend that the "Bolton Evening News" was mistaken in attributing to Virgil the theory that music inspires cows to secrete milk. Now the writer of the article, M. E. T. (Godalming), quotes me the Loeb translation of Virgil's Ninth Eclogue and Conington's version also.

The translation from which I formed my opinion was that of T. F. Royds, M.A. So far from this poem being the repository of hints on cow-keeping it is, according to Royds, a chat on singing between two people, Lycidas and Meris.

A HAPPY FAMILY



The first photographic group to be taken of Marconi and his family. He has achieved nothing in radio to compare with charming little Miss Elettra!

(Continued on next page.)

NEWS—VIEWS—AND INTERVIEWS (Continued)

Shepherds, goatherds, and cowmen piped and sang merely to pass the time away, and I hold it a mere poetic fancy to mention that their sounds stimulated the lacteal glands of their charges.

Me and That Hen-Coop.

WHEN I tried, as I thought, to put C. H. L. (Clevedon) straight about our photograph of a "mike being concealed in a hen-coop preparatory to the broadcasting of the peculiar noises of the night-ingle," I did him less than justice, and I beg his pardon.



His point was that the placing of that illustration in

the middle of my article, "Ariel's Mail," was somewhat malapropos, considering my frequent complaints about the broadcasting of "sweet Philomel" (aren't poets fatheads, somet'imes?). He certainly scores one there. Where were my wits? But really, I did not suspect that my antipathy would have been remembered. Sir, the drinks are on me.

Our artist has complicated matters by illustrating the phrase shown in italics in his own cantankerous way!

Salved from a Glacier.

A BIT of interesting small talk is provided by a side-shoot from the famous journey of Professor Piccard in a balloon to the Heavside Layer or thereabouts. Two "Hellescn" dry batteries, having been abandoned, lay for several months buried in glacier ice, and after being rescued were found to be capable of functioning perfectly. A proof of the excellence of modern batteries—and of the fact that glacier ice is dry?

The Pound—American.

DID you hear the play about François Villon on the 26th or 27th? Ezra Pound—what a name for publicity!—who wrote it, is one of those Americans who live anywhere but in that land of theirs—Italy France, Spain, etc.



I gather that he is a poet and musical composer, but his idea of introducing American gangster slang into a fifteenth-century play is pure fat-headedness. I suppose that the pos-
ers who pretend to like everything

which jars upon ordinary sensible people would applaud the anachronism.

"Comet" Tip.

I AM beholden to G. H. J. (Swinton) for a note about his experience with the "Comet" Three, which, by the way, he says is the best out of eight different "P.W." sets he has made. He met with a bad crackle from the spaghetti resistance and was not satisfied with the quality and volume. He therefore took out the resis-

tance and substituted an H.F. choke, with the happiest results.

Report from Australia.

CHARMED to get an informative letter from M. N. L. (Sydney, N.S.W.), who, though a reader of 1925 vintage, has sprung to life as a correspondent because of our all-electric set of the June 27th issue. He tells me that battery-operated sets have disappeared from Sydney shops. He has made "Economy" Three and "Magic" Four, but considers that W. L. S.'s S.G. Short-Waver the pick of the bundle. The exquisitely drawn diagram of his six-valver all-mains receiver has been passed round the gang here and has given much pleasure. His desire for directions about making coils at home is noted in the proper quarter.

SHORT WAVES.

"The Whole World with One Simple Dial," says a wireless announcement.

Personally, we object to this description of our homely features.—"Punch."

It is an extraordinary thing that some people can't keep cool about this ether congestion when there are so many wireless fans about.

HEARD IN THE STREET.

Foreman (to dullard assistant): "Neow! Not the spanner! The 'ammer! Lumme! If there ain't enough blinkin' wood in yore nob to make one of those there blooming wireless 'beams'!"

Did I ever tell you about the absent-minded professor who was asked to give an address on the wireless? He simply said: "Number 10 Downing Street," and sat down again.—"Pictorial Weekly."

Smith: "How many controls are there on your set?"

Brown: "Too many—my wife, my daughter, and my mother-in-law."

Glasgow is "Magic."

W. M. (Glasgow), who in the course of business visits many homes in the Glasgow area, reveals the gratifying fact that the "P.W." "Magic" sets are very popular up that way. Our joy is mitigated by his explanation that, because of the large number of unemployed there, the money required for altering these sets to newer types is not available. But why alter them, anyway? W. M.'s pick-up of "Roxy" (N.B.C.) talking from Berlin looks to me as though he overheard a transmission via the Berlin radio telephone transmitter, which would be rebroadcast in the U.S.A. Berlin conducts commercial radiotelephone services with Argentina, Brazil and Venezuela.

Acknowledgments and Thanks.

WILL the following readers kindly accept our thanks for their letters, with which I am unable to deal *in extenso*? R. S. (Salford), R. P. (East Sheen), "Superhet" (Aburi), W. A. R. (Cairo), W. H. (Southampton), A. R. Y. (Southport), T. S. (Regina, Canada), C. M. (Mansfield), W. E. H. (Muswell Hill, N.10), C. D. R. (Kettering), G. A. P. (Clapton, E.), B. W. (Co. Antrim), and B. W. (Kingston-on-Thames). It was good of them to write, and I hope they will remember us again

when something happens in their radio work which may be of interest to the radio world at large.

More "P.W." Magic.

NOW listen! A "P.W." reader of Rawalpindi, India, whose signature has apparently suffered from the climate, but which looks like J. Smart, actually had the nerve to receive perfectly a programme from 5 SW on a "Magic" Two (Det. and L.F.). I say "perfectly": but I should add that the only interference or defect came



from his own, very necessary, electric fans.

His "ariel" (naughty man! It's spelt "aerial") was of "maxim" (another slap—"maximum") length 30 ft. and badly screened—by deodars, I trust. Well, that is simply magnificent work! If you amateurs go on like this, what—I ask of the universe—is a poor pro. like me to do but to take up home knitting?

The Sunday Programmes.

NOT many months ago we hoped, as a result of certain announcements, that the Sunday afternoon programmes were to be improved. The Sunday evening radio is, of course, no use until 9.5 p.m., except to people who like radio religious services, of course. But I find that the Bach cantata, the chamber music concert and the brass band still have the monopoly, although these are interspersed with Scripture stories. Surely it is possible to observe the Sabbath and at the same time to give us something really entertaining!

Where the Lady is "The Boss"

AH! that makes some of us turn our thoughts homeward, I'll bet! But I am referring now to the only instance, so far as I know, of a woman owner and operator of a broadcasting station.

The lady is Miss Mary M. Costigan, and she owns and controls station IFXY in Flagstaff, Arizona; 100 watts 1,420 kc. I wish she would send us her photograph!



A Matter of Spelling.

I CONGRATULATE the Malayan Information Agency upon the sharp lookout which it keeps. They have written to point out that W. L. S. in his "Short-Wave Notes" of October 17th referred to Malaya as "Malay," which "can only be used as the adjective relative thereto." I daresay that the final "a" dropped out and the space was closed up, but all the same, the Agency is right, though I believe that in referring to a native of the country it would be correct to say "a Malay," a noun.

ARIEL.

The Problem of Station Separation

By Capt. P.P. Eckersley
M.I.E.E.

"Shame on the false constructor whose thoughts are in his home.

The Delegates of Britain are on the train to Rome."

THE above lines are apposite and show that you and I have learned the lays of ancient Rome, but are yet to learn the results of our invasion of that city!

The situation is serious, and so shame on the listener or thinker who did not give his backing to our technical delegates—the only sensible people, apparently, remaining in the Union.

The Old Complaint!

I receive a great many letters from members of the listening public. At least 90 per cent of those letters complain of interference. At least 100 per cent of the sets I have tested—I have *not* tested them all—are incapable of eliminating side-band jamming.

Whose fault is it—transmission's or reception's?

I maintain that transmission is at fault to some extent, but that receivers could be designed to eliminate the trouble. Such receivers would give a quality inferior to a theoretical perfection, but that is better than receivers which reproduce side-band jamming.

Bigger Spacing.

Should transmission conditions be altered or should receivers be made more selective? What is the correct policy?

I hear that the British proposal to the International Union was to separate the carrier-waves of stations by as much as 11 or 12 kilocycles. This means that all countries would have to give up waves.

Our Radio Consultant-in-Chief has frequently advocated measures for straightening up the ether by rearranging the allocation of wave-lengths, etc., but the struggle for ascendancy in the ether still continues unabated. Therefore, Capt. Eckersley has tackled the problem from the other end—your end—and his efforts have been crowned with success. In the following article, he himself tells you all about it.

No wonder a great many opposed such proposals.

It would be a pity for us, surely, to modify the Regional Scheme to the extent which might be inevitable if Britain gave up even one more wave. Already I hear—I only "hear"; the B.B.C. is curiously reticent

in these matters—that we have lost the 200-metre wave I secured at Prague

I should suggest that a 10-kilocycle separation is sufficient. This means, roughly, that in every 100 waves Europe would have to abandon 10 waves, the existing separation being 9 kc. There are in the present plan, I believe, five or six "common" waves which have been proved quite useless.

France has, if my memory serves me correctly, 15 exclusive waves, as many as Germany and five more than England! And yet by a formula, tacitly accepted by all the nations, France's quota is 10 waves.

Lack of Control.

France has, as yet, no regular system of broadcasting; but if a central French authority were set up, then ten high-power stations, maintained on their proper wave-length, would serve France as well as any country is served to-day.

Given a modicum of good-will and common sense a 10-kc. separation is perfectly practical, and the plan would not have to be seriously modified.

It is foolish to suggest a 12-kc. separation because, ideal as this may be technically, it is impractical since the other European nations will not accept it.

I agreed to a 9-kc. separation as a temporary measure, and everyone knew that Britain had so agreed, but the present delegation, relying upon past understandings, need not have confused the issue by talking about 12-kc. Further, had Britain resigned we should have been in for it and no mistake!

Suppose we got a
(Contd. on next page.)

CAPT. ECKERSLEY TRIES IT OUT



A test of Capt. Eckersley's new tuner actually in progress at Tallis House. It will be noted that the famous inventor is looking pleased. . . . We are of the strong opinion that he has every right to.

A FERRANTI CONSOLE RECEIVER

By FRANK BRIGGS.

THE Ferranti "Inductor" Console Receiver is a three-valver of the all-mains variety, designed for operation from A.C. mains of any voltage between 200 and 250 volts. This is arranged by having various tappings on the transformer to suit the different supply pressures, a wander plug and several sockets providing an easy means of adjustment.

The first valve operates as a H.F. amplifier and is a highly efficient S.G. "tube" with a magnification factor of about 1,500. This is followed by a leaky grid detector which is coupled to the output stage by one of the famous Ferranti intervalve transformers.

Indirectly Heated Valves.

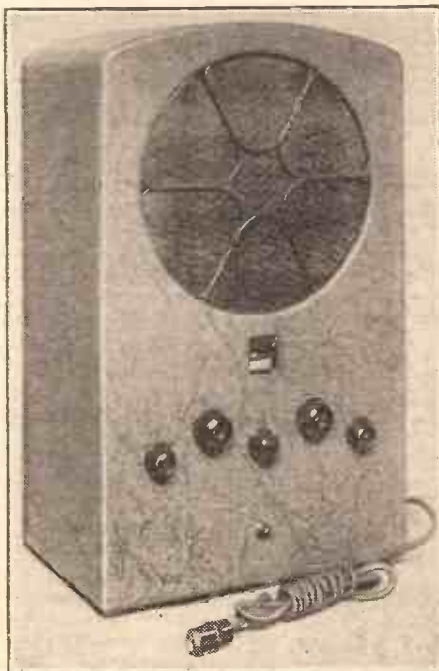
The S.G. and detector valves have indirectly-heated filaments, and the actual heaters are supplied with raw A.C. at a pressure of 4 volts. The output valve, however, is the well-known P.625, and has a directly-heated filament which operates at 6 volts. This valve is capable of handling tremendous power, and must contribute a great deal towards the splendid quality put out by the receiver.

On looking inside the set you'll probably notice that there is a fourth valve. This is for rectifying purposes, and changes the A.C. taken from the mains into D.C. before it can be used for high tension.

A great deal of attention must have been paid to the smoothing arrangements in this part of the circuit, as there is only the very slightest trace of hum, and this could be heard only during lulls in the programme.

You'll see from the accompanying photographs that a loudspeaker is fitted in the

DISTINCTIVE APPEARANCE



The receiver has a very distinctive appearance, as you can see.

upper "story" of the set. This is one of the latest "Inductor" models, and is capable of rendering very faithful reproduction indeed. In fact, it is a very close rival to some of the best moving-coil types. It has to be heard to be appreciated.

Now regarding the actual results obtained on test, these were very interesting, particularly as I had the pleasure, some time ago, of trying out last year's model of this receiver. Selectivity has been improved

SOUND ENGINEERING



A glance at the "innards" of the Ferranti Console reveals that its construction is on sound engineering lines.

tremendously, and no difficulty was experienced, in North London, of separating the two "locals" and getting a number of foreigners in between.

During broad daylight it was an easy matter to bring in a number of the higher-power continentals, such as Brussels, Berlin and Hilversum. This was, of course, on the medium band, for on the long waves a whole host of transmissions were to be found. The tuning range, by the way, is from 200 to 550 metres, and from 800 to 2,200 metres. A very useful range indeed.

Ingenious "Range-Switch."

Talking of wavelengths reminds me that I ought to mention the ingenious "wave-band switching" arrangements. The single illuminated tuning dial is marked direct in metres, and by a clever shutter affair only one set of figures can be seen at a time, depending whether the knob is in the medium or long-wave position.

The controls themselves are remarkably easy to work, there being a total of six. It may sound a lot, but it isn't really.

On the extreme right is the reaction control, then next to it comes the main tuning knob followed by the wave-change switch. To the left a little higher up is the "Trimmer," and on the extreme left the volume control.

The on-off switch is situated just below the wave-change knob. So it's not half so bad as it seems.

THE PROBLEM OF STATION SEPARATION

(Continued from previous page.)

10 kc. separation, is it possible to design receivers for a reasonable price which will give an adequate performance in spite of high-power contiguous stations?

I don't know yet! But I believe in starting with one thing at a time. As it strikes me, the constructor, the listener, the amateur, are waiting first of all for what we used to call a "tuner." You will never get the required selectivity unless you get a good tuner; some circuits which respond much more strongly to the wavelength you want, and eliminate the waves you do not want.

What is a "Tuner"?

Now, a tuner contains a condenser associated with an inductance. If you adjust the condenser to some value, and if the inductance has some value, then the circuit responds most strongly to one particular frequency. In fact, any tuner is responsive to one band of frequencies. Any tuner passes bands, but band-pass tuning has come to have a special significance.

What makes a circuit more selective to one set of frequencies, or as we say, to one station? Why, in fact, the high-frequency resistance of the coil. And what determines the high-frequency resistance of the coil? Answer, its size! That may seem a bit queer, but bulk is proportional to selectivity.

Then there's another thing, and that is the method of coupling two circuits together. In modern practice, and using high-frequency valves two tuned circuits are really coupled together by a valve. The valve is a resistance which magnifies. But every valve gives to some extent a non-linear response, sets up harmonics, works against selectivity.

An Ideal Method.

So I believe, and particularly where cost is a consideration, that we want to couple circuits together, not by a valve, but by a resistance.

A resistance does not amplify, but is linear, and we can amplify by other means. A resistance is a resistance to all frequencies. When you couple circuits together by reactances you get into all sorts of trouble, particularly when one circuit reacts upon another.

So I feel that the problem of station separation is bound up in two phases of the art—transmission and reception. Transmission should most certainly put its house in better order and give us a 10 kc. separation. But we should meet transmission half-way, we should consider first the scientific design of tuners.

More of this, and much more factually of this, and terribly more interestingly of this next week.

NEXT WEEK MY NEW TUNER

By CAPT. P. P. ECKERSLEY.

MY "S.G." FOUR

BY W.L.S.
PART TWO



Our short-wave expert contributes the concluding notes on his special "hot stuff" short-wave receiver. Constructors should note that this set is not a "hybrid," and that it does not concern itself with the ordinary broadcast waves at all—it is a highly specialised instrument designed specifically for the greatest possible short-wave efficiency.

PROBABLY those of you who read this will fall into two classes: Those who have made the set and are duly satisfied with its performance; and those who have made it but have struck a "snag." I sincerely hope that the latter class are very much in the minority, but small snags do turn up, particularly in the case of newcomers to the short-wave field.

A First-rate Set.

I mentioned last week that I was particularly pleased with this receiver because it "went from the word 'go.'" Supposing, however, that it hadn't, I should have looked at one or two points.

First, if the set does not oscillate with any combination of coils, it means either that you have not followed the wiring diagram correctly, that you have a faulty component (including valves), or that you are using insufficient H.T. I cannot think of any other reason. Check up, therefore, on these points, and see that your high-tension supply is giving you at least 100 volts.

I do not think the foregoing trouble is at all likely to turn up, but forewarned is forearmed. What is more likely is that the set will go into oscillation with a loud report instead of the desirable smooth slide. If this happens, or, for that matter, the kindred trouble of going into oscillation with a musical howl (known as "threshold howl"), you may try several cures. First reduce the H.T. slightly and see if that improves matters. If it does not, try another grid leak, even if its labelled value is the same. If possible, try also another detector valve.

About Valves.

At this point I had better mention that the valves required are, a good screened grid variety, two of the "H.L." class, and one power valve for

the output. Practically any "H.L." valve operates perfectly as a detector, as does any of the types specified as detectors.

With your H.T. of 100-120 volts and the de-couplers shown in the diagrams, the voltages will take care of themselves and cannot be far wrong.

If you have any sign of "threshold howl" and cannot clear it by the little adjustments suggested, try connecting a grid leak of 1 or 2 megohms across the secondary terminals of the L.F. transformer. This is almost certain to put matters right; use as high a value as you can, and don't go below .5 megohm in any case.

Some Tuning Tips.

All these remarks may appear unduly pessimistic, but I know that a few definite suggestions of this kind may save a lot of time in the case of a reader who is "up against it."

To be more cheerful, I will now assume that the set is working well, and that you have already heard something. Suppose we start with the band of waves between 30 and 50 metres. Insert a 9-turn coil in both the aerial socket and the "grid" socket for the detector. In the reaction socket use a

6-turn coil. Setting the two main controls somewhere in the middle of the scale, rotate the reaction control until the set just oscillates. Now shift the detector tuning condenser until you hear a signal. Never mind if it is only a commercial station sending strings of automatic Morse.

Listen to him, with the set just oscillating, and rotate the aerial tuning control slowly. If he varies much in tuning, or goes right out of audibility, this means that your coupling from the S.G. valve to the detector is probably too tight.

It is reduced by an outward screwing of the adjustable condenser mounted on the screen. There is no reason why you should not work with this screwed right out, for a very small degree of coupling is sufficient, and there will certainly be no "pulling" then. You should find a point on the aerial tuning at which the station comes up well in strength without varying more than a little in pitch.

If this tuning point has a very different setting from that to which the detector tuning is placed, your aerial coupling needs shifting. This is looked after by the other adjustable condenser, just by the aerial terminal at the rear of the baseboard.

Screwing this out will naturally send the setting farther up the dial; increasing the capacity will send it down. Find the setting that gives roughly equal readings, and you need not worry much more about that.

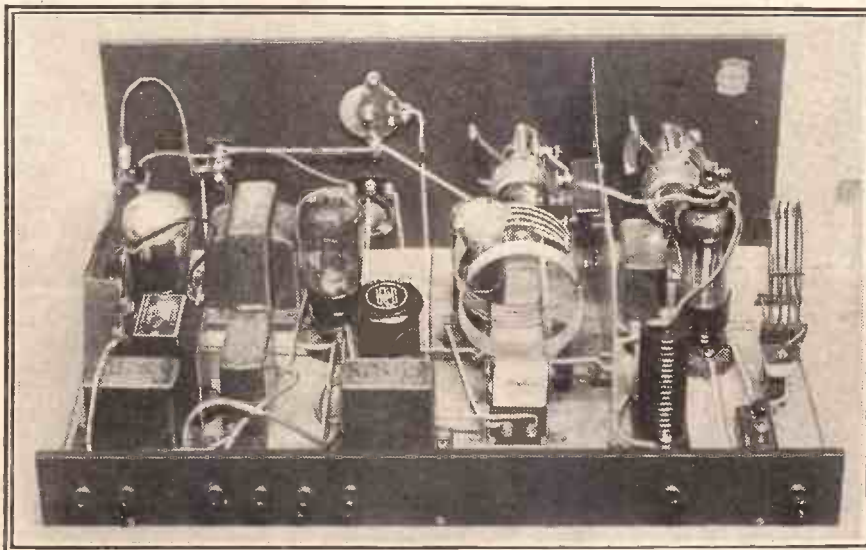
All the above is, of course, written under the assumption that you have exactly similar coils in both sockets.

The Coils.

Now for a few words about coils. You will need two complete sets of short-wave coils, which means that you will have two of nine turns, two of six, two of four, and two of two. The aerial coil and the grid coil

(Continued on next page)

ALL READY TO "COMB" THE ANTIPODES



The W.L.S. S.G. Four with coils, valves, and grid-bias battery in position. Tested in the "P.W." Research Dept., it gave a most impressive performance, and exhibited unusually high degrees of sensitivity and stability, together with complete freedom from hand-capacity and threshold howl.

MY "S.G." FOUR

(Continued from previous page.)

will always be the same size, and the reaction coil is always a "six" except when you use the "sixes" for the other purpose, in which case it will be a "four."

Four "Bands."

Roughly, the waves covered are: 9-turn coil, 60-32 metres; 6-turn, 38-24 metres; 4-turn, 27-19 metres; 2-turn, 20-10 metres.

These are only approximate, but you will be able to get a better idea by the actual settings for the stations that you hear.

You are most likely to start with what I call the "long-short-wave" stations—the crowd working between 40 and 50 metres, and you should not find the slightest difficulty in fixing, as your "marker" station, the enormously powerful Trades Union (Moscow) station on about 50 metres. He

until after midnight to find him at his best except on really good nights.

Next in order, still going downwards, is the 25-metre band, which takes in Rome, Chelmsford, Pontoise, and the Pittsburgh station, W 8 X K. This setting should be found fairly near the top of the condensers with the 4-turn coils. Rome is generally very strong, with Chelmsford just above him. W 8 X K, when he is on, and when he is audible, is just below. Finally, there is W 2 X A D, the other relay of W G Y, working on 19.56 metres, and he will most probably be found, still on the 4-turn coils, well towards the bottom of the condensers. He starts earlier in the evening than W 2 X A F, and stops transmitting at midnight.

Please remember that these directions are intended only to give you a rough and relative idea of the positions of the stations, and that it is impossible to do more. There is more than one make of short-wave coils, and it is possible that you may not use the same variable condensers that I had in the original set.

In between these broadcasting stations you will find the amateur wave-bands on 20 and 40 metres. These are crowded with stations at all times of day and night, and are always interesting to the newcomer to short-wave radio. Many excellent telephony transmissions are to be heard, and if you are keen enough to learn Morse you will find still more enjoyment awaiting you.

Morse Code.

In this connection, it may be said truthfully that the building of a set of this type is one step towards learning Morse. There are so many commercials turning it out at the slow speeds capable of interesting novices that the germ may well attack you!

I have purposely left to the very end the question of aerials for this receiver, on account of its unimportance. Absolutely anything may apparently be used, from a 10-ft. picture-rail affair to a large outside aerial. All that

needs doing is the tuning of the aerial series condenser to give the correct degree of coupling, and you are settled! I have already described that in some detail, and, in any case, you will learn a lot by experimenting for yourself with these things.

In general, however, it is true to say that the aerial itself is not important. The earth carries more weight, not from the point of view of signals, but in connection with the

general stability and "feel" of the set. If you are troubled with hand-capacity effects (which I do not anticipate, if you adopt this idea of covering the baseboard with foil and wiring up as I have done), you may look to the earth. There are cases in which the removal of the earth lead completely cures the trouble. If it does not, try the effect of an adjustable compression-type condenser between the earth lead and the earth terminal, for the purpose of "tuning" the earth lead. This is often a useful tip in difficult cases.

Will Work Anywhere.

One little tip I should very much like to interpose here, although it does not apply particularly to this set. If you find that you can't receive the short waves very well, or even a certain section of the short-wave band, do go ahead and find out why.

Nine times out of ten it is some little fault in the set or in the manner in which it is operated. Don't, whatever you do, wander about with a long face and say, "I am in a bad situation for short waves, and it's not worth trying."

Lots of people do this, but the joke is that they never are in a bad position. Their own loss is due to their own carelessness or lack of perseverance. Heaps of folk are, certainly, not ideally placed for short-wave reception, but these are not, as a rule, the ones that make a song about it!

If you are located in the country you can take it that you are all right. That is fairly definite. Similarly, if you live in the suburbs of a big town, you cannot go far wrong.

If you go about talking of the screening effect of metal gutters and pipes you will only have those that are in the know laughing at you. This "S.G." Four has been tested in the heart of London, in a steel-frame building with higher buildings all round it, and with so many telegraph wires overhead that one can't see much of the sky.

Yet, even in these adverse conditions, it brought in the usual American broadcasters at quite a respectable strength. So please take heed, and if your results are poor, don't blame your locality. See if you can find anything wrong with the set; if you can't, try and improve your knowledge of operating.

World-wide Range.

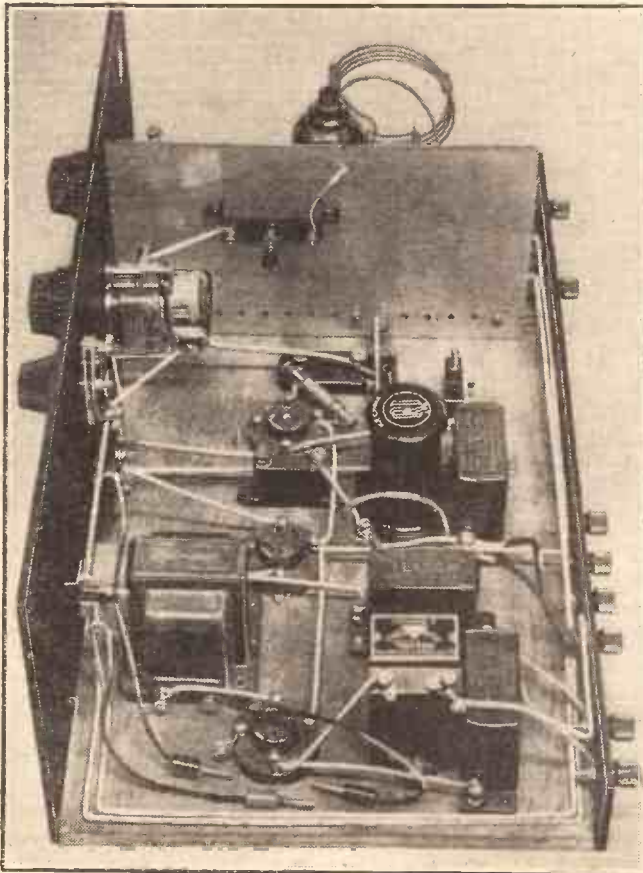
Now a few words as to what you can reasonably expect to receive, and when. Our friend W 2 X A D, Schenectady, on 19.56 metres, is undoubtedly the star turn during the summer and early autumn, but I am afraid that he will have faded out before you read this. On Sundays, when he starts up early, you should hear him well up till about 7 p.m., but after that he disappears, together with all other signals round about that wave-length.

He should, however, when conditions are moderate (not necessarily good) operate a speaker at really good volume. You will probably be troubled with quick fading—the most "super" of sets will not dispose of that—but it will not interfere with his programme too badly on the whole.

The wave you must watch during the winter is 32 metres. Here, within a few degrees on the dial, we have W 2 X A F, the other Schenectady man, V K 2 M E, Sydney, two or three European stations, and a host of lesser lights who are,

(Continued on next page.)

AMPLE L.F. AMPLIFICATION



The L.F. stages provide adequate power for the operation of large loudspeakers, and surprisingly excellent quality from short-wave stations thousands of miles away is given.

will probably be found at about the middle of the scale with the 9-turn coils.

The little bunch of interesting stations in the 31-metre region will be found with the 6-turn coils, and probably will be rather below the middle of the dial. This band includes V K 2 M E (Sydney), W 2 X A F (Schenectady), Zeesen, Skamlebaek, and other well-known transmissions. W 2 X A F is consistently good, but you have to wait

MY "S.G." FOUR

(Continued from previous page.)

nevertheless, outstandingly good on certain nights.

The characteristic of the lower-powered stations is just that they are not as consistent as the others. On a good night they will be every bit as strong as the 50-kilowatt merchants.

On the amateur waves you should have no difficulty, if you can read Morse, in logging transmissions from at least 80 different countries! All Europe—most countries using telephony—will be found on 40 metres, and most of the real DX signals on 20 metres.

If you want the thrill of hearing an Aus-

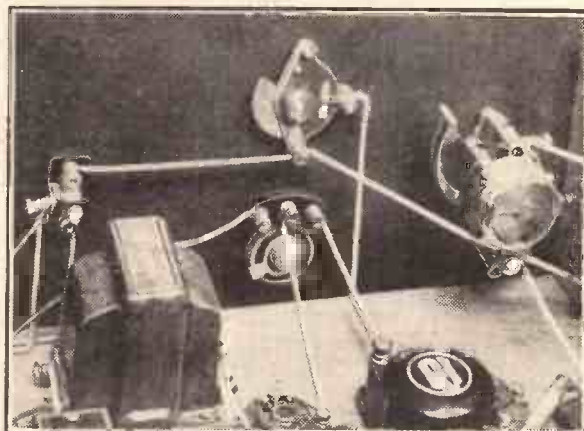
of them coming through, but those that do are often the only signals heard at this time.

One word of advice: If you have an amateur transmitter close to you, don't tune him right in while you have the 'phones on. The reason should be obvious, but it certainly will be the first time you do it!

"P.W." Will Help You.

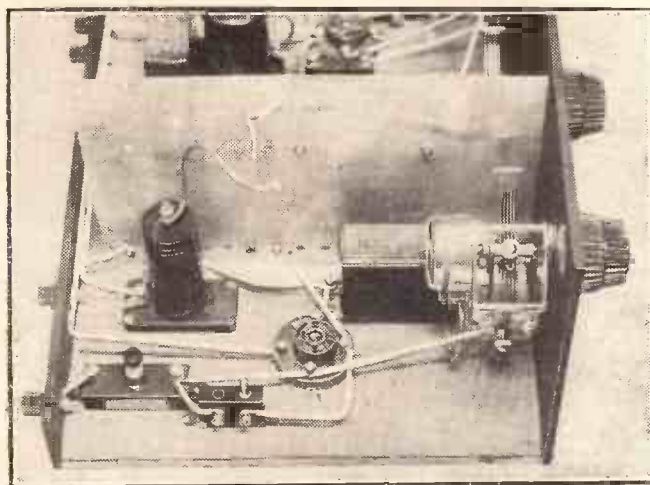
Last of all, if you are a newly-converted short-wave fan, watch "Short-Wave Notes" in "P.W." from week to week, for you will find there last-minute news of the changing conditions, new stations on the air, and

TWO VITAL CONTROLS



A "close-up" of the reaction and volume controls, as seen from the back of the panel.

AN EFFECTIVE H.F. STAGE



The S.G. valve in W.L.S.'s set is much more than a mere "aerial coupling" device.

tralian amateur or a New Zealander, listen on 20 metres between 7.30 and 9 in the morning. You will not find a vast number

expeditions. Practically every important expedition nowadays is equipped with short-wave radio, and if you know its call-sign and wave-length you have a real chance of doing some record-breaking work.

"Good Luck"

And now, having covered the ground, I think fairly fully, nothing remains but for me to wish you luck and many enjoyable hours. If the set *does* smash some DX records, I should be interested to hear about it via "P.W." Conversely, I am keeping the original for a

while, and may be able to make some remarks about it after a few weeks of listening.

SOME SHORT-WAVE STATIONS

Metres	Station.	Metres	Station
54-52	—Brooklyn (N.Y.), W 2 X B H	31-48	—Scheneectady, N.Y. (W 2 X A F).
50	—Moscow.	31-38	—Zeeseu (Germany), 8 kw.
49-33	—Chicago (Ill.), W 9 X F.	31-35	—Poznan (Poland), S R 1 (1 kw.)
49-67	—New York (W 2 X A I).	31-35	—Springfield (Mass.) W 1 X A Z.
49-5	—Nairobi (Kenya), 7 L O.	31-3	—Philadelphia (Pa.), W 3 X A U.
49-5	—Philadelphia (Pa.) W 3 X A U	31-28	—Melbourne (Australia), VK 3ME.
49-4	—Johannesburg (S. Africa), W 9 X A A.	31-28	—Sydney (Australia), VK 2ME.
49-34	—Chicago (Ill.), W 9 X A A.	31-28	—Eindhoven (Holland), P C J.
49-18	—Bound Brook (N.J.), W 3 X A L.	26-2	—Bandoeng (Java) P L R.
48-86	—Pittsburgh East, W 8 X K.	25-83	—Pontoise (Paris).
45-38	—Moscow (Russia), 36-92	25-53	—Chelmsford, G 5 S W.
	—Long Island, W 2 X V.	25-5	—Chapultepec, X D A.
32-26	—Rabat (Radio Maroc), 6 kw.	25-4	—Rome (Italy), 3 R O.
31-36	—Bandoeng (P.L.E.) 80 kw.	25-25	—Pittsburgh East, W 8 X K.
31-55	—Melbourne (Australia), VK 3ME.	25-2	—Pontoise (Paris).
31-51	—Skamlebeck (Denmark), O X Y.	20-5	—Chapultepec, X A, 20 kw.
		19-56	—Scheneectady, W 2 X A D.

A COMPLETE COMPONENT AND ACCESSORY LIST

- 1 Panel, 18 in. x 7 in. (Permcot, Becol, Goltone, Peto-Scott, Wearite).
- 1 Cabinet for above, with baseboard, 10 in. deep (Peto-Scott, Cameo, Pickett, Gilbert, Osborn).
- 1 Sheet of copper foil, 18 in. x 10 in., to cover underside of baseboard.
- 2 .00013 slow-motion condensers (Ormond, Polar, Cyldon, J.B.).
- 1 .0001 reaction condenser (Ready Radio, Telsen, Cyldon, Astra, Wavemaster, J.B., Polar, Lotus, A.W., Graham Farish).
- 1 Three-point L.T. and H.T. switch (Ready Radio, Telsen, Peto-Scott, Wearite, Goltone, Bulgin).
- 1 Volume control, .5-megohm (Igranic, Sovereign, Wearite, R.I., A.E.D., Ready Radio, Varley).
- 4 2-mfd. condensers (Telsen, Igranic, T.C.C., Dubilier, Lissen, Ferranti, Helsby, Hydra, Formo).
- 3 Single-coil sockets (Lotus, Wearite, Bulgin, Goltone, Peto-Scott, Ready Radio).
- 2 Sets short-wave coils (Atlas, Igranic).
- 1 H.F. choke (Lewcos, R.I., Telsen, Igranic, Ready Radio, Peto-Scott, Varley, Graham

- Farish, Parex, Lotus, Lissen, Sovereign, Wearite, Tunewell).
- 1 H.F. choke (R.I., etc.).
- 2 Compression condensers, .0001 max. (Formo-densers, Type F., Goltone, Colvern, R.I., Lissen, Telsen, Sovereign, Polar, Graham Farish).
- 4 Valve holders (Lotus, Graham Farish, Telsen, W.B., Bulgin, Igranic, Lissen, Clix, Wearite, Burton).
- 1 .0003 fixed condenser (Dubilier, T.C.C., Mullard, Formo, Igranic, Telsen, Lissen, Ediswan, Ferranti, Graham Farish, Goltone).
- 1 .004 fixed condenser (T.C.C., etc.).
- 1 L.F. transformer (Telsen, R.I., Mullard, Graham Farish, Ferranti, Lotus, Lewcos, Varley, Igranic, Lissen, Goltone, Atlas, Climax).
- 1 Output choke (Varley Nichoke II., Telsen, R.I., Ferranti, Lewcos, Lotus, Igranic, Graham Farish, Lissen).
- 1 Aluminium screen, 10 in. x 6 in. (Peto-Scott, Ready Radio, Parex).
- 1 Terminal strip, 18 in. x 2 in.
- 8 Terminals (Belling & Lee, Eelex, Clix, Igranic, Goltone).

- Spaghetti resistances: 150,000 ohms, 130,000 ohms, 100,000 ohms, 15,000 ohms, 1,000 ohms (Telsen, Bulgin, Varley, Peto-Scott and Ready Radio, Lissen, Sovereign, Graham Farish, Igranic).
- 1 Grid-leak and holder, 5 megohms (Lissen, Dubilier, Mullard, Graham Farish, Telsen, Varley, Igranic, Ferranti, Ediswan, Watmel).

ACCESSORIES.

- LOUDSPEAKER.**—B.T.-H., Mullard, Undy, Blue Spot, H.M.V., Celestion, Graham Farish, W.B., Epoch.
- VALVES.**—1 S.G. valve, 2 H.L. type valves, 1 power valve (Osram, Mazda, Mullard, Cossor, Six-Sixty, Tunggram, Eta, Lissen, Dario, Fotos).
- BATTERIES.**—H.T. 120- to 150-volts super-capacity (Pertrix, Drydex, Ever Ready, Lissen, Magnet, Ediswan, Columbia). G.B. 9 to 15-volts to suit output valve.
- ACCUMULATOR.**—2-, 4- or 6-volt to suit valves (Exide, Pertrix, Ediswan, Lissen, G.E.C.).

MARCONI'S SHORT-WAVE EXPERIMENTS.

Is the solution of the troubles due to an overcrowded ether to be found on the very short waves? That is the question prompted by Marconi's latest researches.

THE newspapers have been full lately of the news that Marchese Marconi has been successful in carrying out a wireless telephone conversation over a distance of about ten miles using the extremely low wave-length of half a metre.

Certain papers have stated that this constitutes the first step towards revolutionising world telephony. It must be pointed out that, as far back as last March, the Standard Telephone Company was successful in holding two-way wireless telephonic communication over a distance of about twenty-five miles using a wave-length of only 18 centimetres, and even less. And 18 centimetres is considerably shorter than half a metre.

Definitely Limited Range.

However, there is no doubt that if Marchese Marconi's experiments continue successfully, a lot of the difficulties in connection with the use of the ultra-short wave are likely to be eliminated, and once that ultra-short waves are brought within the sphere of practical radio, extraordinarily interesting results might be expected.

As has been pointed out many times, one of the great difficulties in connection with the use of ultra-short waves is that their range is very definitely limited. These short waves will not even penetrate reasonably solid objects.

That is one of the difficulties in connection with the proposal that the B.B.C. should use a local 7-metre transmitter. And it is likely that a wave of, say, half a metre would not be able to pass through walls, and certainly not through houses or other substantial structures.

Special B.B.C. Transmitter.

But once the difficulties in handling these short waves are overcome, it is easy to see how vastly useful they would prove.

To begin with, the wave-length situation would be practically cleared up, for an enormous number of these ultra-short waves could be utilised, and the problem of interference would cease to exist.

The B.B.C. are carrying out experiments in connection with transmitters using wave-lengths between 5 and 7 metres, but whether these transmitters will ever come into practical use in connection with every-day broadcasting remains to be seen.

Hopes for the Future.

However, Marchese Marconi's successful experiments in conjunction with those carried out in the past by the Standard Telephone Company certainly justify hopes that the trickiness of the ultra-short wave is being more fully understood and that, technically speaking, we are justified in hoping that in the near future they will be used for normal broadcasting purposes.

The failure of the Rome Conference is still a sore topic with all those interested in broadcasting. Pessimists are now busily

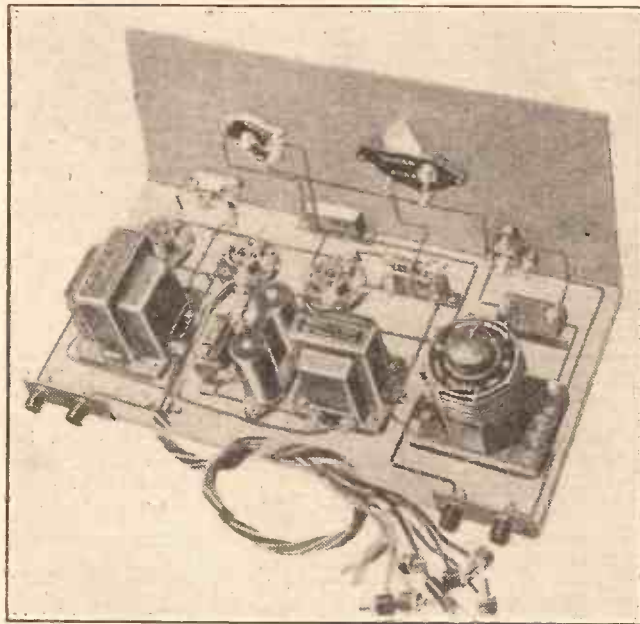
predicting what will happen to broadcasting in general as the winter proceeds.

One newspaper critic forecasts that several if not most of the B.B.C. stations will be as badly jammed as London Regional was by Stuttgart last November, and that probably the first trouble will occur on the Daventry National long wave, where Radio Paris is unpleasantly close, and will probably cause more trouble in the near future when its power is increased.

It is certainly true that anyone who is on the edge of the service area of Daventry will probably suffer very badly from interference from Radio Paris.

Mr. Ashbridge, in an interview, main-

OF INTEREST TO CONSTRUCTORS



An assembled Telsens "Victor" Three Kit set.

tained that with a selective receiver this interference should be eliminated. That is all very well, but there are hundreds of thousands of people in this country using sets which are by no means selective—certainly not selective enough to deal with a problem of this nature.

Slight changes are to be made in the London Regional, London National, North Regional and North National; in fact, the changes will be so slight that in most cases listeners will not notice any difference in their tuning arrangements.

Mr. Ashbridge, the Chief Engineer of the B.B.C., thinks, however, that these slight changes will minimise jamming.

No Definite Agreement.

He pointed out the other day that it is a local readjustment matter between the B.B.C. and certain foreign broadcasting

organisations. He admitted that the arrangement will not go as far as he would have liked.

The B.B.C. wanted a completely new wave-length plan, but as no definite agreement was reached by Rome, the whole question of jamming must now stand over until the World Conference of Government Wireless authorities meets at Madrid next September.

What Mr. Ashbridge Thinks.

In other words, we can't get a revised broadcasting wave-length plan until 1933!

Obviously, Mr. Ashbridge is dubious about the jamming problem this winter, for, when asked by a newspaper man if he thought listeners would experience interference this winter, he replied: "I hope not, but so many new high-powered stations are being built that it is impossible to give any assurance."

It is to be hoped that one day the ether will be scientifically divided up.

A suggestion which has been made by Capt. Eekersley, and which seems to deserve the closest possible consideration, is that commercial radio should be pushed further

down the wavelength spectrum and more of the long-wave channels opened up for broadcasting. This would appear preferable to the reverse arrangement for expert operators are needed for present short-wave apparatus.

AN ATTRACTIVE KIT SET.

THE Telsens "Victor" Three is being sold as a complete kit of parts at a price which is of a most competitive character, as you will see by the Telsens advertisements.

The "Victor" Three is a detector, two L.F. set, there being one choke-coupled and one transformer-coupled L.F. stage.

A Fine Tuner.

A Telsens Variable Selectivity Aerial Coil is used for tuning, and, in our opinion, this is one of the very best two-band tuner units on the market, although, fortunately for the constructor, it is also one of the very least expensive.

The kit is accompanied by a fine blue print giving all the necessary operating information as well as the assembly details.

Regarding the assembly, here, too, the "Victor" Three is notable in that the construction is remarkably simple and could be accomplished by the most inexpert.

In view of all this it is obvious that the "Victor" Three is certain to achieve as great a success as all the individual Telsens products have done.



RADIO REHEARSALS

TWELVE noon is almost a "zero" hour for the listener. There is rarely anything on the wireless other than perhaps an orchestral trio, a baritone, or a cookery talk. Why does the B.B.C. appear so indolent in the morning?

The truth is that the morning hours may not offer a great deal of variety to the all-day listener, but they are invaluable to the broadcasting authorities. It is at this time of day that—in order that the evening listener may hear the nearest possible approach to perfection—the majority of the studios are given up to rehearsals of forthcoming programmes.

Zero Hour.

"Morning, Mr. Handley!" "Nice day, miss." "To rehearse your talk, Sir Henry?" The commissionaire on guard at the door watches and welcomes a continual procession. One by one the famous pass his scrutiny and are directed to their allotted studios.

Twelve o'clock is a zero hour for the B.B.C. as well as for the listener—though at Savoy Hill it may be a period of a different kind. Rehearsals are working up to their peak point. Practically every studio is occupied. Almost every control box encloses an eavesdropper alert for faults.

In one studio, Jack Payne puts additional pep and harmony into his band. In another, a nervous speaker is trying out a tale on an unresponsive "mike," while a man in a second room mentally criticises. Next door, the preliminaries of a variety programme are going strong. In other studios, a play is being rehearsed.

Round the Studios.

And somewhere tucked away, one is informed, Stanford Robinson is attending to the Wireless Choir. To say nothing of a guest conductor ardently wading through Borodin in a deserted Queen's Hall!

I pat my pocket. I still have my permit to roam through all this at large. I peep through a little window in a control box at

Some inside information about the activities of the B.B.C. at noon-day—when the listener usually supposes that broadcasting is at its lowest ebb.

By HAROLD A. ALBERT.

Jack Payne. The effect resembles nothing so much as a coloured film.

The band ranged in a semi-circle awaiting their leader's instructions, attempting to duplicate his illustrative humming, Payne striding up and down, stopping here, asking for repetition there. Close-ups! Jack's worried expression. This man deserves to retain popularity. He certainly works for it.

Sounds come dimly to me, but I hear his order of "All in!" and realise as the whole orchestra take up the tune that this is no new number, but one that Payne has put over the radio a score of times. Obviously, he believes in perpetual improvement. It is essential if the appeal of a dance tune is not to diminish.

Scores of Trial Runs!

I move away, stricken with awe. They will play this tune over a score of times before

they have lunch—and every time with an appearance of freshness. Some job!

Studio doorways stretch before me along the passage, with red lights glowing forbiddingly. One studio is empty—that containing Christopher Stone's gramophone; another is occupied by a trio giving a midday programme.

A third lends refuge to a gentleman who is detailing his escape from a prison camp who must not be disturbed, but the rest I may enter. In a cupboard of a room, an official is listening to a loudspeaker and a story of thrills. "He's nervous," he tells me. "He'll need another rehearsal." They are certainly thorough at Savoy Hill. I agree with the gentleman politely.

Whispering Critics.

I somehow get mixed up with the preparations for the play which is being broadcast this same evening, and now run over for the last time. I wend my way through crowds of people and "effects" to the "biscuit box on stilts." The actors read their scripts into the microphone, and the man in the control box pulls faces at them through the glass of his windows.

People in the background alternately praise and laugh and criticise—in dreadful whispers. The play is being heard somewhere downstairs by the producer at his dramatic control panel, and he mustn't be disturbed.

"Good-bye, John," an actress cries in heartfelt tones, and the effects man beats upon a contraction of cast iron. The noise of a train gathering steam to leave a station fills the studio.

The Purring Plane.

Events now follow swiftly. Another young man starts a gramophone record; one hears the purring of a 'plane. "How high up are we?" an actor whispers confidentially, though I understand that his tones will reach the listener in the form of a shout. "So many thousand feet," replies his partner. "Let's land," and the aeroplane swoops to earth.

(Continued on next page.)



To get those songs and gags sounding natural and spontaneous means plenty of hard team work before the actual broadcast begins.

A "ZONOPHONE" KIT SET

By F. B.

A brief review of an interesting three-valve band-pass receiver recently introduced to home constructors.

THE British Zonophone Co., of gramophone record fame, have recently introduced their first radio set. It is in the form of a kit for home assembly, and it is called "the Zonophone 3-Valve Band-Pass Constructor's Kit."

The Numerical Guide.

The circuit employed consists of a leaky grid detector followed by two resistance-coupled amplifiers, the last valve being a pentode. A form of band-pass tuning is used, and instead of having the two tuning condensers ganged, they are operated separately. A cone loudspeaker is incorporated, and the set is designed for working

from batteries or a mains unit, thus suiting its owner's convenience.

A few days ago the Zonophone Company supplied one of these kits for test and report, and in due course I took it home with me to see what I could do with it. My object being to work under similar conditions to those experienced by the average home constructor, the only tools I allowed myself were a small screwdriver and a pair of pliers.

The complete kit is contained in one large cardboard box, and it includes the walnut cabinet, a cone loudspeaker, and the various component parts of the set; not forgetting the valves. All the various packages inside are numbered, and very complete instructions are given in the booklet provided; the construction proceeding in a series of stages and at each step you are told which packet to open next. So there is not the slightest possibility of going wrong.

Excellent Tuning Range.

Regarding the actual assembling, this is quite easy. The whole job from start to finish should not take a minute longer than three hours, even for the most inexperienced person. Care, however, should be taken when fixing the resistance clips, as these are made of thin strip metal which has extremely sharp edges.

Looking at the back of the finished receiver, the valve on the right is the detector, the next is the first L.F. amplifier, and the left-hand one the pentode output valve. The first two, by the way, are of the new metal-sprayed type.

The two sockets under the first L.F. valve are for connecting a pick-up, while the three under the detector valve provide means for connecting the aerial and earth. The earth is the bottom of the three, the

aerial being connected to either of the remaining two, depending on the amount of selectivity required.

When tried out on a good outdoor aerial in North London, no trouble was found in separating the two Brookmans Park stations. The quality of reproduction was exceptionally good.

About half a dozen stations were received on the long waves, and on the medium band several of the larger Continental transmissions came in after dark. Although there are two tuning controls (the pair of large dials seen in the photograph) no difficulty was experienced whatever, and the spread of the two London stations was only about five degrees on each side of maximum volume position. The two tuning ranges covered are from 180 to 610 metres, and 800 to 2,000 metres.

For Radiogram, Too.

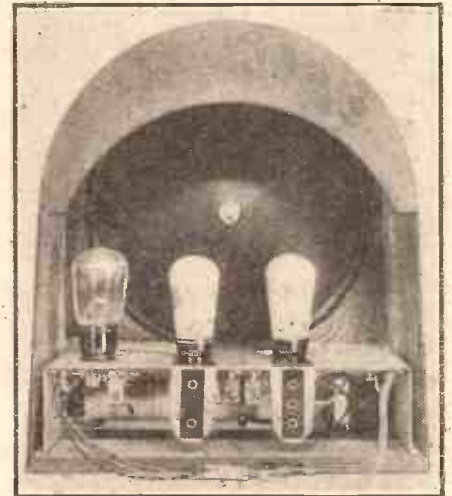
The price of the complete kit is £6 6s. 0d., and when it is considered that this includes three valves and a loud speaker, it will be realised that very good value is given. The Zonophone people also make a pick-up specially suited to this receiver, the price being 15s. complete.

ALL GROUPED TOGETHER



The two main dials are the band-pass controls, and beside them are reaction and the combined wave-change and on-off switch.

PLUGS FOR A PICK-UP



Packed neatly away at the back are aerial and earth sockets, and also a pair for a pick-up.

That is, the gramophone record is gradually slowed down. The scene changes to the hallway of a house. The effects man rattles a bunch of keys, his assistant "croaks" two pieces of wood, the effects man walks slowly along a strip of linoleum.

Action absolutely expressed in sound.

Within ten hours listeners will imagine their hero opening the door and stoaling down the deserted hallway. Elderly spinsters will probably scream!

Eerie Effects.

Elsewhere, the Gershom Parkington Quintet supply the incidental music. The *Danse Macabre*. A gentleman in the background heightens the eerie effect with a piercing scream on a whistle. Everyone laughs at the melodrama of the sound, then they are all serious again. This "dress rehearsal" is serious business.

In another studio, the members of the Theatre Orchestra are being put through their paces as part and parcel of a variety programme. Little is wrong, nothing to interrupt, nothing to alter. The piece comes

to an end. "Ten minutes, boys," comes from the conductor, and the "boys" somehow fade away.

A pianist strikes up a tune. A jazz singer croons to the microphone with expressionless face. She finishes and asks "OK"?

"OK" she is told. "About eight o'clock this evening." She departs as if singing to no one in particular is to her the most natural thing in the world. As perhaps it is.

A lady who intends to carry on a monologue in six different voices announces, "A little impression of a dressmaker's salon." A little impression is what I receive. It is almost impossible for me to distinguish here in the studio between the varied voices. The delicate ear of the microphone can fully catch her clever inflections of tone.

RADIO REHEARSALS

(Continued from previous page.)

The ordinary listener will hear better than the one in the studio.

But it's twelve-thirty. Getting on! "Taxi! Taxi! Quick! Queen's Hall!" There, in the cool greenness, the Symphony Orchestra struggles. A chafvoman peeps down, for a moment from the height of the balcony, and then bends to her work, little interested. One of the world's finest orchestras plays to her alone and she doesn't care a rap.

"With Precision."

"Gentlemen, gentlemen, please, please!" The lean figure in a pullover commanding from the dais taps impatiently with his wand. The orchestra desists slowly. One or two players reluctantly continue a few trills.

"Gentlemen! Forty-six. The instructions are 'With precision.' German precision. Again, please!"

"Jingo!" whispers a tired bandsman to me an hour later. "We rehearsed that forty-sixth bar over fifteen times."

Yet the result will be gone for all eternity in the course of a single night!

They Never Disappoint!



PRODUCTIONS pull their weight in every circuit. They are the unfailing components that never disappoint.

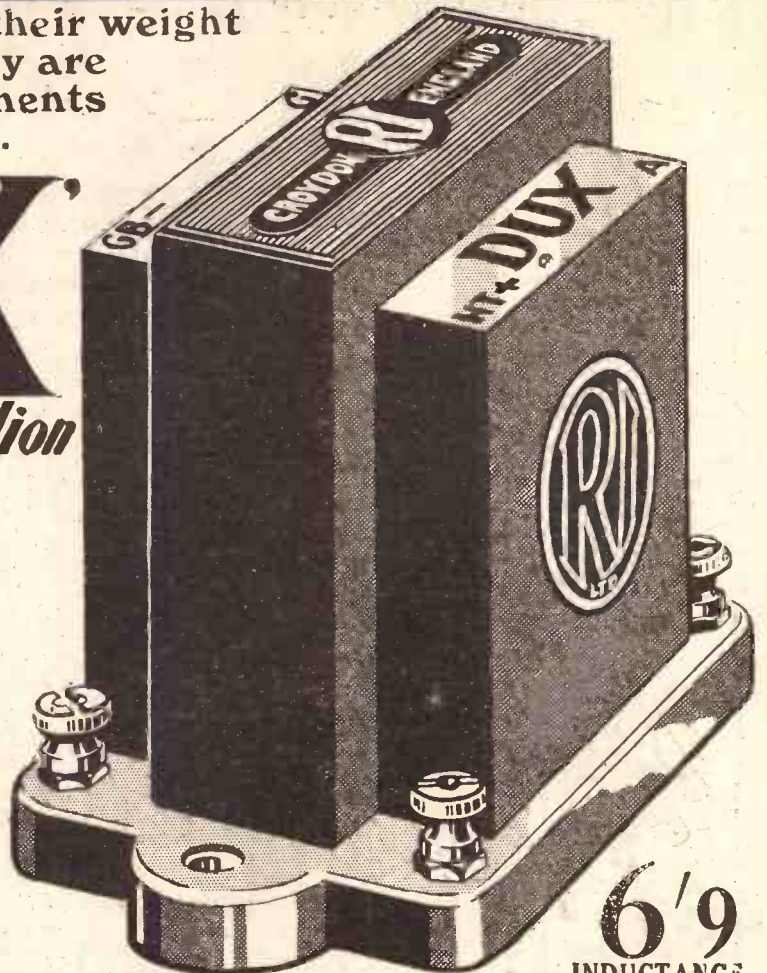
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The Transformer for the Million

You cannot expect the same efficient amplification from any other transformer at such a low price.

By selecting "DUX" you secure the transformer that was built first and foremost to satisfy and not merely to sell because it is low priced.

Full technical details are published and given with "DUX" as with the highest priced transformers. They prove, before you buy, that the performance will be right.



6'9

INDUCTANCE
30 HENRIES

Ratio 1 to 3½ (standard) or
1 to 4½ (auto-connection).
Weight 11½ ozs. Dimensions:
2 x 3½ x 2½ ins.

SPECIFIED for the P.W.
DUAL RANGER and
all Good, Popular Circuits.

RI DUAL RANGE COIL

The cleanest, neatest and most efficient Dual Range Coil. Built with all bakelite mouldings that make for absolute accuracy under all temperature conditions. Tested on the wavemeter and inductance bridge and guaranteed perfect. Note the easily accessible terminals, the clearly engraved identification marks and superior finish. Ask your dealer or us for "DUX" technical leaflet and our latest catalogue.



12/6



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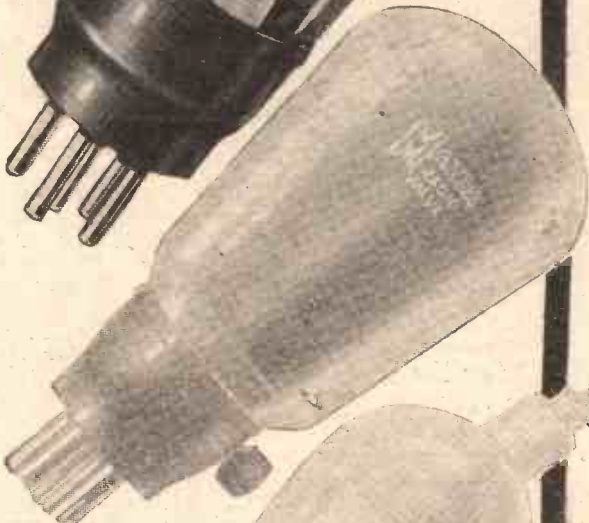
1931
MAZDA
PEN 220



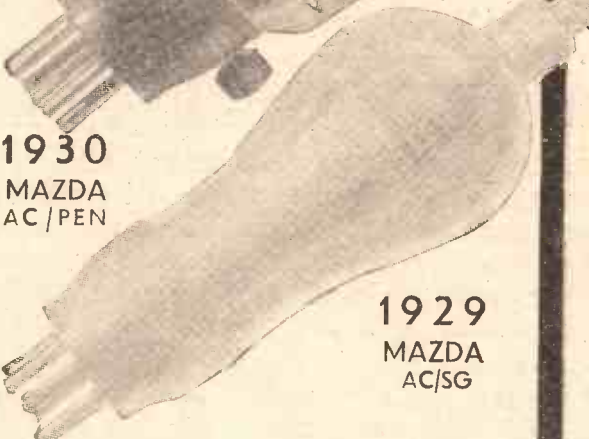
For the **THIRD YEAR** in succession **MAZDA** wins "**THE BLUE RIBAND**" of **RADIO**

Again — for the third time in succession — a Mazda valve has won the highest possible commendation — the vote of "Wireless World" readers for the best valve at Olympia. The success of the Mazda Pen 220 is due to the unceasing research and untiring experiment which has always placed Mazda in the forefront of radio valve development. In 1929 the Mazda AC/SG startled radio engineers and captured the "Wireless World" vote. In 1930 the Mazda AC/Pen reigned supreme (as it still does) over other mains output valves. And now, in simplifying the difficulties of portable receiver design, the Mazda Pen 220 once again justifies and confirms the supremacy of "the finest range of valves the world has known."

1930
MAZDA
AC/PEN



1929
MAZDA
AC/SG



The amazing

MAZDA THE BRITISH VALVES

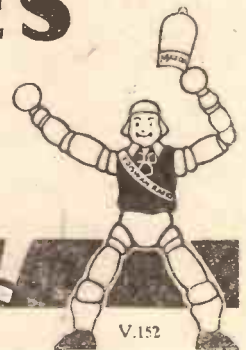
LOOK FOR "EDDY" IN YOUR DEALER'S WINDOW

Another Mazda Achievement for

EDISWAN RADIO



THE EDISON SWAN ELECTRIC CO. LTD.
Radio Division: 155 Charing Cross Road, London, W.C.2



V.152



HOW YOUR SET WORKS

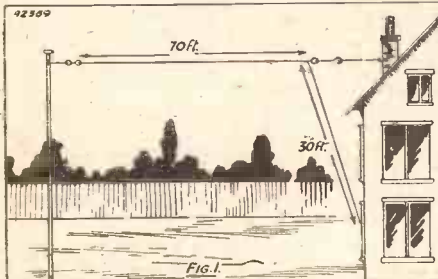
LAST week Mr. Victor King finished telling you about the transmitting side of radio. How Jack Payne and his merry men set up air waves in the studio with their dance tunes. How these sound waves were picked up by the "mike," and changed into electric currents which were passed on to the transmitter. This in turn flung them out into the ether in the form of waves, to be picked up by all who were lucky enough to possess a radio receiver.

Why We Need a Receiver.

Now I am going to take up the story, and I'll do my best to tell you what happens to these waves when they arrive at your receiving aerial.

Also why it is necessary to have a wireless receiver at all. For I'm pretty sure that your first question will be: "Why is it

WHAT WAVELENGTH?



The natural wavelength of an aerial can be roughly calculated by taking the total length from lead-in insulator to the far end (in metres), and multiplying it by four and a half. (One foot equals about point three metres.)

that these ether waves can't be picked up directly by the human ear?" I will explain.

First of all, ether waves are quite different from sound waves.

The former are vibrations in the ether, and the latter simply air waves. The human ear depends upon these air waves, or more correctly speaking, variations of air pressure above and below normal, and their effect on our ear drums for the sensation of sound.

You Couldn't Hear Them!

Even if it were possible for our ears to detect ether waves, it would not help us a great deal. The reason is that the waves used for broadcasting have a frequency well above the audible limit.

A wireless station transmitting on a wave-length of 300 metres has an oscillation frequency of a million cycles a second. The very highest frequency to which the

By **FRANK BRIGGS**, who takes up the story at the point where Victor King left it in his article which appeared in "P.W." last week.

most responsive ear will react must be about twenty thousand, although for all practical purposes the limit stands at about ten thousand. So that clears up that question.

Now, getting down to brass tacks, as the saying goes. When these ether waves strike your receiving aerial they induce in it tiny electric currents which oscillate in rhythm with the ether vibrations.

As all "P.W." readers will realise, it is very necessary to have some scheme whereby any particular wave can be selected from the large number that arrive from the different transmitters.

"Sympathetic" Vibration.

You have seen from previous articles that if a certain note is produced by, say, a tuning-fork, which while it is vibrating, is held near a piano, something will happen. The corresponding string in the piano will also start vibrating, obtaining its power from the air waves set up by the tuning-fork.

In other words, the piano string is tuned to respond to a certain frequency, and as the tuning-fork produced the right number of vibrations per second, the string oscillated in unison. It's just the same with wireless.

We tune our receiving aerial to the frequency of the particular wave we wish to receive, all aerials having a natural period of their own. In a very similar way in which piano strings have a certain period of vibration. The natural wavelength of an aerial, as this is called, depends directly upon its length and height.

Where the Metres Come In.

It can be found very approximately by measuring the length of the wire from the far end to the point where it is attached to your lead-in insulator. You then multiply this by four and a half. This is the natural wavelength of your aerial in feet.

If you divide this by 3.28 (which is the conversion figure for changing feet to metres), you get the natural wavelength in metres. Perhaps, just as an illustration, it would be rather interesting to give an example.

We will take the case of a fairly large broadcast receiving aerial. The length of this imaginary aerial is 70 ft., it is 30 ft.

high, and it is of the single-wire type (See Fig. 1). The total length of wire therefore, is 100 ft.

Multiply this by 4.5, and we get 450. Divide this result by the conversion figure 3.28, and we see that the natural wavelength of our aerial is approximately 137 metres.

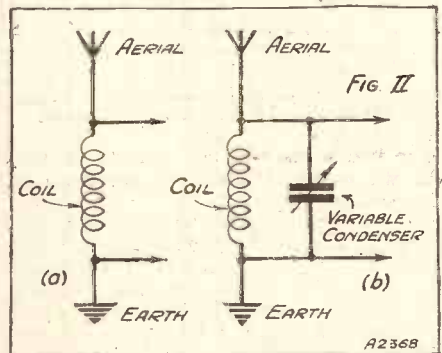
From this you'll see that it should be possible by varying the size of the receiving aerial to make it respond to different wavelengths. The longer the wire the higher its natural wavelength. To be more precise, we could tune a receiver to different wavelengths by having a variable aerial.

Inductance and Capacity.

Now this is all right in theory. In practice, however, it would be a hopeless business, as you can no doubt imagine. What do we do, then?

Why, just leave the actual aerial the same length and increase it artificially by adding coils of wire to the receiver itself. All of you have heard of the terms Inductance and Capacity. In practice you don't say an aerial, or coil for that matter, has such and such a length, and is such and such a height. We say it has an inductance

LOADING THE AERIAL



A coil connected as at (a) increases the natural wavelength of the aerial circuit, while if a variable condenser is connected across the coil as at (b) we have a convenient method of tuning through a wide band of wavelengths.

of so many microhenrys (millionths of a henry), and a capacity of so many microfarads, or fractions of a microfarad.

From these two values it is fairly easy to calculate the wavelength accurately. A very good way to imagine Inductance and Capacity, without going into technical details, is to think of the former as the amount of wire in an aerial or coil, and capacity really corresponds to the height above the earth in the case of an aerial, or the distance between conducting surfaces in

(Continued on next page.)

HOW YOUR SET WORKS

(Continued from previous page.)

the case of a coil, condenser, or any other component.

The nearer two conductors are together the greater the capacity between them. The capacity can also be increased by making their area bigger.

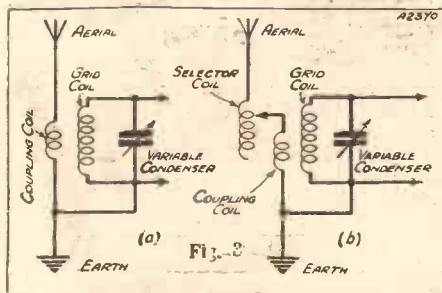
Suppose you wish your aerial circuit to tune from 200 metres upwards. What do you do? If we assume that a full-size aerial by itself has a natural wavelength of about 135 metres, there is a further 65 metres to add in the shape of a coil. So we connect it up as shown in Fig. 2 (a).

How the Set is Tuned.

Naturally, we don't want to stay on 200 metres the whole time, so we have to arrange to vary either the inductance or the capacity of the circuit. Varying the aerial is out of the question. We, therefore, have the choice of either a flexible coil arrangement or a variable condenser. The latter course is the more usual, so we just connect a variable condenser in parallel with the coil, as in Fig. 2 (b).

You now start, at, say, 200 metres, and as the variable condenser is slowly rotated the two sets of plates present more and

IMPROVED SELECTIVITY



(a) An untuned aerial coupled to a tuned-grid coil. This method gives good selectivity. (b) Here both the aerial and grid circuits are tuned, but although it gives superior all-round results it has the disadvantage that two controls are necessary.

more area to one another. The capacity of the whole circuit is thereby increased as the condenser rotates.

As the wavelength depends upon the capacity, the former is gradually increased until the condenser reaches its maximum value. With a capacity of .0005 mfd. it is generally possible to cover the greater part of the medium wave-band.

Although the above system of tuning is still in considerable use, it is gradually going out of favour. This is due to the tremendous increase in the number of broadcasting stations and the large powers used.

Obtaining Station Separation.

The trouble is that when an aerial is tuned in the manner shown, it not only responds to waves of the desired frequency, but there is a certain amount of overlap on each side. A good illustration would be the case of the two London transmitters.

I live about twelve miles from these two powerful stations, and if I use this type of circuit with anything but the smallest of indoor aerials, I find it almost impossible to

separate the two programmes, although there is a wavelength separation of something like 90 metres.

So nowadays it is usual to have an aerial winding of only a few turns, loosely coupled to a tuned-grid coil. See Fig. 3 (a). (Sometimes the aerial is tuned as well, but a disadvantage of this is that a second control is necessary. See Fig. 3 (b).)

By these means our sets can be tuned to the desired wavelength, and we can thus select the desired programme. The next important point to deal with is how the high-frequency currents oscillating in the aerial are changed into impulses of audible frequency. I hope to make this the basis of the next article.

or owner of a radio receiver for information and assistance on any valves.

At each station a full range of practically every class of valve is available from stock, and Six-Sixty valve service can be had on all valves irrespective of type.

The service, which is free and incurs no obligation, may be summarised thus:

1. Advice regarding the modern Six-Sixty valves which would best suit any particular receiver in use—for information of the owner when he requires replacements. This service is, of course, intended for the use of the public at large rather than readers of this journal, who are always kept fully up to date with information regarding the sets we publish.

2. An examination of existing valves brought to the service station and a fair report on their condition and suitability.

A Demonstration in Your Home.

3. A home demonstration, anywhere in the neighbourhood, of a new set of Six-Sixty valves to determine the actual difference new or more modern valves make on any particular receiver.

But the constructor, when building a new design of receiver for himself or friends, or re-planning an existing circuit, should (unless he is buying new valves specifically) always avail himself of Service 2 to make sure that the valves he proposes working in are not only in perfectly good order, but also exactly suitable for the design.

It is our own experience that a very large percentage of troubles on which we are asked to advise arise from attempts to use old valves which are either the wrong equivalent types or do not possess a performance equal to those specified—which reflects on a good set design and the work and care expended on the set itself.

In a case of poor reception from a set which has given good results and where valve troubles and replacements are indicated, the constructor might take advantage of Service 3, at the same time having a personal demonstration of, for example, a Six-Sixty metallised S.G. or detector, or other recent introduction, to satisfy himself regarding the purchase of new valves for that receiver.

Save Yourself Trouble.

Many readers will prefer to refer their friends who have possible valve troubles, to the Six-Sixty service station, instead of themselves undertaking the rather delicate task of advising on the purchase of new valves.

As might be expected, this enterprising service scheme for valves of the Six-Sixty Radio Co., Ltd., is meeting with great appreciation. A post card to the Head Office, Six-Sixty House, 17-18, Rathbone Place, London, W.1, will enable them to put any reader in touch with the nearest Six-Sixty valve service station.

LOGGING A NEW STATION



An ingenious tuning dial which was exhibited at the German Radio Show this year. It has a number of slots round its circumference in which can be inserted small tags bearing the names of broadcasting stations. In this way, once a station has been "logged," it can always be found with ease.

SOLVING CONSTRUCTOR'S VALVE PROBLEMS.

Details of the establishment throughout the country of special valve service stations by a well-known manufacturing firm.

THE correct choice and use of valves in a radio receiver to-day is of far greater moment than a few years ago. But out of the millions of listeners, and—shall we say—hundreds of thousands of constructors, the proportion who have mastered the intricate technique of modern radio valves, who really have an expert knowledge of the fundamentals governing valve design and performance, must be very small indeed.

Yet occasions continually arise where immediate expert advice on valves, old and new would be of great practical help. The makers of the Six-Sixty (B.V.A.) valves are filling the gap by their series of valve service stations throughout the country.

These local Six-Sixty service stations are proving as helpful to the constructor and his friends as do service garages to car owners. The Six-Sixty service stations are always at the disposal of any constructor

CHOOSE YOUR "P.W." DUAL RANGE

**GOLTONE "P.W." and
"M.W."
DUAL RANGE COILS
"POPULAR
WIRELESS" says**

"I would urge constructors to choose their makes with care. I've had samples sent me by Messrs. Ward & Goldstone Ltd., and these are absolutely to specification, and very well made indeed."

COIL WITH CARE



GOLTONE "P.W." DUAL RANGE COIL

**EXTRAORDINARY SELECTIVITY,
CLEAR RECEPTION,
EXCEPTIONAL EFFICIENCY.**

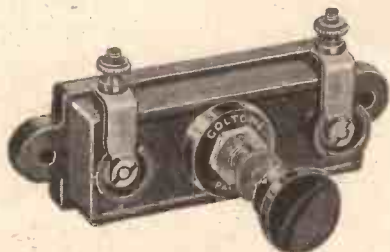
When operating on Medium Wave, the Long Wave winding is paralleled, thus ensuring the avoidance of losses usual in other types of Dual Range Coils.

No. DW/12 ... Price, each **7/6**

**PRICE
7/6
EACH**

"GOLTONE" COMPONENTS are obtainable from all First-Class Radio Stores—Refuse Substitutes. If any difficulty write direct.

"GOLTONE" COMPRESSION TYPE CONDENSER



PANEL OR BASEBOARD MOUNTING

A unique feature is that this Condenser can be mounted on the panel, and adjusted from outside the set as with the ordinary controls.

Type "F" (0001 to 000005) } 1/- each
Type "J" (0003 to 000025) }
Type "G" (001 to 0002) }
Type "H" (002 to 001) ... 1/3 each

Large Illustrated Catalogue of "GOLTONE" RADIO COMPONENTS sent Post FREE on request.



The outstanding performance and excellence in finish of "GOLTONE" COMPONENTS leads to their specification in all "Popular Wireless" Circuits.



"GOLTONE" MIDGET FIXED CONDENSERS.

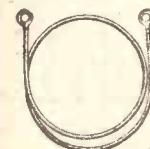
5^o



"GOLTONE" PUSH-PULL SWITCHES.

9^o

7^o



SPAGHETTI RESISTANCE LINKS, from

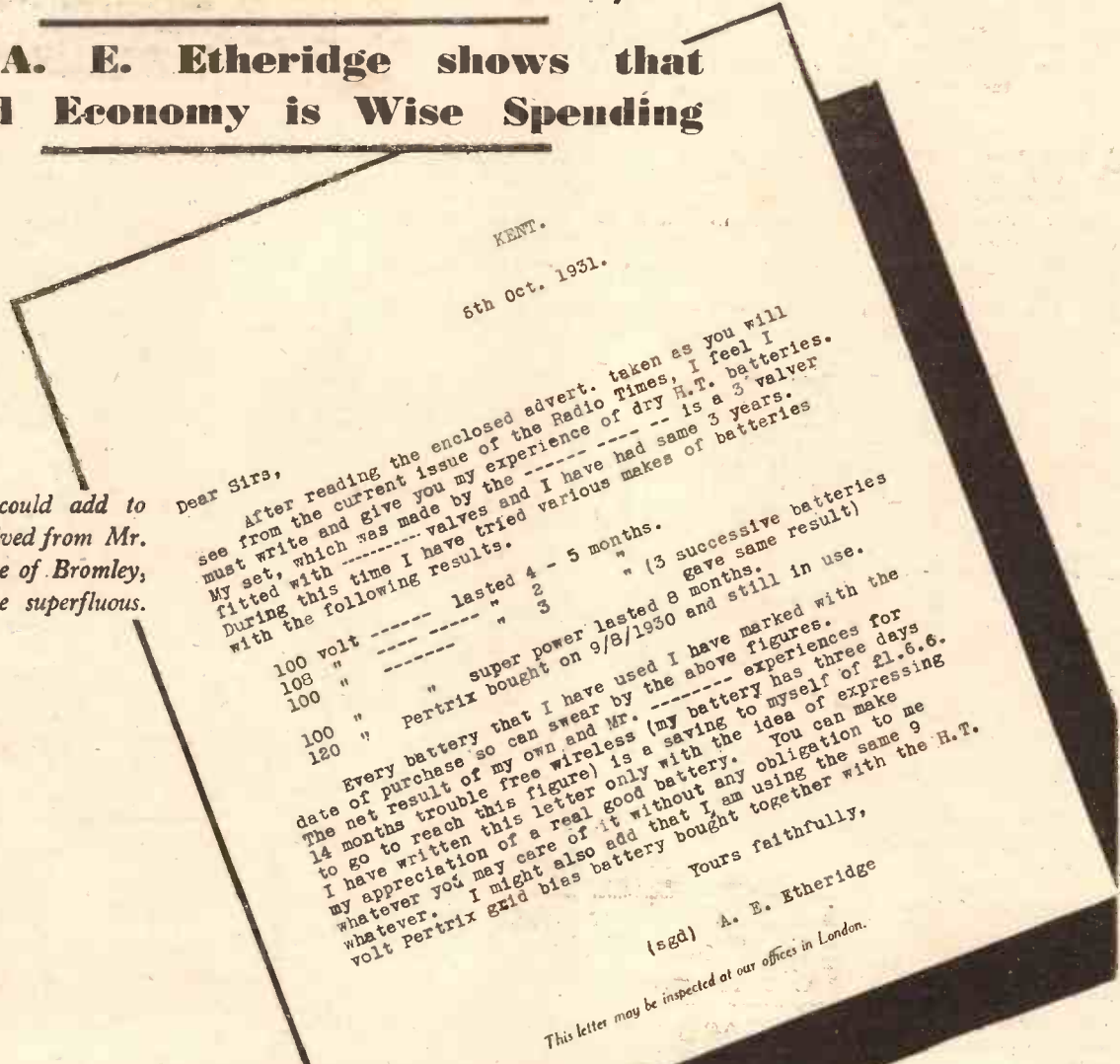
6^o

P.J. 3 Coils - - - Price 2/- ea.
Wound Coil Quits - Price 2/6 ea.
Ready drilled Panels, 18" x 8" x 1/8" mahogany. Price 7/-
Ready drilled Screen 10" x 7" Price 2/-

WIRELESS USER SPENDS.....15/6 —AND SAVES.....26/6

**Mr. A. E. Etheridge shows that
Sound Economy is Wise Spending**

Whatever we could add to this letter, received from Mr. A. E. Etheridge of Bromley, Kent, would be superfluous.



KENT.

6th Oct. 1931.

Dear Sirs,

After reading the enclosed advert. taken as you will see from the current issue of the Radio Times, I feel I must write and give you my experience of dry H.T. batteries. My set, which was made by the ----- valves and I have had same 3 years. During this time I have tried various makes of batteries with the following results.

100 volt	-----	lasted 4 - 5 months.	"	(3 successive batteries gave same result)
108 "	-----	"	"	"
100 "	-----	"	"	"
120 "	-----	super power lasted 8 months.	"	" (3 successive batteries bought on 9/8/1930 and still in use.)

Every battery that I have used I have marked with the date of purchase so can swear by the above figures. The net result of my own and Mr. ----- experiences for 14 months trouble free wireless (my battery has three days to go to reach this figure) is a saving to myself of £1.6.6. I have written this letter only with the idea of expressing my appreciation of a real good battery. You can make whatever you may care of it without any obligation to me whatever. I might also add that I am using the same 9 volt Pertrix grid bias battery bought together with the H.T.

Yours faithfully,

(sgd) A. E. Etheridge

This letter may be inspected at our offices in London.

PERTRIX

TRADE MARK

DRY BATTERIES

**THE BATTERIES THAT SAVE
MORE THAN THEY COST**

MADE IN ENGLAND BY BRITANNIA BATTERIES LIMITED.

Advt. of Britannia Batteries Ltd. Britannia House, 233 Shaftesbury Avenue, London, W.C.2. Phone: Temple Bar 7971 (5 lines) Works: Redditch

"P.W.'s" NEW CABINET SCHEME

In future it will be possible to fit up practically every "P.W." set as a complete console outfit having the appearance of an expensive commercial instrument. But our new scheme calls for no additional complications or even extra expense other than that of the console cabinet itself, and if you don't want a console you are not obliged to have it, but can house the set in a simple case in the usual way.



At one time loudspeakers and batteries were always regarded purely as accessories and it was accepted as inevitable that these should constitute external fittings. Now, however, it is quite obvious that the tendency is for the term "set" to be more inclusive.

The large majority of commercial radio receivers are all-in models and comprise "chassis," speaker and batteries (or mains units) all built into the one compact console cabinet.

Does it seem from this that all our "P.W." constructor designs should also be modelled along console lines? Is there such an overwhelming public demand for "all-ins" that every "P.W." set ought to be a console?

The Question of Cost.

It is true that we have issued numerous "self-contained" designs in the past, but these have necessarily stood somewhat apart as "special," as against "popular" productions. We say "necessarily" because of two things, viz. cost and complications.

Hitherto, a console type of set has meant a more or less costly cabinet and a chassis arranged peculiarly for that one cabinet. And compare that state of affairs with the delightfully simple panel and baseboard method. With this, the set becomes a "set" the moment the panel is screwed to the baseboard and the components mounted and wired up.

A Standard Design.

There is no need for us to mention even the word "cabinet" in our articles, for by now every constructor in the country knows that he has a choice of a wide range of inexpensive five-sided boxes ranging from "four-bob" three-plys up to fifteen or so shilling polished woods, all panels and baseboards being of standard sizes.

But even if it were possible to design console receivers as cheap and as easy to build as the simple "American" varieties, it is very doubtful whether we should be pleasing the majority of our readers by rigidly adhering to such methods.

Here is the Perfect Compromise.

Despite the admitted popularity of commercial consoles, we firmly believe that there are many constructors who do not desire their sets in similar forms, but prefer to have detached loudspeakers at the very least.

However, the justification or otherwise for this belief is now quite immaterial, for we have evolved a scheme which certainly seems to be the perfect compromise.

In future it will be possible to fit practically any "P.W." set into a console cabinet, although those constructors who do not require such an ensemble can utilise the ordinary rectangular cases as hitherto.

The "P.W." chassis, comprising straight-forward baseboards and vertical panels,

will not appear to differ in any general way, and there certainly will be no additional constructional work involved.

The idea is simply this. Certain of our trade firms are designing and producing various patterns of console cabinets able to accommodate set, chassis, loudspeaker unit and batteries or mains units.

In appearance they will look just like any other high-class consoles such as are used to house high-grade commercial sets, but there will be this vital difference:

The front of the cabinet will carry an artistic loudspeaker fret, as usual, but below (or, in cases, above) where the set controls ought to be there will be just a blank stretch of polished wood.

Handsome Vignette for Controls.

But this blankness can be relieved, the moment a customer orders his cabinet, by a handsome vignette.

You see the idea? Each "P.W." set will need its own particular design and size of vignette. But the constructor does not have to worry about that. He just orders a console cabinet, for, say the "P.W." "X.Y.Z." Three, and the right vignette will be cut.

And it won't be a crudely carved-out hole, but a properly fashioned vignette, so that the finished job resembles a quality set in every possible way.

The fitting of the set into one of these consoles is simplicity itself. The illustration accompanying this article shows an Extenser "Dual-Ranger" being fitted up in this way. The panel and baseboard is slid in at the back in exactly the same way as it is slid into any ordinary cabinet.

Moving-Coil Speaker Can be Used.

The loudspeaker unit is screwed into place, the batteries slid in and the whole wired up. In the illustrated model we have used a first-class moving-coil loudspeaker unit to show that there is ample accommodation for an article of this nature.

The scheme presents no difficulties to our set-designing department. All they have to do is to arrange the front panel controls of their productions with the scheme well in mind so that it is possible to have an attractively-shaped vignette.

Of course, it will sometimes happen that there will be "P.W." sets described which cannot be fitted easily into the standardised consoles. Such a set is the "P.V. Star," which has its own very special and very pleasing style of cabinet.

AMPLE SPACE FOR EVERYTHING



Showing how an Epoch moving-coil speaker can easily be accommodated in a "P.W." Console. The set is the Extenser "Dual-Ranger."

THE MIRROR OF THE B.B.C.

THE INTERNATIONAL
POSITION

THE PRINCE'S SUGGESTION
—EMPIRE BROADCASTING—
CHRISTMAS PLANS.

AS I prophesied, little good came from the Rome meeting of the International Union of Broadcasters, and we are in for a worse winter than ever of interference between broadcasting channels.

I suppose it is no fault of the B.B.C., but I confess some misgiving as to the strength of their action. Before the delegation went to Rome there was a lot of brave talk about leaving the Union entirely if some reform was not secured, and I have good reason to believe that resignation was seriously considered at Savoy Hill.

But when the meeting was over, and without result, the B.B.C. spokesmen expressed surprise that there was ever any reference even to the possibility of leaving the Union! This inconsistency should be watched in future, otherwise the weight of B.B.C. arguments will be discounted in advance.

The Prince's Suggestion.

I wonder how many listeners to the Election Results know that the repetition of the name of the constituency, introduced about half-way through, was due to a telephoned suggestion from the Prince of Wales.

Empire Broadcasting.

The National Government is already considering Empire Broadcasting, and an important announcement will be made soon. I anticipate that the project will proceed without delay, but I do not know who is going to pay for it!

Points from Programmes.

An exchange of views on the repertory theatre movement in the form of a discussion between Irene Vanbrugh and Sir Barry Jackson will be included in the London and Midland Regional programmes on Friday, November 13th.

One of the most extravagant farces ever given before the microphone is the adaptation by Edward Lewis of "Borzoï," a burlesque by Stephen Leacock, which is in the Regional and National programmes on Wednesday and Friday, November 25th and 27th, respectively. The vaudeville programmes in the same week should be well up to standard by the inclusion of items by favourite artistes.

Those who remember the gallant fight put up by the civic authorities of Slaithwaite to get as prominent a place on the map as Daventry by inducing the B.B.C. to describe the location of the North Regional transmitter as Slaithwaite instead of Moorside Edge, will be interested to learn that the Slaithwaite Prize Band is making its first appearance before the microphone on Saturday, November 21st.

Slaithwaite certainly lost nothing by its efforts, and the B.B.C. was equally skilful in refraining from upsetting either the local

inhabitants or those of the nearby city of Huddersfield. Anyway, we shall look forward to hearing Slaithwaite's Prize Band.

Christmas Plans.

Christmas seems a long way off, but the remaining weeks before the Festive Season will pass quickly enough for most of us, and it is not too soon to mention some of the items that Savoy Hill is planning for the Yuletide programmes.

Pantomime has a place, as it should, and one is pleased to see that the B.B.C. realises that in this form of entertainment no new-fangled ideas are wanted. So Ernest Longstaffe is busy preparing a radio version of "Aladdin" in the real old-fashioned style, which he himself will produce. Mr. Longstaffe's microphone work is as outstanding as everything else he does.

There is nothing amateurish about it, and though more use of his services could very well be made by the B.B.C., listeners will miss him while he is away in India and Far Eastern China and Japan, where he is taking a company "on tour" early in the New Year.

I understand that another Christmas production is a revival of Gordon McConnel's burlesque "Pantomimicry" about which we shall hear more in due course,

because I very much doubt whether Mr. McConnel himself could say more about it at the moment than I have done.

Just now he is engaged with the production of Cyril Scott's operetta entitled "Janet and Felix," which he has adapted for presentation on Thursday and Friday, November 26th and 27th. The theme of the operetta is of a musical maid who is scornful of her adorer because he has not music in his soul.

Felix visits a Yorkshire cave, noted for its wishing stool, where his wish to be able to sing is fulfilled to such an extent that he can do nothing else.

We must wait for the operetta to be broadcast to learn of his subsequent meeting with Janet.

JUST A SONG AT TWILIGHT



Mr. Frederick Bowyer, who is said to be Britain's oldest song writer, listening to his apparently rather old-fashioned radio set. Mr. Bowyer has written 632 songs.

FOR THE LISTENER

By "PHILEMON."

Some notes on the tendency of unwanted foreign stations to trespass on the B.B.C. programme to which we wish to listen.

APPARENTLY there is to be War in the Air. For some centuries now the peoples of Europe have had some difficulty in dividing up the land between them; and now there is going to be difficulty in dividing up the air between them. And, as usually happens, it is the ordinary folk who are going to suffer. The engineers promise us a bad winter!

The Chatter in the Background.

I am quite ignorant on the technical side of the matter. I don't know the difference between a kilocycle and a super-heterodyne. They may be the same thing, for all I know. What I do know is that, although I use a pretty useful set, I get more and more interference as time goes on.

It is a rare thing now to listen to a programme without the sound of somebody chattering away in the background. This is always a nuisance; at times it is a confounded nuisance. The pleasure of listening nowadays with a goodish set is less than it was in the earlier days with a much poorer set.

The engineers are having a good time, building more and more stations, increasing

the power and range of the transmitters, and the listeners are having a correspondingly thin time. It would be nearer the truth to call it a "thick" time, having regard to the number of stations which crowd in as soon as we switch on.

So that the question arises whether wireless exists for the engineers or for the listeners? Governments made war, and the masses of the people suffered; and now the engineers are making war, and the masses of the listeners are to suffer.

I suppose that in the long run it is the listeners who pay the piper. They should call the tune. They do, as a matter of fact, call the tune. Unfortunately, when they call the tune, they get several other tunes thrown in!

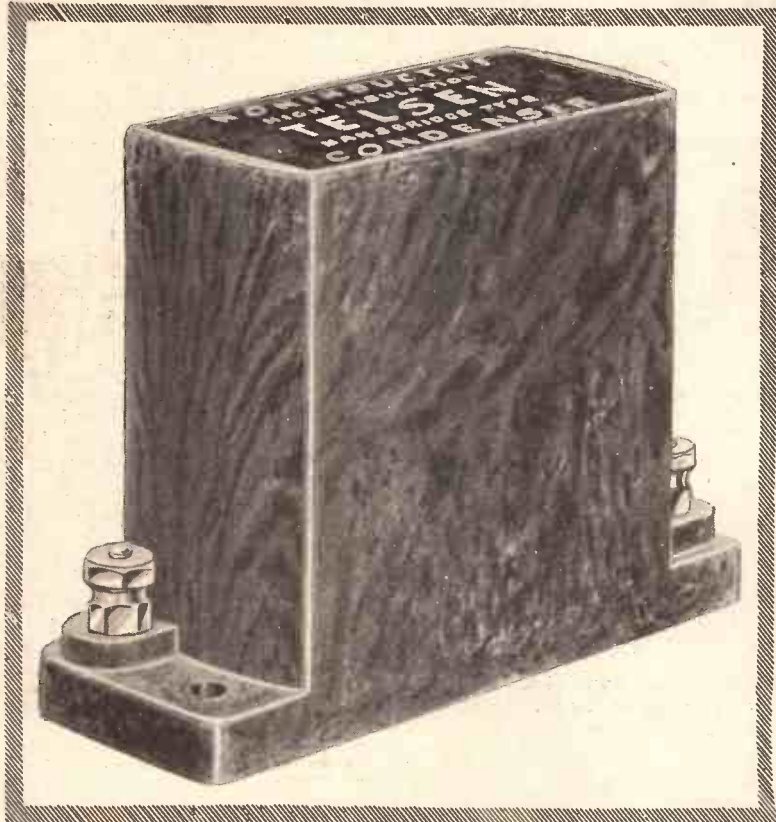
Annie and the Aria.

If you switch on for "Annie Laurie," the chances are that you will get an operatic aria, a negro spiritual, a jazz ditty, with the combined orchestras of Europe, heavy and light, thrown in!

It is impossible for the listener to keep pace with this multiplication of high-

(Continued on page 639.)

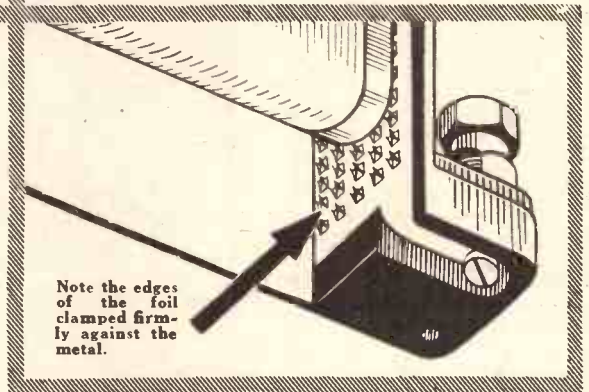
ABSOLUTELY NON-INDUCTIVE



TELSEN MANSBRIDGE TYPE CONDENSERS

It is essential for condensers used in radio work to be non-inductive to ensure negligible resistance to H.F. currents. Telsen Condensers are made by a special process which ensures *hundreds* of points of contact along the edge of each foil, thus preventing the possibility of any inductive effect.

The illustration below shows the base of a Telsen Condenser stripped to show the method of "Nutmeg-grater" contact.



EVERY

Telsen Condenser is completely non-inductive.

EVERY

Telsen Condenser is of the true Mansbridge self-sealing type, dehydrated in vacuo, impregnated and hermetically sealed.

EVERY

Telsen Condenser undergoes five laboratory tests before it is packed.

EVERY

Telsen Condenser is tested to the high insulation standards of the G.P.O.

EVERY

Telsen Condenser is 100% British.

Telsen Mansbridge Type Condensers, made in capacities from .01 to 2.0 microfarad from 1/6

Send for the "Telsen Radio Catalogue" and book of "All-Telsen Circuits" to
The Telsen Electric Co., Ltd., Aston, Birmingham.

TELSEN

THE SECRET OF PERFECT RADIO RECEPTION

FROM THE TECHNICAL EDITOR'S NOTE BOOK.

Tested and Found—?

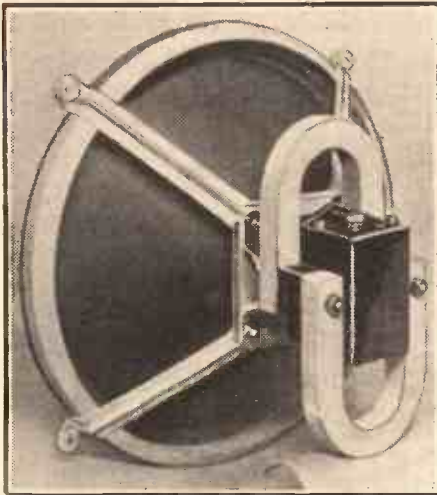


THE FERRANTI "INDUCTOR."

ONCE went into a radio store to purchase a loudspeaker for a friend. "This one," said the salesman, "costs two pounds five shillings, and it is a real bargain. But I've got one here—it's a *special balanced armature type*—at four guineas."

Of course, I was quickly able to choose the best instrument in stock at around about the price I wanted to pay, because I had

AN OUTSTANDING SPEAKER



Note the large permanent magnets of the Ferranti "Inductor" loudspeaker.

previously heard practically all the makes displayed under strict test conditions, but I took the opportunity of pointing out to the salesman that my mission was to buy a *loudspeaker* not a *principle*!

It is very good salesmanship to make play on a scientific principle and, of course, it is legitimate cataloguing to provide a specification giving full technical details, but I cannot help thinking that "principle plugging" is at times apt to develop into a mild disease.

The six best loudspeakers on the market to-day are not, in my opinion, all moving-coil instruments. The moving-coil principle is an excellent one when applied properly, but its mere application is no proof that the speaker concerned is superior to all others not embodying similar ideas.

The Ferranti "Inductor" speaker is, in my view, preferable to quite a few moving

coils and fully deserves inclusion in the above-mentioned "leading six."

Particularly is its bass robust and clean, while its performance on the higher notes is first-rate. On test it gave a good response to a six-thousand cycle "squeak" which was entirely inaudible on a mains-driven moving-coil speaker of a certain make!

THE "AUTOKOIL"

This is an all-wave tuner unit covering 200 to 2,000 metres. There are three controls, viz. a wave-band selector, a reaction adjustment, and a compensating condenser.

The last mainly serves as a selectivity control, but also has the effect of giving "vernier" tuning and an added regeneration.

You can use an "Autokoil" as an aerial tuning device, in which capacity it replaces all the usual tuning and reaction coils for both ordinary and long waves, or it can be employed as an intervalve "H.F." coupling unit.

The literature which is supplied gives full details (with practical circuits) for the application of the device to various kinds of receivers.

The controls of the unit are neatly arranged on a compact front panel where they are all readily accessible.

It should be noted that the "Autokoil" is British throughout, which in the view of its price, 12s. 6d., proves that our radio industry can give the foreigner a good run for his money—and beat him.

I have tested the "Autokoil" in two entirely different set arrangements and find it gives fine results both in point of power and selectivity. Also the reaction control is liberal and smooth, and the selectivity adjustment able to provide sufficient degrees of station separation for modern conditions.

R.I. DUOSTATIC BAND FILTER COIL.

There is now available a leaflet describing this coil which can be obtained free upon request from Radio Instruments Ltd. The leaflet is illustrated by several diagrams showing how the coil can be wired into various circuits.

AN INEXPENSIVE CABINET.

There are doubtless many amateurs who avoid the construction of complete radio-gram receivers only because they think that the cabinets for such are very expensive items. But this is not necessarily the case. There are numerous excellent cabinets available at quite modest prices.

For instance, the Denny Woodworking Co. offer a radio-gram cabinet in oak at £2 5s., or in mahogany at £2 10s., either model being available on the easy payment system. Moreover, each cabinet is sent out with a "satisfaction or money back guaran-

tee"—a particularly attractive system I have had one of these cabinets sent me, and, in my opinion, it is a good proposition and should meet with considerable success, more especially as it is obtainable, to order, in different sizes to suit individual requirements.

ANOTHER ATTRACTIVE CABINET.

A further piece of "radio furniture" has reached me from F. Digby. This is suitable for a number of the popular kit sets, such as the "Radio for the Million" A.C. and battery models.

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.

It is a particularly well designed and nicely finished piece of work, and is constructed in two sections, the main body, as it were, and an ornamental stand or stool that raises it artistically from the floor level and makes it into a handsome pedestal model.

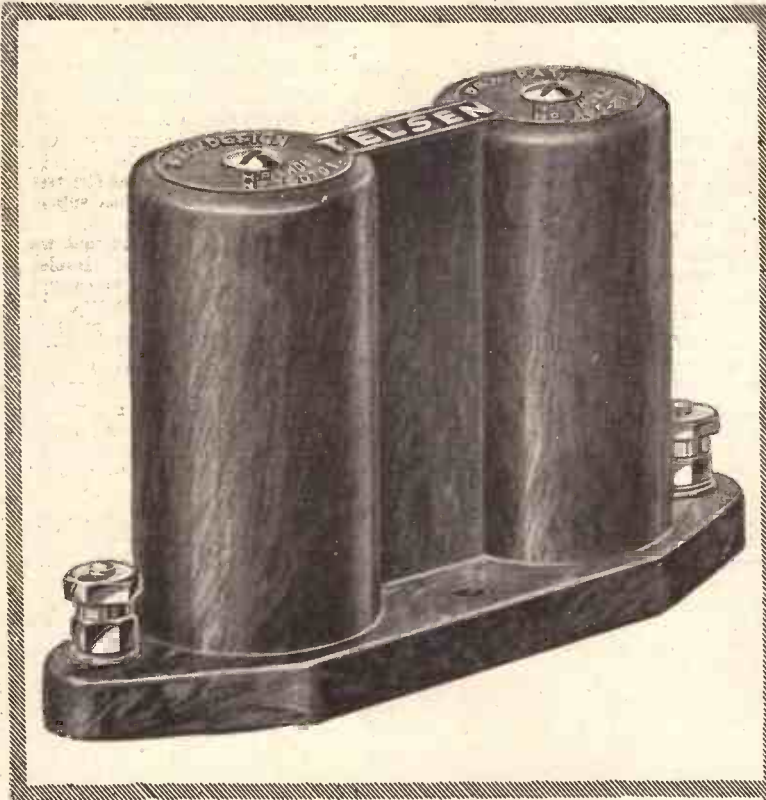
These sections are obtainable separately. The complete outfit in figured walnut costs £3 15s. Its appearance is that of high-grade craftsmanship, and I would certainly advise interested readers to secure details concerning it.

"VIRILITY" AND "LONG LIFE"



"Miss Exide" meets "Mr. Exide" at an exhibition. Could two figures be more representative of virility and long life?

IMPEDANCE . . .

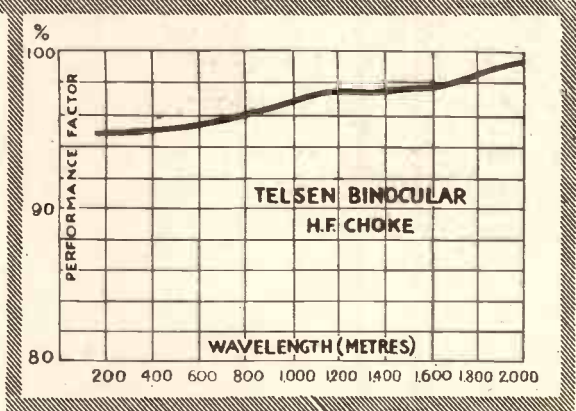


TELSEN BINOCULAR H.F. CHOKES

It is the function of an H.F. Choke to present the highest possible impedance to H.F. currents at all wavelengths. Particularly does this apply to the popular tuned grid arrangement of screened-grid amplification, where the performance of the whole set is limited by the value of the impedance in the anode circuit of the screened-grid valve. It is equally important that this high efficiency should be maintained over the whole broadcast band.

Telsen Binocular H.F. Choke. Price 5/-
Telsen Standard H.F. Choke. Price 2/-

The Curve adjoining (published by courtesy of AMATEUR WIRELESS) represents the efficiency over the Broadcast Band, as measured at the Furzehill Laboratories by J. H. Reyner, B.Sc., A.C.G.I., D.I.C., A.M.I.E.E., M.I.R.E., who says: "This curve shows the fine performance of the new Telsen Binocular H.F. Choke . . . the performance factor exceeds 95 per cent. at all points, and there is a distinct freedom from subsidiary resonances. . . . This Choke must be considered as taking its place as the best on the market."



Combined with its "fieldless" properties these figures show that where superlative performance is called for the choice must be the TELSEN Binocular H.F. Choke.

Send for the "Telsen Radio Catalogue" and book of "All-Telsen Circuits" to The Telsen Electric Co., Ltd., Aston, Birmingham.

TELSEN

THE SECRET OF PERFECT RADIO RECEPTION

AT the present time we have two very good examples of the mysterious fate which seems sooner or later to overtake so many Continental stations. You have probably noticed now and again that you are not hearing a certain station nearly so well as you once did.

Probably, though, you have not realised how often this happens. Do you remember, for instance, how we used to receive Motala when he first came into operation? Though my house is only forty-five miles from Daventry, Motala's transmissions were in those days nearly as strongly received as 5 X X's. Now Motala has but a fraction of his old strength. Hamburg, Frankfurt, Langenberg, Madrid Union Radio, Stockholm, Heilsberg, and Hilversum are all instances that come to mind, and there have been many others.

Why Do They Fall Off?

Why a station should be less and less well received at considerable distances as time goes on is one of the mysteries of wireless. Measurements show that the aerial output remains the same, and there is no apparent reason why results should deteriorate.

One possible explanation is that a greater



Some practical distant programme notes compiled by a special contributor who nightly searches the ether in order to obtain really up-to-the-minute information for "P.W." readers.

amount of energy is absorbed near the station by the erection of a larger and larger number of receiving aerials. It has also been suggested that oscillations may produce in course of time an actual change in the ground about the earth connections.

At present Huizen, which used to be an extraordinarily good station at any time when he was working, is found to be distinctly on the weak side even after dark on most nights. The second example is in the medium wave-band. This is Brussels No. 1, a station which all through the past very bad wireless summer I have been able to receive at good loudspeaker strength in broad daylight. Now he is barely to be heard in the daytime, and after dark the volume obtainable is seldom better than fair to moderate.

The Long-Wavers.

The long waves are providing splendid reception all round—so good, in fact, that

there is now no hour between breakfast-time and bed-time at which you cannot be sure of hearing foreign programmes. Let me particularly call your attention to Kalundborg, who is back to his old form as a first-rate station.

If you want to hear Copenhagen's programmes you can always get them through Kalundborg, though the parent station on the medium waves is difficult to pick up, except in the north of this country. Other long-wavers that you should not miss are Warsaw and Zeesen.

Watch for Vienna.

On the medium band we are having a good time all round. Up at the very top, stations such as Budapest, Munich, Sundsvall and Vienna are better heard than at any time in the past owing to the decreased amount of spark signal interference. Though not quite so good as he was last year, Vienna is definitely a station that should be tried for whenever you indulge in long-distance work.

Milan is nearly always ready to oblige, whilst Prague is showing fine strength. Langenberg is generally good, though he still has occasional weakish nights.

IN view of the absence of real news this week I am taking the opportunity to get up to date with some of my correspondence. There are several letters that are of sufficient interest to appeal to readers other than those who wrote them, and I will deal with these in print.

First, we have an admirable log from T. C. (or is it F. C.?), of Maryhill Barracks, Glasgow, giving a detailed account of reception of Americans and others. He, too, noticed the extraordinary period round about September 1st. He also logged a very good period for W 8 X K, which I myself did not notice, during the last week in September. Since then he has not been too good.

The Sixteen-Year-Old.

W 2 X A F he finds also consistent, but fairly weak. All the Europeans are, naturally, logged at better strength than can be managed by us Southerners.

He is very keen on short-wave superhet. adaptors and wants to see an up-to-date one published soon. We shall have to see what can be done.

Next is a cheery little letter from "Sixteen-year-old" (Richmond), who confesses similar symptoms to my own on being bitten by the short-wave "bug." One transmission mentioned in his log that does not seem to attract the attention of many readers is W 6 X N (Oakland, California).

California is not an easy place to receive, and very few people seem to try. A formidable log includes some stations that would warm the hearts of many readers aged far more than sixteen!

SHORT-WAVE NOTES



News and views regarding an exciting and fascinating wave-band.

By W. L. S.

A. E. B., of Leeds, reports hearing V K 2 M E at good strength at 7.45 p.m., instead of the more usual morning time. He also logged, on the same day, W 2 X A D at R7 (6.20 p.m.), and W 2 X A F at R7 (8.30 p.m.).

He is also the first reader to claim reception of El Prado, but he is not sure of it himself. Bandoeng, on 31.86 metres, is yet another of his captures. Congrats., A. E. B.

Can Anyone Beat This?

G. L., of Salisbury, sends in a log that seems to give him the title of the youngest member of our august "H.A.C." Club. He is not yet fourteen, but has heard all continents without a doubt. He has few thrills left to come from radio, having received Australia on a single-valve made when he was ten! Now, some of you hot receiving men, beat that!

Regarding your queries, G. L., first, I think the Sydney end of the 'phone service you mention is V L K. Secondly, I am

afraid I can't trace the Spanish (?) station calling Madrid on 56 metres. Can anyone else oblige?

Lastly, Sydney's times from V K 2 M E are as follows, all in G.M.T.: 05.00 to 07.00, programmes for America; 09.30 to 11.30, for New Zealand and Oceania generally; 11.30 to 13.30, for Asia; 19.30 to 21.00 for Europe, South Africa, Egypt, and other countries.

It is rather strange to note that the transmission generally received best in this country is that intended for America!

P C J to Close.

I hear on good authority that Zeesen is going to make a lot of use of his new 19'72 wave-length for the exchange of programmes with the United States this winter. It seems, in view of what I have already said, a most unsuitable wave for the job, since it is completely "blacked out" quite early in the evening.

Doubtless, though, the engineers at both ends know what they are doing. Perhaps the same conditions do not exist over that slightly greater distance as between our own country and Schenectady.

M. S., of Harlow, informs me that he has heard from the P C J announcer that the station is closing right down for six months. This being so, we may surely expect something extra good when he starts up again?

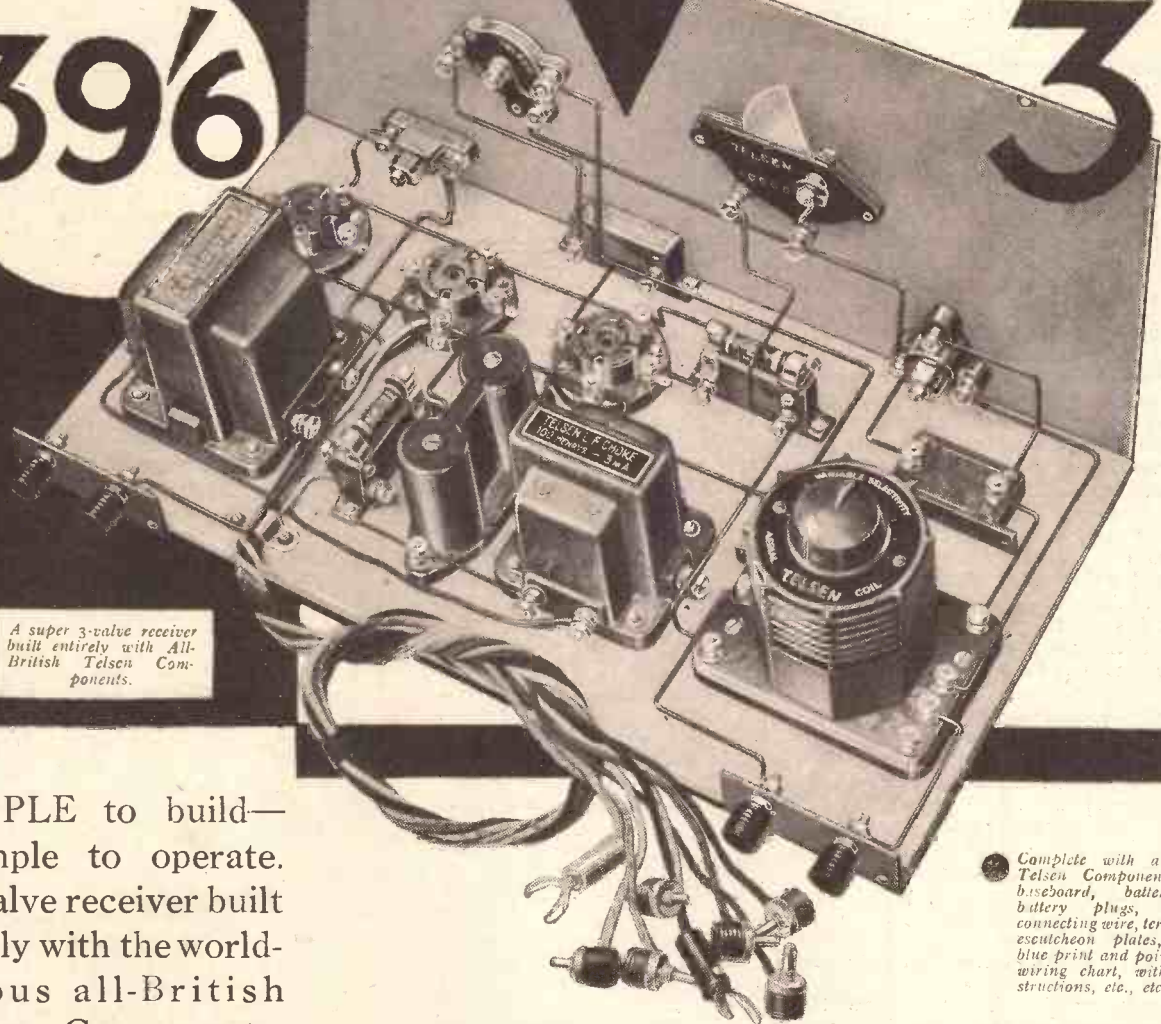
M. S. is apparently "in the know" about "Buttercup," "Ferret," "Firefly," and the other little stations on 80 metres that several readers have mentioned. But, remembering the "divulgence" clause in the licence, we had better say no more.



BUILD THE TELSEN VICTOR 31

39'6

A super 3-valve receiver built entirely with All-British Telsen Components.



SIMPLE to build—simple to operate. A 3-valve receiver built entirely with the world-famous all-British Telsen Components, all matched for efficiency. Separation of regional from national programmes is guaranteed, thanks to the incorporation of the Telsen Dual Range Aerial Coil. Ask to see the kit at your usual retailer's.

**BUYERS ARE BUILDERS
BUY BRITISH**
from
**THE EMPIRE
AT HOME & OVERSEAS**

- Complete with all British Telsen Components—panel, baseboard, battery cord, battery plugs, terminals, connecting wire, terminal and escutcheon plates, full-size blue print and point-to-point wiring chart, with full instructions, etc., etc.
- Super 3-valve receiver built entirely with all-British Telsen Components, matched for efficiency.
- Separation of regional from national programmes guaranteed by incorporation of Telsen Dual Range Aerial Coil.
- Very simply built and simply operated. Full constructional details with every kit.

**ALL BRITISH
RADIO
COMPONENTS**

TELESON

THAT MADRID CONFERENCE

Now that the International Broadcasting Union meeting at Rome has been shown to have achieved hardly anything at all, every one is turning with hopeful eyes to the Madrid Conference next year. But will anything useful emerge therefrom? Read what our Special Correspondent has to say on the matter.

LISTENERS are constantly being told that all wave-length problems will be solved at the coming Madrid conference next year. I regret to say that this is far from being the case.

Not Their Business.

The Madrid conference, the same as the Washington conference in 1927, will have nothing to do with European broadcasting problems except as far as they fit into the world organisation of wireless telegraphy and telephony as a whole. The Broadcasters are not meeting at Madrid, it will be delegates sent by all telegraph administrations of all the countries in the world.

They will be discussing ship telegraphy, commercial telegraphy and telephony, telegraphy in connection with police and air traffic and also in a world aspect broadcasting. They may allot a few more wave-lengths to broadcasting, but they also may not.

If they change anything these decisions have to be ratified by the governments concerned before they can be put into practice. After the Washington conference in 1927 it took one year and a half before the decisions were carried out. So the listener has no hope from the Madrid conference.

"How about the Broadcasters themselves, the Union?" somebody asks me. According to the Prague protocol duly signed and ratified in 1929, the Union only has advisory powers.

The Union, as far as the government administrations are concerned, and with them lie all decisions, is a mere expert whose views will be heard but need not be followed. Certainly the Union has done a lot of good and would be able to do more if it hadn't called in the administrations in 1929.

As far as wave-lengths are concerned the Union can arrange tests—with kind permission of the administrations concerned—can suggest certain wave-length changes, but these can only be carried out if every government administration concerned says yes. And here lies the trouble. Here lies the failure of the International Broadcasting Union to rectify the evils of the Prague Plan after the conditions under which this plan was drawn up have completely changed.

Completely Out-of-Date.

The Prague plan is obsolete. It was drawn up for a smaller number of stations with much less power and at a time when receivers were not at the standard they are to-day. The administrations were tired of many international conferences and had to prepare for Madrid, they refused by a majority of one to come together to modernise the Prague wave plan.

In some countries, where a new plan will have to be built on sacrifices, sacrifices of

wave-lengths, there is naturally a desire to keep the moment as far distant as possible when wave-lengths have to be given up. Then, for instance, in Germany, where there are nine different regional companies, the giving up of a wave means that one of these companies will have to work on a common wave, and this puts it at a disadvantage where the others are concerned. Therefore wave-length questions in Germany are closely connected with inner-politics.

All Fighting for Room.

This is one of the main reasons for the unwillingness of Germany to give up a wave. France, on the other hand, wants to

operation has been postponed to a later date, that is all, but the condition of the patient really does not allow for such postponement.

I suggest that there be a technical committee of broadcasters, and a juridical one, and also a general broadcasters' club with rooms at Geneva where members can come and talk things over, but why this unwieldy organisation where a body of experts dispute for over an hour over the use of one verb or the other in a report?

Waiting for Wave-lengths.

As far as listeners are concerned then the Union has no actual powers, and the Madrid conference will have more important things to do (in non-broadcasters' eyes) than to worry about the European wave-lengths.

It has been suggested that the Prague Plan be revised immediately after the Madrid conference. Which is quite a sane suggestion. We shall know if the world's administrations have decided to grant broadcasting more wave-lengths, and we shall be informed as to any other decisions which may influence broadcasting.

But who is going to revise the Prague Plan? Will the Union meet, squabble, come to some sort of compromise and then

SPEECH FROM GERMANY HEARD ALL OVER U.S.A.



Quite a feat in international broadcasting was accomplished when the world famous tenor, Richard Tauber, seen above at the microphone, gave a talk which was taken by all American stations. He spoke from his hotel in Germany.

stick to what it has got. And countries without long waves feel very sore indeed, so that the moment a new plan appears on the horizon there will be a fearful struggle for wave-lengths, and I think this was one of the main reasons for nothing happening at the Rome meeting of the International Broadcasters.

Britain offered to forsake a wave, if the others did likewise. The others came along with their grievances as to long waves, etc., and so one gave the patient another dose of morphine by just shoving and sliding a few stations to give relief to the spots where there was the greatest pain. The

ask the European administrations, tired out after the Madrid conference, to meet again on their way home or even still at Madrid and sanction or re-arrange the Union's suggestions?

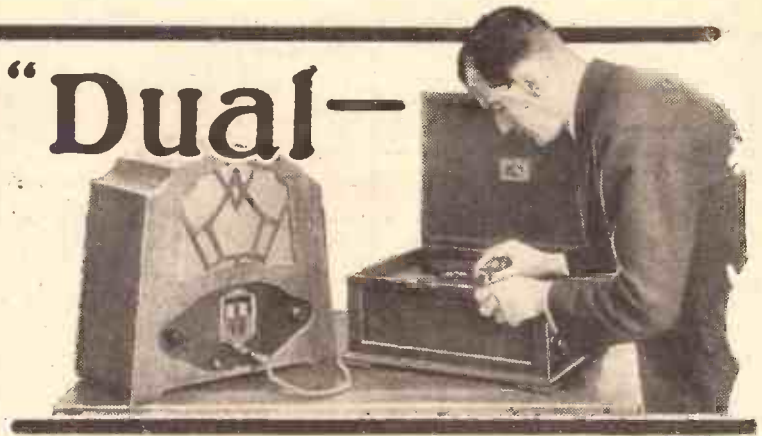
And then I heard another suggestion: Pass the whole European broadcasting question on to some international body already existent and ask them to name a committee who will impartially re-arrange Europe's ether.

Here I say no, because if there is going to be any squabbling let it be done by the broadcasters themselves and not by a crowd of outsiders.

THE Extenser "Dual-Ranger"

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

A first-class "S.G.3" set representative of the most modern radio reception technique, and incorporating many exclusive features making for easier control and better results in general.



FOR some time before actually commencing to tap the keys of my typewriter, I sat with a meditative cigarette trying to fasten upon a word that would, in a verbal nutshell, describe the "P.W." "Extenser Dual-Ranger."

But the one word which would persist in recurring to mind is a word that I hesitate to use on account of its slanginess. Nevertheless, it is so apt that I am going to chance the consequences of impressing it on paper. So here goes.

The "Extenser Dual-Ranger" is a very *posh* set; very *posh* indeed. Mind you, I am using the expression in a technical sense, and it will have got over in the way intended only if you are given to understand that the "Extenser Dual-Ranger" is, technically, a Rolls-Royce of S.G. threes designed in such a manner that its cost is out of all proportion with its capabilities.

If you are a regular reader of "P.W." you will by now be fully acquainted with the original "P.W." "Dual-Ranger," and all that we claim for that set. And I trust that many of you have had ample opportunity to test our claims.

Well, the Extenser version is identical, except that it has a dual-drum extenser. This is, however, an important exception. The extenser contributes numerous attractive qualities, and the fact that it eliminates two wave-change switches is by no means the greatest of these.

The Extenser.

It would appear that many people are under the impression that an extenser is merely a combination of variable condenser and wave-change switch. However much physical justification there might be for that belief, it is not fair just to leave it at that and look no further.

Let us examine the facts. European broadcasting is divided into two distinct broadcasting bands—viz. the long waves, among which

you find such stations as Daventry 5 X X, Radio-Paris, Motala, etc., and the medium or "ordinary" waves which embrace all other British broadcasting stations, and such Continentals as Langenberg, Stuttgart, Milan, Brussels, and so on.

Before the arrival of the extenser it was necessary to have interchangeable coils or some switching arrangement controlled from the panel in order to cover all these wave-lengths. You see, the ordinary tuning condenser is able to tune over only a certain limited band of waves—to extend the range it is necessary to make an alteration in the inductance or inductances of a set.

Special Vanes Required.

But an ordinary tuning condenser makes use of but one half of the possible 360 degrees of rotation of its dial—its vanes can, in fact, sweep through only 180 degrees, and, having reached the end of their travel, you have to sweep them back in the opposite direction.

There would be no purpose in completing the circle even if you could, for all you would do would be to run down the same band of wave-lengths that you have just run up! And owing to the shaping of the vanes, the tuning would go awry; you would en-

counter a distorted version of the dial positioning of the same stations.

It is certainly true that the extenser is a tuning condenser with a wave-changing device built into it, but it is a very specially fashioned tuning condenser, and its vanes are so shaped that you get exactly the same "compensating" or "straight line" effect throughout the whole travel of its vanes.

You rotate the dial 180 degrees and you tune from zero to maximum up the one-wave-band, then the switch automatically functions, and as you continue rotating the dial through the remaining 180 degrees, you tune on an entirely new wave-band, but the tuning is still "straight line," as before.

In brief, the extenser gives you exactly the same even spread of stations that you get when you employ an ordinary tuning condenser plus a wave-change switch.

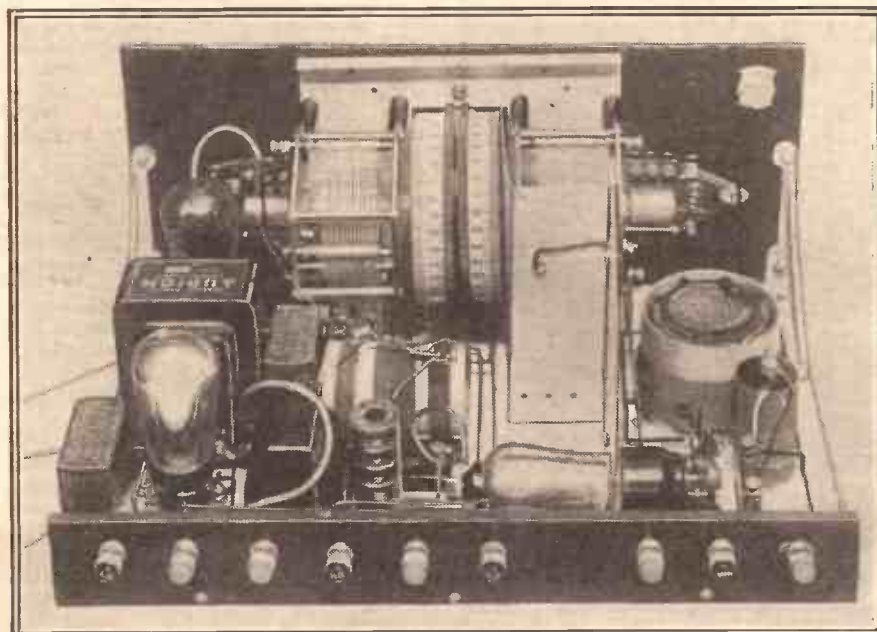
Every extenser dial or drum is numbered in accordance with a standard method of extenser dial marking, and the numbers run from 0 to 200. And, unlike the ordinary tuning condenser, the numbers do not have to serve a double purpose.

In the usual way, the one set of condenser dial readings has to serve for two entirely different sets of stations. For example, 45 might be the reading for the London National transmitter on the medium waves, and also for Eiffel Tower on the long waves.

Separate Readings.

You do not get that with an extenser; one dial reading can indicate only one station. And the dial numbers are so arranged in conjunction with the automatic switching that you can always tell at a glance whether the particular programme to which you are listening is a long- or short-waver, for the numbers up to 100 stand for the medium-wavers, and those from 101 to 200 for the long-wavers.

AN IMPROVED MODEL OF A FAMOUS SET



This fine receiver is based on the "P.W." Dual Ranger, with its recently described additions, and also has dual-drum extenser tuning.

(Continued on next page.)

THE EXTENSER "DUAL-RANGER"

(Continued from previous page.)

I have had extenders on my own set for such a long time now that I have almost forgotten what it is like to have to "gear-change" every time I want to vary the wave-band of my home outfit.

I am certain that the "household" would now be quite "flummoxed" if I suddenly introduced wave-change switches.

And one gets so accustomed to just sweeping the dial round for the station one wants, long or ordinary wave, that one

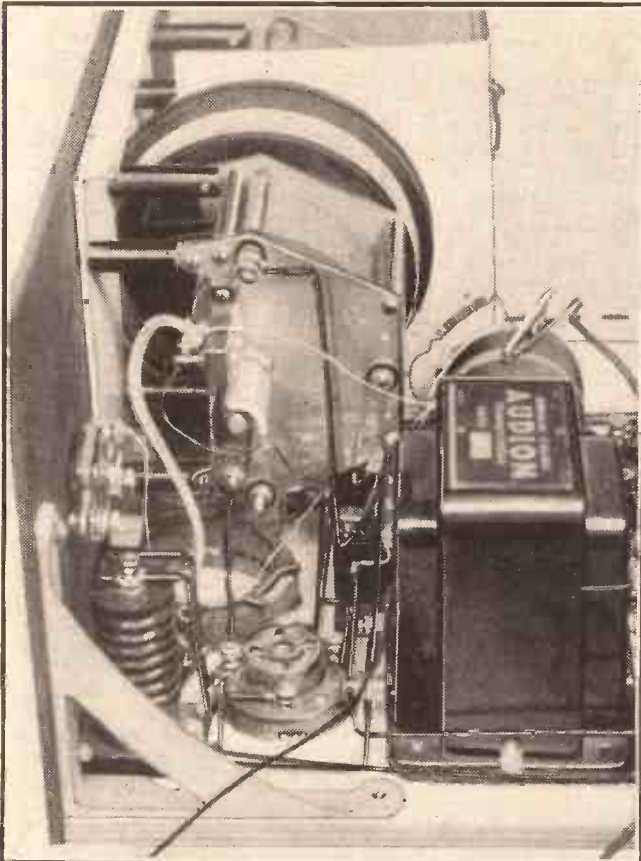
WHAT THIS SET IS

An S.G.3 embodying many special "P.W." features, such as the famous "P.W." Dual-Range coil, a P.J. coil, and "P.W." Coil Quoit, Extenser tuning, and "P.W." Inter-wave coupling.

shudders at the crudity of the normal method, although at the same time realising that, in these hard times, many are unable to find the money to purchase these new components.

Now, all the above are the obvious and immediately apparent advantages of the extenser. But in addition it contributes

COMPACT COIL CONSTRUCTION



Note the compactness of the coils used in this set. The Dual-Range coil (you can see this item in the other photo on this page) is particularly notable in this regard, while a Coil Quoit winding is easy to tuck away on a baseboard, as you can see.

considerably to the simplifying of the construction and the technical efficiency of the set.

Glance at one of the back-of-panel photographs of the Extenser "Dual-Ranger." You will see that the extenser self-changers (which correspond with wave-change switches and which are fitted on the ends of the spindles of the device) are situated quite close to the coils which they have to switch. Especially is this the case with the dual-range coil.

Short Wiring

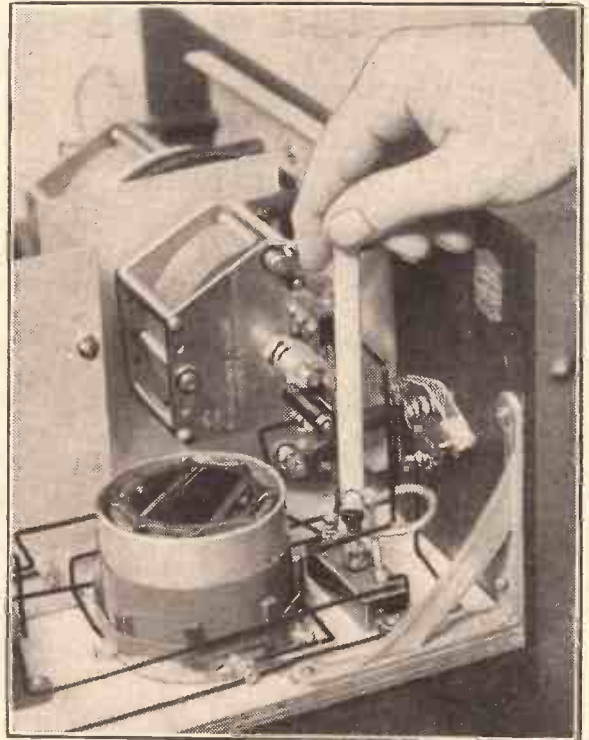
Note how simple, short and convenient is the subsequent wiring. Take out the extenser and introduce ordinary tuning condensers. You now have to have two wave-change switches, and, for convenience of operation, these must be fixed to the front panel. And the wiring must run from the two sets of coils to the front of the set.

It is true that in actual physical dimensions this means only an inch or so additional length to each lead. But in such wires every inch and part of an inch in length that can be saved means greatly increased efficiency.

if you wanted to employ two ordinary tuning condensers, you will need to fit two wave-change switches and two extra wires, wires which do not appear at all in the present instance.

Well, so much for the extenser. I have

SUITS ANY AERIAL



This adjustment enables the set to be adjusted for greatest efficiency in regard to both selectivity and power whatever your aerial or local condition.

Further, by using the extenser, two leads are entirely wiped out! This touches upon a point that seems to be frequently overlooked by constructors.

We present a design in which is used an extenser having only three wires running to its self-changer, and two wires running to its vane terminals. But the constructor who imagines that he can transfer the two vane leads to an ordinary tuning condenser, and the three self-changer leads to any wave-change switch and get equivalent results is making a mistake.

Not Advisable

Actually, a wave-change switch having four terminals, and to which four leads require to be connected, would have to be used.

Thus, in the Extenser "Dual-Ranger,"

dealt with this at length for the benefit of new readers, and that the diversion is called for is proved by the number of letters we continually receive asking us to explain "exactly what is this extenser?"

A Vital Component

There is little necessity for me to say anything more about the Extenser "Dual-Ranger" (plus additions) built around one of the finest pieces of radio engineering that I have ever met, a dual-drum extenser, due to a firm which is specialising in such work.

Next week we are presenting full constructional details of the receiver, but in

WHAT IT DOES

It gives first-class loudspeaker results on both ordinary and long-waves, and is particularly easy to tune.

the meantime I would just like to add a few words concerning the other components used. The most vital of these are the "P.W." dual-range coil and the "P.W." P.J. coil.

These comprise a combination it would be extremely hard to beat—I mean for all-round effectiveness, taking into consideration their inexpensiveness and compactness.

You will be the better able to appreciate

(Continued on page 616.)



FULL-SIZE WIRING DIAGRAM

with Complete Instructions for Building and Operating

FREE WITH EVERY Ready Radio

“P.W.” DUAL-RANGER KIT
 Ready Radio Kit “A” (Complete Set of Components Less Valves and Cabinet.)
£3-19-9 or 7/6 down and 11 monthly payments of **7/6**

Kit “B” - £5-18-9
 (With Valves less Cabinet.)
 or 11/- down and 11 monthly payments of **11/-**

Kit “C” - £6-16-3
 (With Valves and Cabinet.)
 or 12/6 down and 11 monthly payments of **12/6**

RECOMMENDED BATTERY AND LOUDSPEAKER EQUIPMENT

1 Ready Radio Kit “C”	£6 16 3
1 Pertrix 120 v. Standard H.T. battery	15 6
1 Pertrix 9 v. grid-bias battery	1 6
1 Pertrix accumulator, type P.X.C.3	11 0
1 Blue Spot speaker, type 4R.	£2 12 6

Any other makes can be supplied if required
COMPLETE KIT as above
£10.16.9 20/- down and 11 monthly payments of 20/-

COMPLETELY ASSEMBLED “P.W.” DUAL-RANGER
 with Cabinet and Valves, aerial tested, royalties paid.
£8.6.8 or 12 monthly payments of **15/3**
 With Battery Equipment and Loudspeaker as specified above
£12.7.2 or 12 monthly payments of **23/-**

JIFFILINX FOR SIMPLER WIRING

Always use Jiffilinx for wiring. They eliminate soldering, they give contact and are the most convenient, rapid and neat method of wiring a set.

Forty Jiffilinx in various lengths, fitted with shake-proof connectors—price 2.6. Send for a packet to-day.

Be sure to read Kendall's book entitled '10 Hours for Modern Radio Constructors.' Send four 1½d. stamps now.

A READY REFERENCE TO RADIO

Our new 100-page fully illustrated Catalogue contains details of all modern radio products. You need a copy. Price 1/- post free.

TO INLAND CUSTOMERS—Your goods are despatched Post Free or Carriage Paid.

TO OVERSEAS CUSTOMERS—Everything Radio can be supplied against cash. In case of doubt regarding the value of your order, a deposit of one-third of the approximate value will be accepted and the balance collected by our Agent upon the delivery of the goods. All goods are very carefully packed for export and insured. All charges forward.

IMMEDIATE DESPATCH

KENDALL “P.W.” DUAL-RANGE COIL. Price 10/6
 Every Ready Radio Dual-Ranger Kit includes the famous Kendall “P.W.” Dual-Range Coil, tested before despatch under the supervision of its designer, Mr. G. P. Kendall.

HEAR THE “P.W.” DUAL-RANGER AT OUR SHOWROOMS,
 159, BOROUGH HIGH STREET (2 minutes from London Bridge Station.)

CASH or C.O.D. ORDER FORM

To: **READY RADIO LTD.,**
 Eastnor House,
 Blackheath, S.E.3.

Please dispatch to me at once the following goods:

.....

for which (a) I enclose (cross out line) £
 (b) I will pay on delivery (not applicable)

Name

Address

P.W. 14/11/31.....

EASY PAYMENT ORDER FORM

To: **READY RADIO LTD.,**
 Eastnor House,
 Blackheath, S.E.3.

Please dispatch to me the following goods:

.....

for which I enclose first deposit of £

Name

Address

P.W. 14/11/31.....

THE EXTENSER "DUAL-RANGER"

(Continued from page 614.)

this when you have built the set, and have it actually "on the air." You see, there is no break between the long waves and the medium waves on an extenser set. Normally, there is that hiatus due to the need for pushing and pulling switches. This operation might not take long, but it is quite

AN IMMEDIATE ALTERNATIVE



The moment the pick-up jack is inserted the set becomes an electrical record reproducer and the S.G. valve is switched out of circuit.

long enough to enable the ears to regain their "neutrality." On the other hand, the sweep through to the new wave-band is almost instantaneous on such a set as the Extenser "Dual-Ranger," and you are able immediately to detect any falling-off in punch. But this won't happen, as you will discover, for the Extenser "Dual-Ranger" has perfect "bi-band balance," and you'll probably be surprised at the power with which long waves, such as 5 X X and Radio-Paris, will come in.

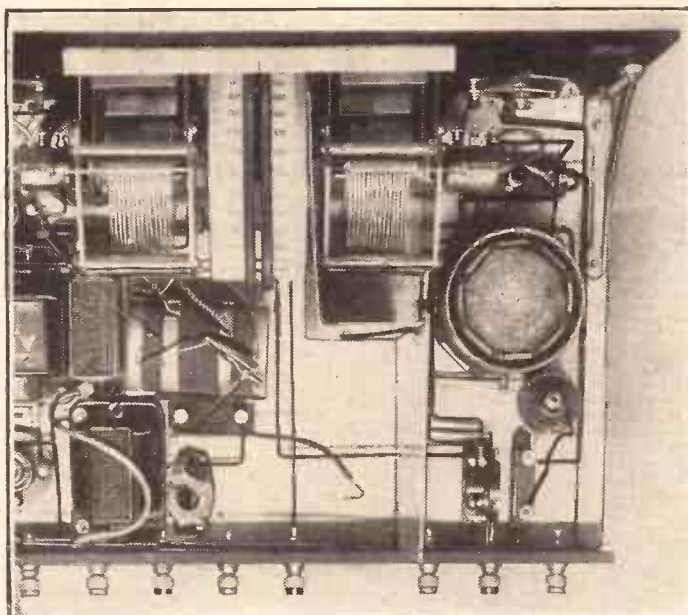
The Console Cabinet.

Also, you will notice a full quota of that electric "peppiness" that is so often lacking in this wave-band.

Another outstanding feature in regard to this receiver is that it is the very first one to be designed with the new "P.W." Console cabinet scheme in mind.

This new console cabinet scheme is fully described in other pages in this

PERFECT BI-BAND BALANCE



The magnificent results given by the "P.W." Dual-Range coil, particularly on the ordinary waves, is adequately balanced by the exceptional effectiveness of the P.J. coil and Coil Quoit combination with its outstanding long-wave efficiency.

issue, and constructors should make a point of reading about it before they finally decide upon a cabinet for this Dual-Ranger set.

WE RECOMMEND THESE MAKES OF COMPONENTS

- 1 Panel 16 in. x 7 in. (Permeol, Becol, Peto-Scott, Wearite, Goltone).
- 1 Cabinet, to fit 10 in. baseboard (Peto-Scott, Pickett, Cameo, Gilbert, Osborn, Ready Radio).
- 1 0005-mfd. double drum-drive Extenser (Cylidon).
- 1 0005-mfd. solid dielectric condenser (Ready Radio, Telsen, Astra, Wavemaster, A.W., Graham Farish).
- 1 On-off switch (Ready Radio, Telsen, Bulgin, Goltone, Lissen, Igranic, Lotus, Peto-Scott, Wearite, Graham Farish).
- 1 0001-mfd. differential reaction condenser (Telsen, Ready Radio, Graham Farish, J.B., Lotus, Wavemaster, Formo, Astra, A.W., Lissen, Polar, Igranic, Dubilier).
- 1 "P.W." Dual-range coil (any good make).
- 1 002-mfd. max. compression condenser (Formo, Colvern, Telsen, R.I., Leweos, Polar, Sovereign, Goltone, Graham Farish).
- 1 01-mfd. fixed condenser (T.C.C., Dubilier, Ferranti, Telsen, Graham Farish, Goltone, Formo, Ediswan, Igranic, Lissen, Mullard, Watmel).
- 1 0003-mfd. fixed condenser (Dubilier, etc.).
- 1 001-mfd. fixed condenser (Lissen, etc.).
- 2 2-mfd. fixed condensers (Telsen, Formo, Ferranti, Dubilier, T.C.C., Lissen, Hydra, Igranic, Helsby).
- 1 P.J.3 coil (Peto-Scott, Ready Radio, Formo, Wearite, Goltone, R.I., Parex, Melbourne).

- 1 Coil quoit (Peto-Scott, Melbourne, Wearite, Ready Radio, A.E.D., Sovereign).
- 2 ozs. 30 D.S.C. wire for above.
- 1 2-meg. Grid Leak (with holder if necessary) (Igranic, Graham Farish, Ferranti, Telsen, Dubilier, Ediswan, Varley, Ready Radio, Lissen, Loewe, Leweos).
- 2 H.F. chokes (Sovereign, Ready Radio, R.I., Leweos, Graham Farish, Tunewell, Varley, Parex, Dubilier, Lissen, Lotus, Atlas, Wearite, Peto-Scott).
- 1 L.F. Transformer, medium ratio (Graham Farish, Audion, Lotus, Telsen, R.I., Leweos, Varley, Goltone, Atlas, Formo, Ferranti, Igranic, Lissen).
- 1 50,000 - ohm spaghetti resistance (Varley, Telsen, Ready Radio, Lissen, Igranic, Bulgin, Graham Farish, Sovereign, Peto-Scott).
- 1 25,000 - ohm spaghetti resistance (Leweos, etc.).
- 1 Output Choke (Ferranti, Leweos, Lotus, Telsen, Graham Farish, Tunewell, Wearite, Bulgin, Atlas, Varley, R.I., Lissen, Igranic).
- 2 Valve Holders (Lotus, Telsen, Graham Farish, W.B., Igranic, Wearite, Lissen, Clix, Dario, Formo, Bulgin). (If Pentode output is used one of these should be five-pin variety).
- 1 Valve holder, horizontal mounting (W.B., Parex).
- 1 Terminal strip, 16 in. x 2 in.
- 9 Terminals (Belling and Lee, Igranic, Clix, Goltone, Ealex).

- Battery Plugs (Belling and Lee, Clix, Ealex, Igranic).
- 2 Crocodile clips (Bulgin, Goltone).
Jifflinx, Lacolone, Glazite, Quickwire.
Flex, screws, etc.
- Metal sheet for screen 11½ in. x 6 in. (Ready Radio, Peto-Scott, Parex).
- 2 Panel brackets (Peto-Scott, Bulgin, Ready Radio).
- 1 Jack and plug. (Igranic P.66., Lotus.)

ACCESSORIES.

- LOUDSPEAKER.**—Amplion, Mullard, W.B., H.M.V., B.T.-H., Blue Spot, Celestion, Graham Farish.
- VALVES.**—1 S.G., 1 Det., 1 Small Power or small pentode such as Mazda P.220. (Osram, Mazda, Cossor, Mullard, Six-Sixty, Tungram, Dario, Eta, Lissen, Fotos). (H.T. Consumption of set is 14-16 milliamps.).
- BATTERIES.**—H.T., 120-150 volts. Super Capacity. (Drydex, Pertrix, Ever Ready, Magnet, Ediswan, Lissen, Columbia).
- G.B., 1.5 or .9 cell for S.G. valve, (as above). 9-15 volts for power valve (as above).
- ACCUMULATOR.**—Voltage to suit valves (Exide, Ediswan, G.E.C., Pertrix, Lissen).
- MAINS UNITS.**—Ekco, Tannoy, Tunewell, R.I., Atlas, Heayberd, Lotus, Regentone, Formo. (State voltage and type of mains, and give details of set when ordering).

Ready Radio

MATCHED KITS

for the

EXTENSER DUAL-RANGER

APPROVED LIST

	£	s.	d.
1 Panel, 16" x 7", drilled to specification	4	6	
1 Cabinet, 16" x 7" x 10", with baseboard	17	6	
1 Cydon .0005 double drum extenser	1	19	6
1 ReadiRad .0005 solid dielectric condenser	3	6	
1 ReadiRad "on/off" switch		10	
1 ReadiRad .00015 differential condenser	2	6	
1 ReadiRad Kendall Dual Range coil	10	6	
1 Sovereign Pre-set condenser, .002-mfd. max.	1	6	
1 T.C.C. .001 fixed condenser, type 40	1	9	
1 T.C.C. .0003 fixed condenser, type 34	1	6	
1 T.C.C. .001 fixed condenser, type 5	1	6	
2 T.C.C. 2-mfd. fixed condensers, type 50	7	8	
1 ReadiRad P.J.3 coil	2	6	
1 Ready wound coil quoit	2	10	
1 ReadiRad 2-meg. leak and holder	1	4	
1 Lewcos H.F. choke, type M.C.	2	6	
1 ReadiRad H.F. choke for S.G. circuit	4	6	
1 Lotus L.F. transformer, No. 1	5	6	
1 Lewcos 50,000-ohm spaghetti resistance	1	6	
1 Lewcos 25,000-ohm spaghetti resistance	1	6	
1 R.I. output choke, type G.P.	12	6	
2 Junit valve holders	1	4	
1 Junit valve holder, horizontal mounting	1	9	
1 Terminal strip, 16" x 2"	1	6	
9 Belling Lee terminals, type R.	2	3	
1 Packet Jifilins for wiring	2	6	
1 ReadiRad screen, 7" x 11½"	2	0	
2 Panel brackets	3	0	
1 Lotus J.K.5	3	0	
1 Lotus J.P.1	2	0	
Flex, screws, 1 crocodile clip, etc.	2	5	
3 Valves	1	19	0

£9 4 0

KIT "A" (less valves and cabinet) £6.7.6

OR BY EASY PAYMENTS

Deposit of 11/9 and 11 monthly payments of **11/9**

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All Ready Radio Kits are tested and matched before dispatch under the supervision of Mr. G. P. Kendall, B.Sc.

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Fuller, Type DMHG. 120 volts, 6,500 m.a. capacity. Cash Price £4 1 0
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All these Receivers are Complete with Valves and Cabinet. This offer only applies to the few Laboratory Models we have in stock.

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Please dispatch to me the following goods:

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CAPT. ECKERSLEY'S QUERY CORNER



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

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

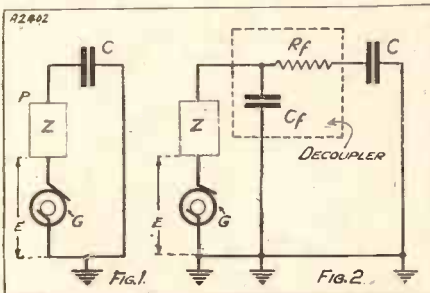
The Differential's Advantage.

C. McL. (Glasgow). — "Recently in receiver designs the reaction condenser is of the differential type. What advantage has this method over the arrangement using a condenser with only one set of fixed vanes?"

The movement of a reaction condenser of the ordinary kind upsets the tuning of a circuit because you will find it is effectively in parallel with the closed circuit condenser. Its parallelism is not truly complete, there being other small condensers (such as valve capacities) interposed, but it is complete enough to cause an effective change of tuning capacity.

The differential condenser puts in as much tuning capacity as it takes out, but meanwhile it only puts in reaction capacity.

VALUES FOR DECOUPLERS



The sizes of decoupling condensers are dependent upon their position in the circuit and the value of the associated resistances.

Capacities for De-coupling H.F.

H. K. (Ryde, I.O.W.). — "De-coupling' condensers associated with H.F. amplifying valves appear to vary greatly in specified capacity. Sometimes they are as small as .01 mfd., and sometimes as large as 2 mfd. Can I assume, therefore, that the capacities of H.F. 'de-coupling' condensers are not in the least critical?"

This is the point. The valve is a source of H.F. Draw it as a generator (g) having a voltage, E.

The valve has some kind of anode impedance (Z). The point P is the + H.T., and is connected to earth via a condenser, (C).

The valve pumps current back through Z via C to earth. If C has any sort of appreciable impedance, an H.F. voltage is developed across it, and is passed to other parts of the circuit which are thereby coupled.

So we have to interpose a de-coupler or filter, Rf and Cf, Fig. 2, between Z and C. The impedance of the path to earth must

ONLY IN "P.W."
will you find
Radio Questions answered by
CAPTAIN ECKERSLEY.

be, say, 100 times the resistance path to the condenser, C.

Supposing the series resistance of the decoupler is 5,000 ohms, then Cf must be 50 ohms. This means that at a frequency of 150 kilocycles C must equal about .05 mfd.

So that 2 mfd. is ample, .01 small if the series resistance is 5,000 ohms. I think .05 is a safe value, but see that you use good H.F. condensers, not any old L.F. condenser, otherwise, even though it's labelled .5 mfd., it may have a resistance of more like 5,000 than 50!

Dropping the Voltage of D.C. Mains.

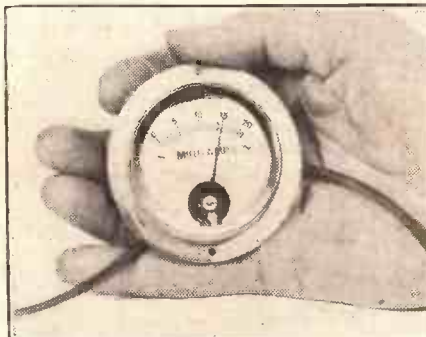
C. S. (Cromer). — "Whenever an attempt is made to run a receiver entirely from D.C. mains, the problem always arises as to the best means of 'dropping' the mains volts to the low figure required by the filaments or heaters of the valves.

"This is usually accomplished by means of a resistance which gets unpleasantly hot. Would it not be possible for the unwanted energy in the filament circuit to be dissipated by some other means than the generation of heat?"

"Could not, for instance, one dissipate some watts in a magnetic device?"

You can only dissipate watts by inserting resistance in a circuit. Magnetic energy in an inductance may oppose the

THE BEST VALVE TEST

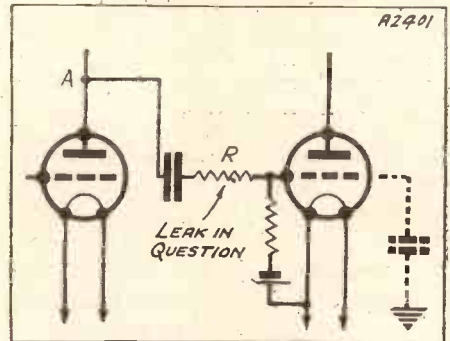


The most reliable way of seeing if a valve is O.K. is to check its anode current when a stated grid bias and anode voltage is applied, and see if the current is what the manufacturer's figures indicate it should be.

flow of alternating current, but it does not oppose such flow by dissipating energy but rather by introducing a back electro-motive force acting against the applied electro-motive force.

No! I fear the dropping of a D.C. voltage can only be done by either inserting a resistance or by introducing a steady back E.M.F. from cells which would, of course, continuously charge. But it would be both bulky and costly to insert a 228 volt battery in opposition to the mains of 230 volts to get a resultant 2 volts for the filaments. We've got to work it until A.C. puts us out of our misery.

A BAR TO H.F.



An extra grid leak in the position indicated keeps H.F. out of the L.F. side of the set, and works in the way explained below.

That H.F. Stopper.

F. R. (Sundridge Park). — "I have often seen a .25-megohm grid leak placed in series with the grid of an L.F. valve, the object being to stop H.F. from getting through to the L.F. side. Although this is a common scheme, I have never understood how it works. Can you explain this for me, please?"

You mean the arrangement shown in my diagram, don't you?

The idea is this:

I have shown by a dotted condenser the grid-to-earth capacity. Now, such capacity has a much lower impedance to high- than to low-frequency currents. So the H.F. starts at A and it gets to earth via the capacity shown dotted.

But it has to pass through R, and, in doing so, gets very tired. H.F. volts drop in R, but L.F. volts (dotted condenser having a higher impedance to L.F.) do not so much.

If R were omitted the impedance of dotted condenser is still quite high enough to establish volts of H.F. in the grid.

A new valve service

for readers of "Popular Wireless"

First List of local Six-Sixty Service Stations

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tric Co.,
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Etc., Etc.

If you would like to have a fair report on the present condition of any valves and their suitability for any particular purpose *take them to a Six-Sixty Valve Service Station and you will get it—FREE.*

If you think that your reception can be improved by new or different valves and would like to try by actual comparison what difference they would make to your receiver (or to those of any of your friends) by replacing any valve by a modern Six-Sixty valve, or a complete set of the latest types of Six-Sixty valves, *then ask a Six-Sixty Service Station to give you a demonstration—FREE.*

These are two features of the remarkable new Valve Service inaugurated by SIX-SIXTY and now being extended rapidly throughout the country.

THE SERVICE IS FREE AND INCURS NO OBLIGATION.

No wonder it is acclaimed by the Radio Press, by Wireless Editors of daily papers and by the public as a real boon. It fills a decided need and is as valuable to the constructor as to the ordinary listener.

Post the coupon NOW because you will want the service some day.

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To Six-Sixty Radio Co. Ltd. Makers of the famous Six-Sixty
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Please send particulars of Six-Sixty Valves and address of nearest
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NOTES FROM THE NORTH

News from the North of England, Scotland and Belfast, and an interesting comment on the effect of B.B.C. economy schemes on provincial programmes is given by

OUR NORTHERN CORRESPONDENT.

THE national crisis has changed the outlook upon provincial broadcasting. The B.B.C. has surrendered to the nation £200,000 of its licence revenue in this year and next. One of the economies decided upon is that henceforth the London Regional, North Regional, and Midland Regional transmitters will be more frequently linked together for "S.B." programmes.

Hitherto these transmitters have frequently broadcast different programmes. Readers of POPULAR WIRELESS will remember the heated controversy before the North Regional station opened, when the degree of responsibility to be vested in the provincial offices of the B.B.C. hung in the balance.

The advocates of "centralisation" were for concentrating programme-production in London. Their opponents argued that a strong staff at (for instance) Manchester would be able to provide a Regional programme contrasting more sharply with the National programme than any so-called "alternative" relayed from London.

Eventually a compromise was made. In point of fact, about 70 per cent of the North Regional programme has been produced in the North of England, the remainder relayed from London and the Midlands. The Belfast station broadcasts about 50 per cent local material.

The general attitude has been: "Let the provincial stations prove themselves. If they make a success of it, perhaps the percentage of local material will be increased some day." But now, like a sudden wipe with a sponge, the crisis has removed such arguments, hopes and compromises off the slate.

The increased sharing of programmes between the three Regional stations (and Scottish Regional will be added to the group next year) obviously means that the amount of programme material produced by each is proportionately reduced.

I am assured by the B.B.C. that this change does *not* mean simply that the Regional transmitters in the provinces are to relay more London Regional material. Certainly more will be relayed, but in return, the London station will take more Northern, Midland and Scottish Regional programmes.

Increasing the "Alternatives."

I hope this quid pro quo will be maintained. The present emergency must not be used by the "centralisation" enthusiasts as a means of getting back to their original idea of practically eliminating provincial programmes. When normal times return there must also be a return to the original

arrangement of each provincial station paddling its own canoe.

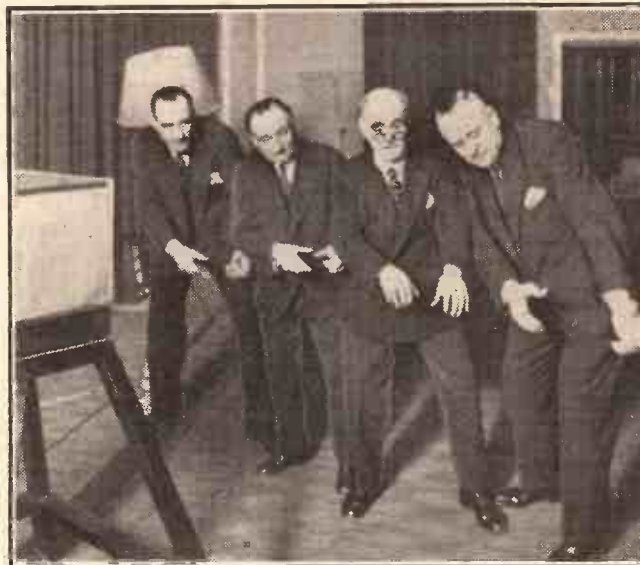
Provincial activities are good for B.B.C. programmes. They give an extra alternative to listeners with suitable valve sets. Where I live, for instance, I have often had the choice between three different British programmes, all at good volume: North Regional, North National, and Midland Regional.

Belfast Unaffected.

The Belfast station will not be affected by the above economy measure. It is considered advisable to maintain the 50 per cent local material in Belfast's transmissions owing to the not-so-good quality of the submarine cable over which London programmes must be relayed.

The North Regional station has shown

OUR MERRY M.P.'s!



"All work and no play makes Jack a dull boy." A happy band of M.P.s rehearsing for a broadcast of Sea Shanties from London.

that in many ways it is capable of running the race on even terms with Savoy Hill. In some respects we have been disappointed. When are the so-called variety programmes going to be taken in hand? They are almost utterly devoid of "pep," originality, talent—and variety.

The Northern programmes relayed by London Regional are not always representative of the best the North can do. I am told that Savoy Hill most frequently asks for the Northern Studio Orchestra, the Tower Organ (Blackpool), brass band concerts or the Hallé Orchestra. There are other Northern features in which, I am sure, London listeners would be interested.

"Regional Revels," the first of a series of revues to be produced at the Manchester studios this winter, struck a happy note,

and in the play "Red Night" the North launched out on more ambitious lines than ever. For this war play, broadcast on November 9th, a cast of ex-Service men was recruited. The actresses in the play had also seen war service, and realism even went so far that the bugle calls were blown by one of the buglers who blew "Cease Fire" in France on Armistice Day, 1918—and he used the identical bugle!

In Scotland also they are getting ambitious over radio drama, although many people were disappointed by "The Lost Cause," with its amateurish methods. We expected better than this of Mr. Compton Mackenzie.

Mr. Ian Whyte has been appointed Scottish Musical Director to the B.B.C. at Edinburgh. This young Scots composer was formerly part-time B.B.C. "Representative" at Aberdeen. Will he display the catholicity of outlook which is necessary for a provincial musical director?

The failure of the Rome conference of broadcasting authorities to come to an arrangement to avoid interference between stations has dismayed many listeners in the North. There is already a bad heterodyne on North National (301 metres). North Regional (479 metres) is threatened by the increases of power at Prague and Langenberg, which are at present each nine

kilocycles on either side of North Regional. This separation is to be increased to 11 kilocycles, however. The wavelength to be used by the new Scottish-Regional high-power transmitter (376 metres) is only nine kilocycles away from 21-kilowatt Lwow, and the same from Hamburg.

Broadcast relay services seem to be increasing in popularity. I know of several which are doing good business, and a new one has just been opened to cover three well-populated areas on the outskirts of Leeds. A single programme is provided, by overhead cables. The charge is 1s. 6d. per week, plus 6d. per week for a loudspeaker.

The new B.B.C. studios at Leeds will not be finished this year, as originally planned. The work on Broadcasting House, London, is delaying this other enterprise. The plans provide for a studio, 50 ft. long by 35 ft. wide and 25 ft. high, with a public gallery, and also a talks studio, both in the former Quaker Meeting House, Carlton Hill.

Leeds. They will not be ready until probably March. In the meantime the old Leeds studio is being used.

London Wouldn't Wait!

I must give Savoy Hill a rap over the knuckles for a recent action which annoyed many listeners in the North. A splendid relay of "Cavalleria Rusticana" from Hanley (performed by the North Staffordshire Choral Society) over-ran its time by a few minutes and at the end North Regional listeners were switched over to London, into the middle of the news bulletin.

The North has to wait for London when the latter exceeds its time table; why should London not wait for the North? Sometimes the London end of the B.B.C. seems to have a swollen notion of its own importance.

Change from batteries to mains

BUT CHANGE WITH REGENTONE



Experts say

Many prominent set manufacturers, whose only concern is the performance of their sets, consistently specify Regentone Mains Units. They insist on Regentone because they are, without doubt, the finest in mains radio to-day; because they are absolutely reliable and trouble-free; because they are made by specialists in mains radio since 1924. Experts realise the value of specialisation and expert knowledge!

Read what they say: "In every instance the results obtained are entirely satisfactory... we are regularly recommending them to our customers." "Volume was noticeably greater than when using an ordinary H.T. Battery—and the quality was better." "Regentone Units constitute a distinct challenge to the H.T. Battery in point of initial cost." "The reception, both for home and foreign stations, was commendably free from hum and 'mush.'"

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The Radio-Gram of the Future

IN no technical matter is it more fascinating to endeavour to take a peep into the future than it is in the matter of the radio-gram. Few of us are unable to recall clearly the time when the radio-gram was not; and when the old-time acoustical gramophone was more or less looked down upon on all sides as a raucous noise-generator.

All this sort of attitude, of course, has changed since the improvements which have come about in the art and science of gramophonics during recent years, and, most particularly, since the advent of the radio-gram.

Imminent Improvements.

Yet, gramophones, and even radio-grams still have their critics. As the latter people insistently point out, modern record-playing instruments, although they have reached a very high degree of perfection, are still deficient in one respect. The records which they use are not long-lasting enough. By that I mean, of course, that their playing time is too short, although, even so far as actual durability goes, there is no doubt that there is still room for improvement.

Now that the radio-gram and its acoustical confrere have reached such a high and truly excellent degree of tonal performance, there is going on an eager search for what may be termed refinements in radio-gramophony.

Thus we have the electrically driven motor which obviates the bugbear of

1910—1912



The type of gramophone which was popular in pre-War days.

By J. F. CORRIGAN.
M.Sc. A.I.C.

In the last year or two electric gramophones have gone ahead in leaps and bounds. And in this fascinating article our contributor tells you in a most delightful and interesting manner what he thinks the Radio-Gram of the future will be like.

winding up. Strangely enough, the electric motor was used in the very early days of Edison's original phonographs, but, owing to the necessity of having to work it off storage batteries, it was given up as soon as a reliable clockwork motor was perfected.

Needles which play many records without wearing too much are common articles nowadays, and radio-grams embodying ingenious mechanisms for record changing and selecting are becoming almost daily more in evidence.

Such improvements and refinements, however, are not in the nature of radical changes in gramophone and radio-gram design. Nor are the many suggestions toward the production of long-playing records which have been put forward ever since Mr. Pemberton Billing, in 1919, took out several patents for a long-playing record.

Runs for an Hour!

There is no doubt whatever that the radio-gram of the future—for acoustical reproduction will entirely give way to electrical playing sooner or later—will be one which will play for an hour without needing attention.

You will be able to obtain huge chunks of opera on a record. Two records will be able to hold an entire Shakespeare play or a modern revue, whilst a long orchestral Symphony in three movements will be able to be stored away very comfortably without at all straining the capacity of one record.

Such, I imagine, will be the state of affairs in the world of radio-gramophony in, say, twenty years' time. And that, of course, is not taking into consideration the close conjunction which is bound to be made very shortly between the home cinema and the radio-gram.

Very little imagination is needed to visualise the above statements. Already the material, the knowledge, and the means for effecting them are at hand. It is only a question, more or less, of who is going to be the first to begin.

There seems to be little doubt that the record of the present day—the composition disc—will go. Perhaps, of course, it may

not, if only in view of the enormous amount of capital which has been sunk in the manufacture of these discs.

In such an instance, the radio-gram of the future will be a combination affair—one which is able to play the short disc records by means of a needle and pick-up, and, also, the long-playing celluloid ribbon records—for such the future records will be.

Films Instead of Records.

The purely long-playing radio-gram of the future will be different in appearance from the present-day article, though, doubtless, attachments will be made available in order to convert the older radio-grams into the long-playing models.

Imagine a machine which comprises, in its essentials, a box provided with a slit over which passes at an even rate a narrow celluloid film, something like the present-day "Baby" Pathé film. The box contains

(Continued on page 624.)

A MODERN MODEL

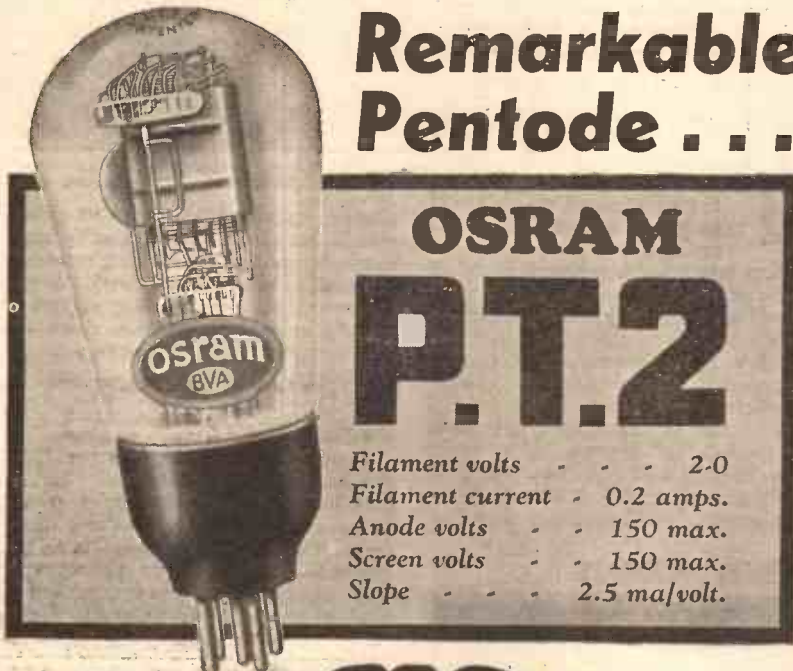


A modern radio-gram bears little resemblance to the older type of gramophone. This is one of the latest H.M.V. models.

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If your H.T. Battery is 100 volts, the H.T. consumption is only 4 m.a. If you have 150 volts H.T., you will get more power output and the H.T. consumption will still be only 6 m.a.

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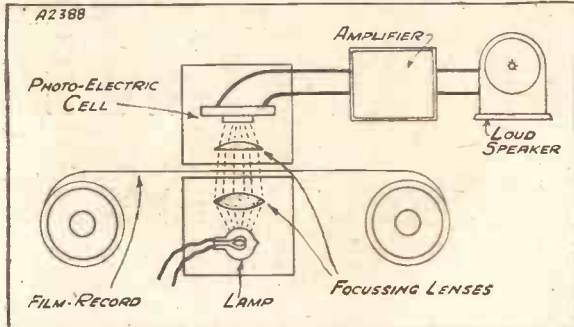
THE RADIO-GRAM OF THE FUTURE.

(Continued from page 622.)

an electric bulb, the light from which is focused upon the slit over which the film is drawn. After passing through the narrow film, the light is made to impinge upon a photo-electric cell, suitably connected up to an amplifying circuit.

The film contains the sound record, which is photographically made upon it, as is the case with the present-day talking films.

FILMS MAY REPLACE DISCS



By recording the sound on a film photographically and reproducing it in a loud speaker, with the aid of a photo-electric cell and amplifier, it would be possible to have an hour or more of uninterrupted entertainment without the bother of changing records.

The variation in the light falling upon the photo-electric cell sets up fluctuations of current in the circuit.

How It Will Work.

These current pulsations, after amplification, are then passed on to a loudspeaker circuit, and so reproduction of the sound photographed on the film is effected. Such, therefore, seems to be the state of things which will happen in the radio-gram world of the future.

Now, a film of a few hundred feet would run for at least a quarter of an hour or twenty minutes, thus, at one step, increasing the playing time of the radio-gram very considerably.

But this is not all. There is no reason why one narrow film should not contain at least four separate sound tracks. It would require some type of self-reversing mechanism, such as is given to a typewriter ribbon. Under these conditions, the film, after being wound by an electric motor from one reel, past the light-slot of the machine, on to the opposite reel, will automatically begin to move in the opposite direction, and, also, it will be made to shift slightly in position so that the second sound-track on the film falls into position over the light-slot.

All these movements could be made to take place in an instant of time, and, if the recorded material were suitably arranged, no break in the continuity of the reproduced matter would be apparent.

Light-Cell Control.

A film of this nature would move in front of the light-slot four times before finally coming to an end, thus giving rise to a record which would play continuously for about an hour.

The films would not be expensive, and, if you were content with a shorter-playing film-record carrying only one sound track you would be able to make it yourself by means of a specially-constructed camera which focused the light rays from a delicate mirror vibrating under the influence of the sound waves on to the moving film as it passed through the camera. You would then pass this exposed film in to your local dealer for development just as you do an ordinary still-picture film of the present day.

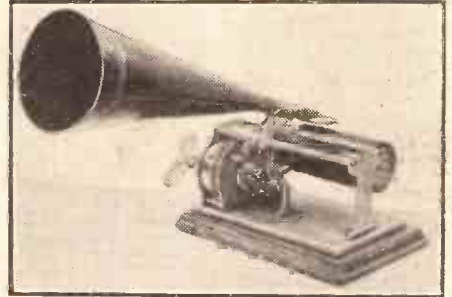
The film-records will be more durable than the present-day disc ones. Surface scratch will, of course, become a thing of the past, and, what is more, the vexed problem of record storage will be abolished once and for all because such diminutive film-records will take up very little room indeed.

"But Not This Week!"

Such is going to be the radio-gram of the future, although, commercially, as yet, there are no signs of its arrival.

In the near future, that is to say, during the next four, five, or six years, the cry for longer-playing records will be met by the companies by the production of cheaper,

ONE OF THE "ANCIENTS"!



An old phonograph dating back to the last century. It was manufactured under Edison's patents.

simpler and more "fool-proof" automatic record-changing machines, and by improvements in the methods of disc recording, in virtue of which these articles will be given a longer playing time. For, as we have already mentioned, far too much capital has been sunk in the production of present-day records for all the vast and complicated plant to be scrapped as useless.

The Disc is Doomed.

Taking the long view, however, the composition disc record is doomed. Its decease may be a matter of twenty, or even more years ahead. Maybe, perhaps, the disc record will never completely die as the old cylindrical record of the phonograph has done, but in the years to come it will face a competitor which will appear to start with all the advantages.

BROADCASTING A BUDDHIST SERVICE



Japan has owned and operated broadcasting stations for some years now, and seems to have taken to it like a duck does to water. Religious programmes occupy a considerable amount of the time, and this photograph was taken during the broadcasting of a Buddhist service.

VENEERING WITH MATCH BOXES

Have you tried this?

HAVE you ever tried veneering with the sides of match boxes? The wooden types of these containers are quite useful sometimes, especially as there is a tendency nowadays to patternise, which, in effect, is very pleasing.

Any paper adhering to the wood after breaking can be peeled off when the squares are soaked, as they must be. After soaking place between blotting paper in two flat pieces of soft wood, and clamp or weight it down. This will flatten the crinkly surfaces and at the same time dry out the moisture.

Any inlaid pattern must be determined and pencilled on the foundation; the squares cut to size and shape before being fixed with glue or gum. Match sticks will be found useful; and any shadowgraph picture can be introduced into the design.—W. W.

EPOCH

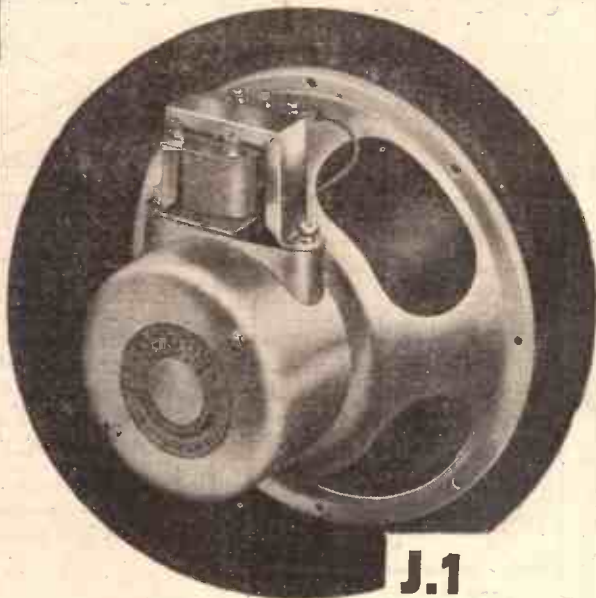
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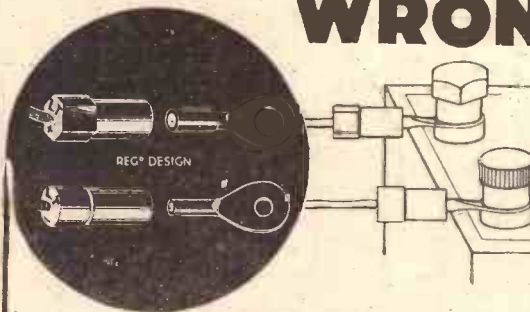
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The insulated connectors (lettered L.T.+ and L.T.-), attached permanently to the wires from the set, have different sized sockets and cannot be plugged on the wrong eye. Further, the positive is red and hexagonal, to conform in shape with the positive terminals in certain accumulators, while the negative is blue and round. Thus under no circumstances, deliberately or accidentally, can a wrong connection be made.

Being completely insulated, even when disconnected, the connectors cannot blow your valves by touching H.T. sockets or wires. The insulators have vaseline-filled cavities to prevent acid creeping back to the wires from the set.

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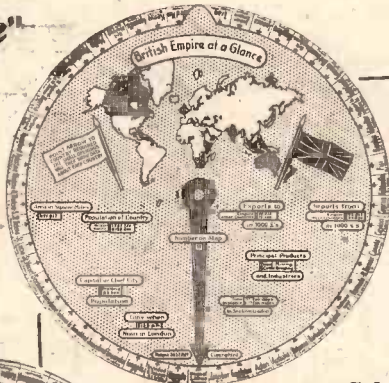
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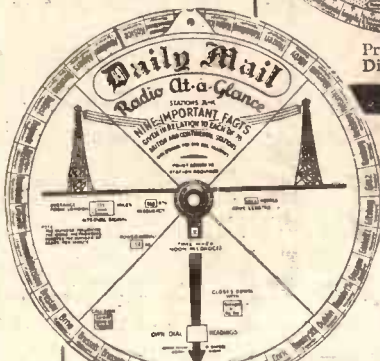
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THOSE METAL-COATED VALVES

DURING the last few months the leading British manufacturers have placed their latest development, metallised valves, upon the market.

The reader will easily understand that this development makes it possible for radical changes to be made in receiver design, and consequently they are able to offer single and multi high-frequency staged receivers at a cost much below that which was possible in this country before.

It is possible now to obtain from all makers metal-coated valves not only of the S.G. type but high-slope detector valves as well, which are considerably less microphonic than the standard detector valves. This is a distinct advantage, particularly in the portable and transportable type sets, which are flooding the market at the present time. As no doubt many readers have discovered due to the close proximity of the speaker to the detector and sometimes H.F. valves, an unpleasant ring can be set up in the speaker.

The Coating's Connection.

A few years ago a special detector valve was issued by a British valve-maker in which the entire valve was enclosed in an additional envelope to reduce the effect on a valve when the speaker was placed too close to it.

I always understood that it was very satisfactory and the only disadvantage was the size. This idea of course is fundamentally the same as a metal-coated valve.

The metal-coated valve, as we know it to-day, consists of a fairly heavy coating of zinc applied automatically by a special spraying machine.

If you carefully examine a treated valve you will be able to see that a length of fine gauge copper wire is wound around the base of the bulb, of course before the spraying takes place, and is joined to the negative side of the filament in the case of a battery-operated valve, and to the cathode in the mains valves.

Self-Screening.

This simply forms a very effective screen and in addition to this a decided decrease in the anode-grid capacity is brought about, of course being more prominent in the S.G. type.

I have for some time now been testing some of these valves in a 6-valve super-het. and I find that not only is the set more stable and easier to handle but that the original background usual with a set of this type has been greatly reduced.

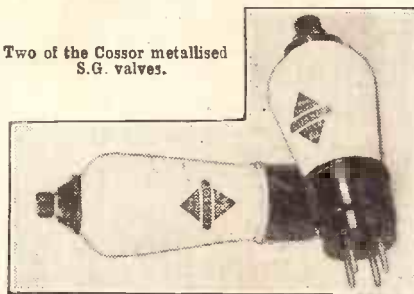
You have probably seen those new S.G. valves with sprayed metal covering their bulbs, and may, indeed, have used them. In the latter case you will be particularly interested in the following informative article by a special correspondent, who shows that they are much more than mere "stunts."

At the present time, when everyone appears to be saving what money they have, the average amateur is only interested in the S.G. valve as it will enable him to increase the efficiency of his receiver without entailing much extra expenditure.

Of course it must be realised that the use of these valves does not mean that all screening can now be dispensed with, far from it; but it will be found that when using a receiver that is slightly unstable at only certain frequencies, the use of these valves will in most cases cure the trouble.

As an example, take an ordinary 4-valve set employing two S.G. high-frequency

Two of the Cossor metallised S.G. valves.



stages and det. and pentode in the conventional manner.

Sometimes great trouble is found in obtaining complete stability even with the most complete screening, but the average amateur should be able to construct a receiver on the following lines without any trouble at all.

By simply using screened coils a metal baseboard and panel, together with metal-coated S.G. and detector valves, you are almost assured of complete success. Ganged condensers can of course be used as the coils can be purchased ready matched for you, and the condensers are nearly all supplied with trimmers. The entire cost is quite reasonable, as screening boxes, etc., are now dispensed with.

As no doubt the majority of my readers will endeavour to utilise these valves in their existing receivers, it would be just as well to give you not only all their good points but the little drawbacks as well, and some of the precautions you must be sure to take.

As I mentioned before, in all battery-operated valves the metal coating is joined to the negative side of the filament. (The makers, I hope, will mark their valves in some way.) And if the same side of the filament in your receiver is not earthed but joined to L.T. + you can clearly see that a direct short of your accumulator will result should the valve touch any earthed object such as a screen, etc.

Using S.G. Valves.

Also, if a resistance is in series with the fil. for use as a volume control, an accidental shorting to earth of the bulb will cause it to be completely cut out of circuit.

I notice in quite a number of cases that the connection to the anode of an S.G. valve consists of a stranded wire, and if only one strand should touch the bulb of the valve it will cause a very high positive potential to be applied to the filament, causing the breakdown, not only of the valve in question, but perhaps of the remainder of the valves in the receiver as well.

In the case of mains valves a different state of affairs exists.

The usual manner of obtaining free grid bias is by obtaining a potential drop across a resistance placed in series with the cathode return to earth.

The Bias Resistance.

If the screened grid valve is placed through a screen in the usual manner it will mean that the bias resistance would be short-circuited, due to the contact to earth obtained through the screen, and this would increase the plate current to a large extent, the amount of increase depending on the valve impedance, etc. This would also cause a big drop in anode volts, a loss of signal strength, and in some cases instability.

If this should happen in the case of a fairly low impedance valve used as a power grid detector, the drop in voltage due to this short-circuit would be so disastrous as to cause nearly a total stoppage of reception due to the very heavy increase in plate current.



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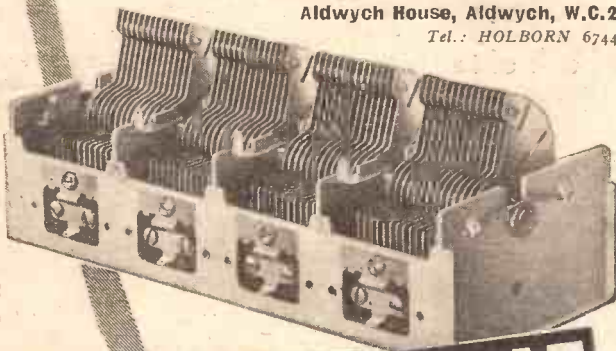
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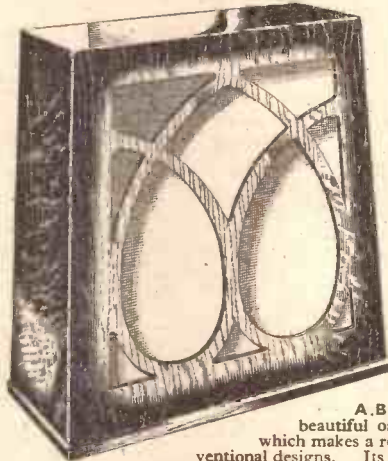
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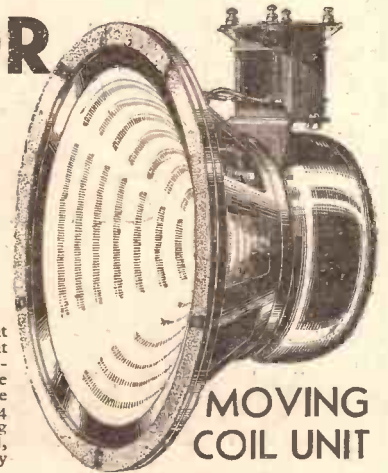
A.B.4.—The modern lines of this beautiful oak cabinet have a severity which makes a refreshing change from conventional designs. Its handsome exterior houses a highly efficient speaker—a balanced armature model with provision for matching to power or pentode outputs. Fifty shillings is indeed a small price for such volume and crisp reproduction. Same model in Walnut 59/6.

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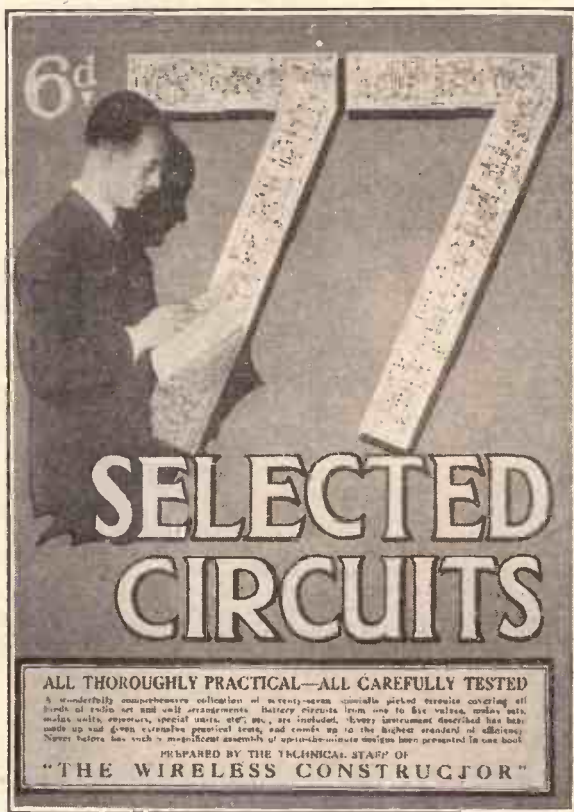
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The constructional articles which appear from time to time in this journal are the outcome of research and experimental work carried out with a view to improving the technique of wireless reception. As much of the information given in the columns of this paper concerns the most recent developments in the radio world, some of the arrangements and specialities described may be the subject 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

"AVERAGE NEGATIVE G.B. VOLTAGE."

S. J. (Charlton).—"The particulars supplied with the valve have become partly obliterated from the slip by accident, and although G.B. negative is given as 60 volts (for 300 volts H.T.) it says "average negative G.B. volts" above that figure, instead of definitely giving the 60 volts as the G.B. to use.

"Does this mean 60 volts is not necessarily correct for 300 H.T.?"

At these high figures of H.T. and G.B. the best grid bias cannot always be stated to a volt or so, and the makers, therefore, give an "average negative grid bias" value, which will serve as a guide. The correct way to arrive at the exact figure for the particular valve in question is to apply the average G.B. volts (in this case 60) and the H.T. named (in this case 300) and then note the steadiness of the plate current with a milliammeter.

If it kicks up a little higher than the steady anode current figure for this H.T. voltage, then a slight decrease of G.B. (say to 57 volts) which will steady the kicks should be tried.

Conversely, if the anode current kicks down to a lower value, grid bias may safely be increased a few

volts, the idea being that the governing factor should be in which direction the needle kicks on loud passages. If it is equal in both directions, the grid bias is right, but the valve is being overloaded.

You will, of course, remember that on no account should the G.B. plugs be varied whilst the set is "on." Always switch off first, if you value your valve.

CAUSES OF FLAT TUNING.

W. R. (Winton).—"What I cannot make out is why my tuning is so flat compared with my friend's, who uses the same 2-valve circuit. It is rather disappointing as it was partly because his was so good that I got mine, and now he admits that his own is much better.

(Continued on page 634.)

WHAT'S THE MATTER WITH THE SET?

Perhaps the 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 an unrivalled service.

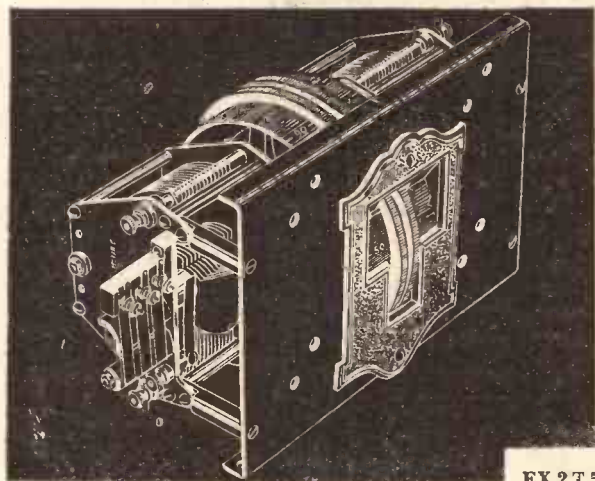
Full details, including scale of charges, can be obtained direct from the Technical Query Dept., POPULAR WIRELESS, The Fleetway House, Farringdon Street, London, E.C.4.

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.

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CYLDON make the Extenser Model of the Dual-Ranger possible and CYLDON alone will do when building this set. CYLDON features include super-rigid four pillar construction, perfectly timed wave-change, noiseless wipe contacts and insulated commutators. As with all CYLDON Condensers, EX 2T5 is made from the finest raw materials obtainable and is tested over every stage of manufacture and assembly. Those who know Extensers insist on CYLDON — built with a precision that lasts.

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RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 632.)

"What is likely to be the cause of such poor selectivity?"

Your selectivity may be affected by several factors the chief of which are outlined below:

First of all, there is the question of coils. Cheap and inefficient coils are one of the most fruitful causes of poor selectivity. They are really very false economy, if your conditions are such as to require a high degree of selectivity.

Really good coils are well worth while and have a great influence on the general efficiency of a receiver. There are a certain number of specimens on the market, made of very low-grade moulded material, which introduce very considerable H.F. losses into the circuit.

These, we have found, are definitely quite capable of reducing the overall selectivity very considerably, and a little care should be exercised here. See that your coil sockets are of really good quality.

The aerial and earth in use are also very potent factors in deciding the degree of selectivity which you will obtain, and it cannot be emphasised too much that a very large aerial is really a hopeless proposition under modern conditions of crowded wavelengths.

Effect of Inefficient Aerial,

Do not forget, too, that an inefficient aerial can spoil your selectivity just as effectively as a very large one, so if you have any cause to think that something is preventing you from getting the results you expect, take a look at your aerial and ask yourself whether its efficiency is being spoiled by being run too close to walls, iron fall pipes or gutters, and so on.

Above all, remember that it is a most undesirable practice to take your aerial lead-in for any very considerable distance indoors, particularly if that means taking it along walls, and do not yield to the temptation to use twisted flex for the aerial and earth leads indoors. Always keep them well separated from one another, and if you use any form of earthing switch, be sure that it is satisfactory from the H.F. point of view.

A good earth is a pretty obvious requirement in the interests of selectivity and general efficiency, but nevertheless, it is a point which many people seem to forget. A poor, high-resistance earth, a long earth lead, or an earth lead of too thin a gauge of wire

is one of those things which you can depend upon to spoil your results with complete certainty, and this is one of the first questions you should go into if you feel that your selectivity is not up to scratch.

A connection to a doubtful sort of gas-pipe, a single small earth-pin in dry earth, and so on, is definitely not good enough if you desire to get the best possible selectivity of which your receiver is capable. What you want is a short and direct lead to a water-pipe, with a good sound connection thereto, a good-sized earth-pin in damp soil, or one or other of the well-known schemes for obtaining a really low-resistance earth connection.

CONNECTIONS FOR THE "COMET" THREE

T. W. T. (Wantage, Berks).—"I am very disappointed to discover that the blue print of the 'Comet' Three is now 'out of print.'

TECHNICAL TWISTERS

No. 87.—ACCUMULATOR ACID.

CAN YOU FILL IN THE MISSING LETTERS?

The liquid of the ordinary accumulator is a solution of acid.

In use the "strength" or of the liquid decreases, and after a time must be made good by recharging.

An inexpensive and useful means of checking the condition of the liquid—and thus of the cell—is to measure the specific gravity of the electrolyte by means of a

Last week's missing words (in order) were Pole, pole, Zinc, zinc, Electrons.

To help me with a partly-finished 'Comet' can you give the connections of that set in words?"

The connections are given below, as requested. Aerial terminal to one side of the .001-mfd. compression condenser. Its other terminal to "A" on the "P.W." Dual-Range Coil.

The other connections from this coil unit are: "G" terminal to the .0003 grid condenser, and to the .0005 tuning condenser (fixed vanes). "R" terminal to one set of fixed vanes of differential reaction condenser.

"S2" terminal to one contact of the (3-point) wave-change switch.

"S1" terminal to another contact on this, to the moving vanes of the .0005 tuning condenser, and to one side of the .002-mfd. compression condenser.

"S3" terminal to the other side of this .002 condenser, to remaining contact on wave-change switch to Earth, to the other fixed vanes of the differential condenser, to one filament socket on each valve holder, to one side of the 2-mfd. condenser, to G.B. plus, to H.T. neg, and to L.T. neg.

The L.T. Switch Wiring.

Grid terminal of detector valve holder to the grid leak and to the other side of the grid condenser. Plate terminal of detector to the moving vanes of the differential and to the 10,000-ohm "spaghetti."

The remaining filament terminal of the first valve holder (detector) goes to the remaining end of the grid leak, to the remaining filament terminals on V2 and V3, and to one side of the on-off switch. The other side of this switch goes to L.T. +.

The "P" terminal of the first L.F. transformer is joined to remaining side of 10,000-ohm "spaghetti" resistance. H.T. + terminal on this transformer goes to the remaining terminal of the 2-mfd. condenser and to one side of the 25,000-ohms spaghetti resistance.

H.T. +1 terminal is joined to the other end of this 25,000-ohm resistance. There are two remaining terminals on the first L.F. transformer, namely "G" and "G.B." "G" goes to grid terminal of 2nd valve holder, and "G.B." by a flex, to the G.B.1 plug (black).

Should there be an extra "Earth" terminal on this transformer it may be connected to earth, though often this is unnecessary.

The "Plate" terminal of V2 (the first L.F. valve) goes to the "P" terminal on the 2nd L.F. transformer. "H.T.2" terminal goes to "H.T." on this transformer, and also to L.S. +.

"G" terminal on the 2nd L.F. transformer goes to the grid terminal of V3 valve holder, and "G.B." (Continued on page 636.)

What's inside a FULLER 'SUPER' battery?

A dry battery is still a mystery to most wireless enthusiasts. Yet it plays a most important part in reception. That is why Fuller's have devoted all their energies and resources to improving dry batteries. They have recently installed entirely new automatic manufacturing and testing machinery. They have standardised every component part, every process of manufacture. Here you see the zinc cans, with the 'dolly' being prepared for sealing up—each perfect—identical in size, weight and latent energy. This uniformity and regularity of manufacture gives a dry battery infinitely superior to the hand-made type. Fit a Fuller 'Super' and your wireless will take a new lease of life. Full list of other types and sizes on application.

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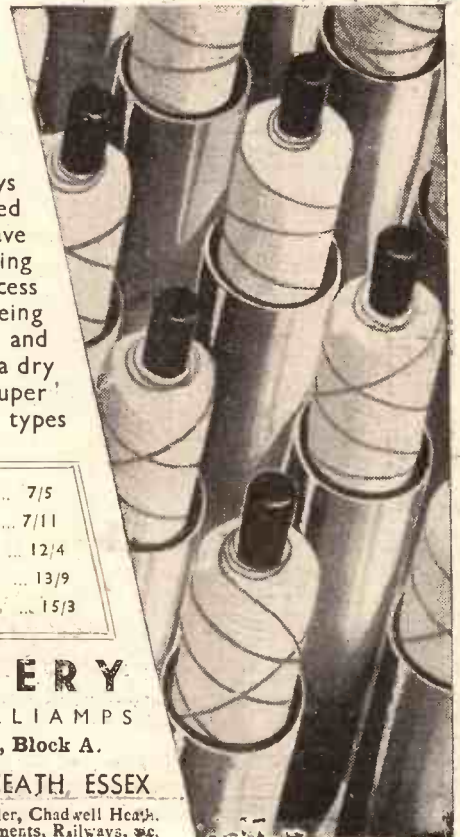
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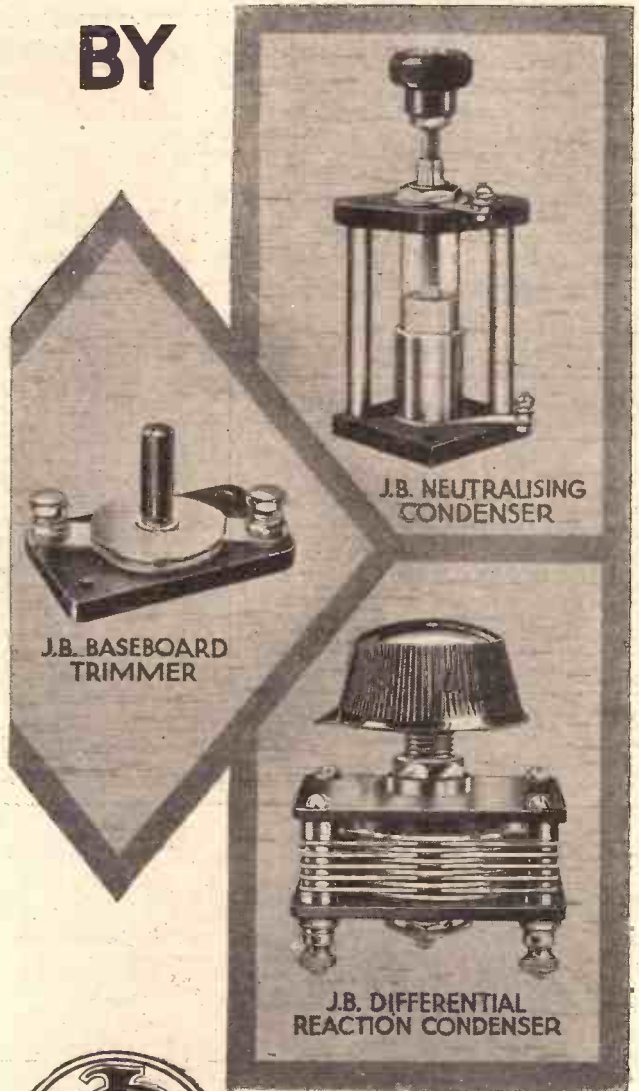
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J.B. BASEBOARD TRIMMER. Simple, compact and low in price. Once set, remains accurately adjusted. Ideal for gang trimming, aerial series condenser, or for trimming Super-heterodyne Intermediates. Ebonite base. Mica Insulation. .00005 or .0001 mfd., each **1/-**

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.0001, 4/- .00015, 4/- .0002, 4/3 .00025, 4/3 .0003, 4/6

NEW J.B. AIR-SPACED DIFFERENTIAL CONDENSER, similar in design to above, but with air dielectric instead of bakelite between its amply spaced vanes.
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Write for new catalogue.

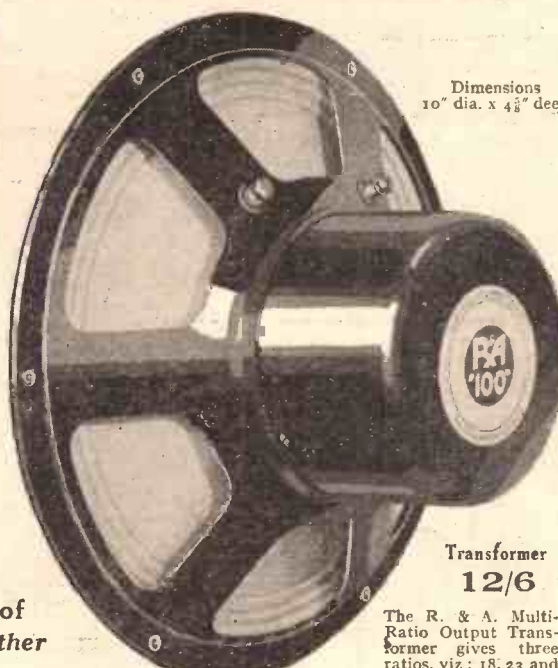
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Transformer
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The R. & A. Multi-Ratio Output Transformer gives three ratios, viz: 18, 23 and 32/1, sufficient to cover the whole range of power valves, including Pentodes. Primary inductance 12.5 henrys, leakage inductance 2.3%.



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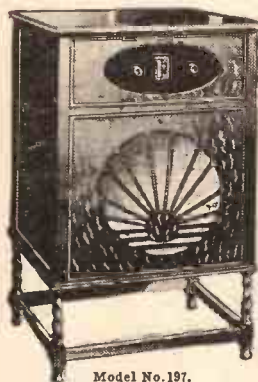
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Model No. 197.



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RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 636.)

This should be quite sufficient for a simple set situated well away from the broadcasting aerial, as you are.

MAKING UP THE "CONTRADYNE" THREE FOR RADIO-GRAM.

"CONSTANT READER" (Near Paisley).—"I am anxious to make my 'Contradyne' Three up for radio-gram. What is the exact wiring for the same, and what components are required?"

"I have built almost all the three-valve sets put up by 'P.W.', but always return to the 'Contradyne' Three and have the best results. Thanking you and wishing 'P.W.' all success."

You will find it quite easy to convert the "Contradyne" Three to radio-gram. The parts required will be just a single-pole-double-throw type switch and a small grid-bias battery (apart from the gramophone pick-up itself, etc., of course), and the necessary wire.

A good place for the new switch would be on the panel near S2. The leads to this new switch must be kept as short as possible, and arranged as follows:

First disconnect both the grid leak G.L.1 and the condenser C3 from the grid terminal of V1 valve holder.

Next join the vacant terminals on leak and condenser together, and also by a short straight wire to one of the "outer" contacts on the switch.

THE ACTION OF THE SWITCH.

If you examine the switch's action you will see that one terminal is *always* in use, and the other two are joined in turn to it, according to how the switch is operated. These two occasionally-used terminals are the "outer" ones, and either of them can be joined up as above.

The remaining "outer" terminal is then connected to one pick-up terminal. The other terminal on the pick-up goes by a short flexible lead and black plug to a 1½ v. or 3 v. tapping on the grid bias battery. The + end of this battery is connected to "earth" on the set (or to any lead which is joined to earth, such as L.T. -), by means of a flex lead and red plug.

The other connection is from the G terminal of the valve holder V1 to the remaining switch contact.

In the one position you restore the set exactly as before, for radio, and in the other position you are ready for the electrical reproduction of gramophone records.

BOTH WAVE-BANDS WITHOUT SWITCHING.

M. A. (Coalville).—"I want to do away with the wave-change switch on the 'Contradyne' Three, if this is possible, by using an Extenser, covering both long and medium waves as before.

The stop-by-step process is as follows:

Take out the present tuning condenser and put in an Extenser, wiring to "fixed" and "moving" leads, as before. Take out the wave-change switch, which now has three wires or connecting points going to it.

One of these, from S₂, must in future go to one self-changer contact on the Extenser. Another of these (from S₂, C₂, etc.) goes to another self-changer contact on the Extenser.

The third wave-change switch contact was connected to S₁, to C₂'s other terminal and to moving vanes, so leaving all these points connected together

YOUR LAST CHANCE!

The demand for the November issue of

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has been enormous, and by the time these words appear it may be sold right out in many areas. If you have not secured your copy yet, buy the first one you see on a bookstall or at a newsagents and so make sure of your

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NOVEMBER MODERN WIRELESS
PRICE ONE SHILLING.

"What would the wiring be for this, and do you consider it is a worth-while alteration?"

Certainly. If you want to do away with the necessity for wave-change switches there is only one way worth mentioning—the Extenser, every time.

It is very easy to change over, too. All that you do is to take out the wave-change switch and "carry on" its wiring to the self-changer contacts on the Extenser.

you join them to the third wave-change contact on the Extenser, and the job's done.

You see the idea? Simply leave the wiring as it was before, but take out the wave-change switch and take the three lots of leads going to it to three different self-changer contacts on the Extenser.

(By the way, some Extensers have an arrangement by which their moving vanes can be insulated from the condenser spindle, if desired, but for your purpose this is unnecessary.)

Turn your back on HUMDRUM Radio



MoToR Chassis Assembly, C88 **43/6**
Unit only, Type S8 **23/6**



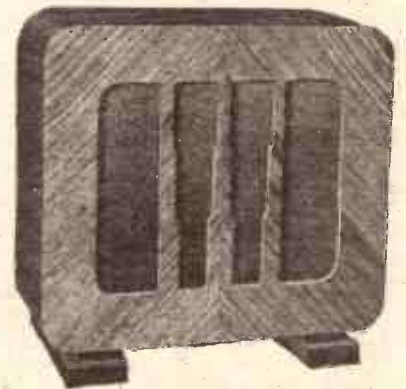
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FOR THE LISTENER

(Continued from page 606.)

powered stations. Most of us are poor. We cannot afford to scrap our sets and buy more expensive ones; or to buy gadget after gadget which may or may not keep the chattering universe out of our loudspeaker.

When listening was a novelty, what we wanted was to get more and more stations in; but now that the novelty has worn off, and we are settling down to a regular enjoyment, what we want is to keep more and more stations out. Many listeners no doubt still want to experiment, and to reach into the four corners of the world; but the vast majority of listeners chiefly wish to be allowed to listen to their home station in peace. The engineers are threatening that peace.

Roxy's Radio City.

What seems to be required is a sort of Trades Union of Listeners, able to effect a general strike. If we all gave up listening for a year—and we used to be quite tolerably happy without it—where would the engineers be?

And now, as if the complication in Europe were not enough, America is determined to go in for what will doubtless be called super-Radio, and boss the world. An amusing fellow was over here the other day.

By the pet name of "Roxy." He is going to build a Radio City in New York, with Mr. Rockefeller's money—fifty millions of it! The city will be built on twelve acres of ground, sixty-eight storeys high—higher than the Tower of Babel; indeed, almost as high as Jacob's Ladder!

Roxy will have sixty-eight storeys of studios, to say nothing of cinema, opera-house, theatre, and television, with a wave-band as broad as the equator itself, and a transmitter capable of heterodyning creation!

So that one day we shall be able to hear nothing but America and the N.B.C., and by television to see Roxy standing like a deity at the centre of the universe, controlling the noise effects. Some boss, what?

"Mill Acre."

We have let loose a monster in the world—this Radio; and for the moment we can't control it. There is some obstinate pig-headedness somewhere. Meanwhile you and I suffer, and pay our licences like lambs.

Once upon a time, somewhere in Germany, there was a little miller who had a little mill where he ground his corn, and an acre of land which he husbanded. It was a pleasant place, full of pleasant sounds, the noise of the mill-stream, and the mill-wheel turning, and the miller singing at his work.

In course of time, they built a town there and called it Mill Acre, after the mill and the miller's plot. It has now become that accursed thing known to London Regional listeners as Mühlacker—which is German for Mill Acre; and there are moments when, listening with extreme irritation, I wish the miller had never been born!

And, from all I hear, it is going to be worse before it is better!

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TECHNICAL NOTES

Some diverse and informative jottings about interesting aspects of radio reception.

By Dr. J. H. T. ROBERTS, F. Inst.P.

Calibrating the Set.

It is often a great convenience to make some sort of calibration of your set so that you have a fairly good idea whereabouts on the dial to tune-in any particular station you want more or less at a moment's notice. As a matter of fact, even though no conscious efforts are made in this direction, most people unconsciously make a mental note of the dial positions of different stations.

This is, however, not quite good enough because it does not mean anything in terms of wavelengths or kilocycles. What you want to know is the approximate position of a station on your dial when you know its wavelength or frequency.

One method of doing this is to plot out a chart to which you can make reference, whilst another method is to note the dial readings for particular stations, noting also, either mentally or on paper, the wavelengths of these stations; in the latter case you will easily be able to make a more or less accurate guess at the tuning position for a station the wavelength of which is intermediate between two stations, the positions of which are known.

Upsetting Tuning.

If you have all this nicely planned out, and by any chance you have to make an alteration in the set—such as changing a valve—you may find that the calibration has all gone a little bit wrong.

If you like to make an accurate test for the shift in the tuning position for one particular station, then you get an estimate of the amount which has to be added to or subtracted from all the other readings, although unfortunately the actual amount is not constant, but will vary at different parts of the scale.

If, however, you rely upon your memory for the tuning positions, it is a nuisance to have to rearrange these things in your mind; it becomes rather like the landlady's clock from which, as you remember, it was quite easy to tell the time, because when the fingers were pointing to twenty past seven it struck three, and then you knew it was ten minutes past eleven.

A Simple Correction.

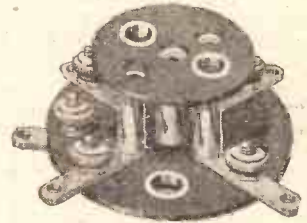
You can, however, by a very simple arrangement "neutralise" or compensate the slight change in circuit conditions by the use of an additional small condenser connected in parallel with the tuning condenser.

If the change in the calibration amounted to a definite shift, constant for all parts of the scale, this little dodge would be a complete solution of the difficulty. As I say, however, the amount of the correction varies at different parts of the scale and therefore the addition of a small fixed condenser shunted across the tuning condenser is only in the nature of a compromise, but at the same

(Continued on next page.)

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TECHNICAL NOTES

(Continued from previous page.)

time, assuming the actual correction to be quite small, it will be found reasonably satisfactory.

All you have to do is to take any station of known tuning position, tune the set to the old position and then adjust the small balancing condenser until it brings the station in at full strength.

Performance of Units.

I have lately been testing some H.T. units, particularly with regard to the way in which the output voltage depends upon the output current. I think this is a very important point to be observed if you intend going in for a unit, because unless the internal arrangements are sufficiently generously proportioned, you may get a nice terminal voltage on "no load," but this drops down much too seriously when the unit is in operation on the set.

In view of the internal resistance of the unit (unlike an H.T. accumulator battery) you are bound, of course, to get a certain appreciable drop in the output voltage according to the current drawn from the instrument.

This is quite understandable, but if the transformer is designed to have reasonably good "regulation," and there is not too much resistance used in the voltage divider (where this is the method adopted), then you should be able to tap off all the milliamps reasonably required without the output voltage falling below the required value.

Standing Up to Load.

As an example, I may perhaps mention one particular unit which gave quite a good performance. This unit has output tappings for detector and screening grid voltages and another for the maximum voltage of the unit for supplying the anode of the power valve.

In the particular case in question the first two voltages were rated at 60 and 80, on the assumption that the average detector load would be about four milliamps and the current to the screening grid about two milliamps.

When there was no load on the unit the maximum voltage on the highest tap was just over 240 volts. When the appropriate loads were thrown upon the detector and screened grid tappings it was possible to take off over 20 milliamps from the power tapping and this tapping still stood up to a voltage of about 140 volts.

So that with this arrangement you would be able to get ample power for the average case and still draw proper voltages for your screen-grid and detector stages. This I regard as a very satisfactory performance.

At the same time, I have tested one or two inferior units in which the voltages just went all to pieces as soon as any decent sort of load was put on.

Study the Rating.

Most reputable manufacturers now give definite ratings for the output voltages at different loads, and you would be well advised to study these very carefully, particularly in relation to your set, before making your decision in the matter of buying a mains unit. It may be that the output of the unit is beyond your requirements, in which case you will be able to satisfy all your needs with a unit at a lower price.

(Continued on next page.)

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TECHNICAL NOTES.

(Continued from previous page.)

Improving Selectivity.

If you add an extra stage of H.F. amplification to your set in the hope of increasing selectivity, you will, as a rule, be disappointed; generally, the extra selectivity obtained from an additional tuning stage is not so marked as you might have expected. A better way of improving selectivity is to use a bandpass filter which consists, in principle, of an additional tuning circuit in the aerial system.

When using a bandpass filter the signal has to pass as it were through two refining processes before it reaches the first valve, and it is clear that whereas unwanted signals may get through the first circuit, they are less likely to get through both. A very simple illustration of the arrangement of two tuned circuits is to compare it to a combination lock.

You may get the first figure right or the second figure, but neither of these is any use unless you get them both right. Of course, in the case of two tuned circuits the effect is not so marked and precise as it is with a combination lock (it would be very nice if it were), but the principle is somewhat similar.

Cutting Down Background.

Another point which is of particular importance is the question of shock excitation. It is impossible to avoid this type of excitation, but when we have two tuned circuits there is very little of the shock likely to be imparted to the second, most of it being taken by the first circuit. The effect of all this is that unwanted "background" is very much reduced.

A further important feature of bandpass tuning is that you get what is known as "flat topped" tuning. This is due to the fact that there is a certain amount of coupling between the circuits, which you do not get with an ordinary H.F. stage, and the result is that the loss of the higher frequencies, which is such a common feature of highly selective circuits, is very largely avoided.

Using Ganged Condensers.

In using a set with ordinary bandpass tuning it is important to make sure that both circuits are in tune; if a ganged condenser is used this condition will be arranged beforehand, but if you do not use the ganged condenser arrangement, then you want to pay particular attention to the tuning of the two circuits.

If there is too much reaction used, or if the coupling between the bandpass coils is too tight, the double tuning effect will probably become pronounced. This can be got over by slackening the coupling between the bandpass coils or by using less reaction.

Television Developments.

The most promising developments in television at the present time are due to a young American technician, Mr. P. T. Farnsworth, who is Technical Director of the Television Laboratories, California.

The principal feature of Mr. Farnsworth's invention is a special tube without moving parts, by which it is possible to achieve "electrical scanning" so that the light

(Continued on next page.)



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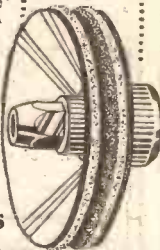
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TECHNICAL NOTES

(Continued from previous page.)

waves are converted into electric waves, these then being converted back into the appropriate image, whether this is in motion or stationary.

It is claimed that by this new tube television will very soon become a really practical proposition and, in fact, arrangements have been made for the transmission of television on this new scheme from a high-power transmitting station in New York.

One of the most important claims about this new television invention is that good images can be sent over the ether without using a frequency band any wider, or much wider, than is used for ordinary broadcasting. The fact that there are no mechanical parts means elimination of inertia so that the detail in the received picture for a definite allowance of frequency band is very much greater. It is said that on the Farnsworth system both pictures and sound can be transmitted on a wave-band of only 20 kilocycles.

A New Principle.

Many leading experts of the Federal Radio Commission and of various American University Departments have observed the results of this new television system and are very much impressed with its possibilities. They say that the principle involved is quite different from any single side-band television transmission, where the carrier and one side-band are suppressed at the transmitter and added at the receiver. In the Farnsworth process quite a narrow frequency band is used and this is achieved by distorting the signal on transmission and restoring it to its proper form at the receiving end.

It goes without saying that if by means of the Farnsworth invention it should prove possible to cut down substantially the frequency-band required for the transmission of proper detail in television pictures, then it is a most important step forward in the development of this new science.

Froth-Blowing!

Everyone knows that when an accumulator battery is on charge there is a very slight gassing or sizzling at the plates; if you put your ear very close to the open vent hole of the battery whilst it is on charge, you will hear this noise, very similar to the sound of fresh soda water in a tumbler. As the battery is further charged, however, it gasses much more freely until finally, when it is fully charged there is a rapid evolution of minute bubbles from all over the surfaces of the plates.

These bubbles, on reaching the surface of the acid, immediately break, so that you do not get any appreciable collection of bubbles on the top of the electrolyte. Sometimes, however, you will find a cell in which the bubbles persist and form themselves into a kind of froth on the top of the electrolyte, this froth, in fact, sometimes pushing its way out through the vent hole and flowing over the top of the container, very similar to the froth formed by stirring up soapy water.

Due to Impurities.

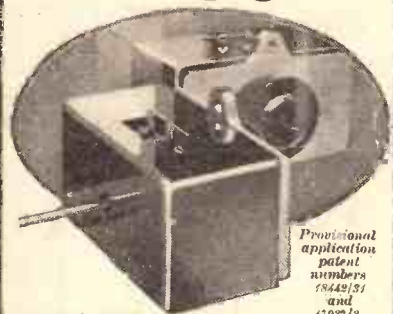
A healthy cell should not froth in this way and the froth is always a sign that there is some impurity in the electrolyte.

(Continued on next page.)

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TECHNICAL NOTES

(Continued from previous page.)

Sometimes the impurity is due to the use of ordinary water instead of distilled water, but it is also due sometimes to the use of unsuitable or inferior material for the container of the cell.

Glass, of course, is perfectly satisfactory from the chemical point of view, but cheap or unsuitable celluloid may sometimes cause endless trouble with frothing of the cell.

If you have this trouble in your batteries it is a good plan to empty out the electrolyte, to wash out the plates with distilled water, or with boiled water which has been allowed to cool, and then to fill up again with fresh electrolyte. If you are still troubled with the frothing it is most probably that this is due to impurities dissolved out by the electrolyte from the container or from the separators used between the plates.

Detector Damping.

It is not as a rule advisable to pull out the valves while the set is working, but I have known several cases, where howling sets in if the detector valve is removed, and this is something which you would not find out in the ordinary way unless you tried while the set was "on." I daresay a good many of you have noticed the same sort of thing; it is liable to happen more particularly where there is a stage (or stages) of low-frequency transformer-coupled amplification.

The howling is due to the feedback from the output valve, and generally arises owing to bad characteristics of the transformer. When the detector is in position it has a damping effect which masks the tendency to oscillation, or at any rate keeps the oscillation in check, whilst when the detector is taken away and this damping is no longer available, oscillation sets in.

You will bear in mind that the detector damping is connected across the winding of the transformer, and therefore it cuts down peaks in the curve in just the same way as damping does in other parts of the circuit.

Transformer Response Curve.

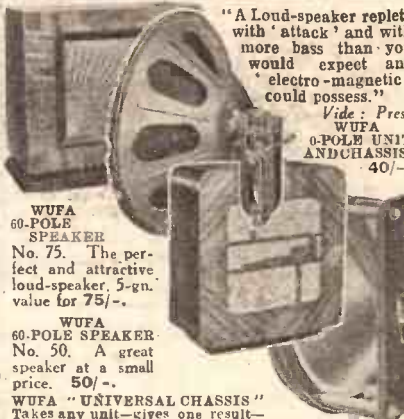
As a matter of fact, if you were to make careful tests upon the response curve of the transformer you would probably find—particularly in a case such as the above, where howling sets in when the detector is taken away—that there was a pronounced peak in the curve, and if you then applied damping, such as a resistance, across one of the windings of the transformer (it really doesn't matter very much which winding) you would find that this flattened out the curve considerably.

The tendency for the curve to be peaked is greater when there is a capacity across the secondary of the transformer. You will notice that when the output valve is in its place and the detector valve is removed, you have got exactly the right conditions for a peak in the curve, because you have the capacity across the output of the transformer whilst the damping due to the detector valve is absent.

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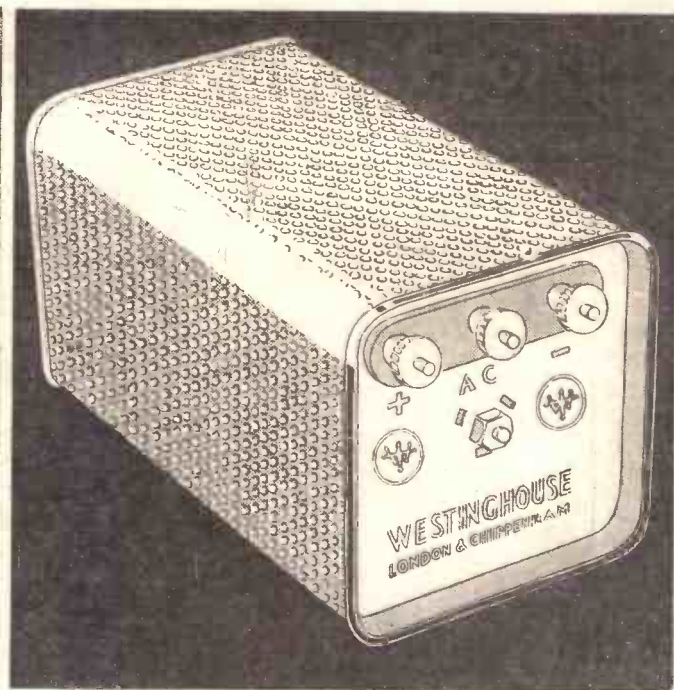
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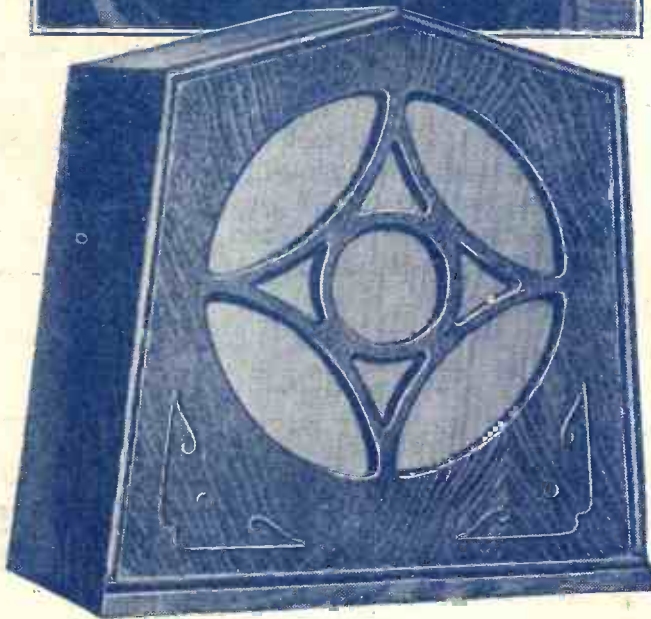
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