

LARGEST RADIO CIRCULATION IN THE WORLD

Popular Wireless

Every Thursday
PRICE
3d.

No. 510. Vol. XX.

INCORPORATING "WIRELESS"

March 12th, 1932.

FINDING THOSE FOREIGNERS

ON THE "COSMIC"

*In
this
Issue*



Build the **COSMIC STAR**
with a **READY RADIO** Blueprint Kit

See pages
1545,
1547.

Adv.

To Past, Present and Prospective Advertisers:—
FIGURES OF WHICH WE ARE PROUD

During the month of FEBRUARY
 "P.W." carried over 164 pages
 of paid advertising in addition to
 FIVE ADVT. PAGES in FREE BOOK—"501 Radio Questions Answered"
 —and ADVERTISER'S BLUE PRINT INSET throughout FEB. 20 issue

Our SALES for FEB. 13
 EXCEEDED

251,000

Our SALES for FEB. 20
 EXCEEDED

294,000

We greatly appreciate the following unsolicited testimony to the pulling power of "P.W."

READY RADIO LTD.
 Eastnor House Blackheath London S.E.3

Telephone
 LEE GREEN 5629
 (Private Exchange)

Director: F. T. PANKHURST
 IVER W. E. HUSTLER



Telegram: READYRAD, BLACKHEATH LONDON

Tuesday, 23rd February, 1932.

IWL/ED.

The Editor,
 "Popular Wireless",
 Tallis House,
 Tallis Street,
 London, E.C.4.

Dear Sir,

I think you may be interested to know that our experience this season has confirmed me in my belief in "Popular Wireless" as the most effective weekly advertising medium.

No doubt the fact that P.W.'s circulation holds the record has much to do with this, but I think due credit must be given to a bold Editorial policy and to the class of reader to whom the paper appeals.

The response to our advertising on the "Cosmic Star" Receiver has been sufficient in itself to establish the pre-eminence of "Popular Wireless" and the loyalty of its readers.

Yours faithfully,
 for READY RADIO LTD.

Iver W. E. Hustler
 (Iver W. E. Hustler),
 Managing Director.

TELEPHONE:
 TRIPLE DIAL 5125
 (Private Exchange)

STANDARD BATTERIES LIMITED
 WATER BATTERY PRODUCTS
 WATER BATTERY UNIT
 WATER BATTERY RECEIVER
 WATER BATTERY CHARGER
 WATER BATTERY TESTER
 WATER BATTERY BATTERY

BATTERY
 F. S. S. WATES
 M. E. WATES

Your Ref.
 Our Ref. FSW/EC.

STANDARD BATTERY COMPANY

184-188 SHAFTESBURY AVENUE
 LONDON W.C.2

INCORPORATING
 THE SHAFTESBURY
 RADIO CO.
 THE SHAFTESBURY
 RADIO SALES
 CO. LTD.

"Popular Wireless"
 Editorial Department,
 Tallis House,
 Tallis Street, E.C.4.

12th February 1932.

Dear Sir

With reference to our recent advertisements in your journal dealing with Standard Batteries, we have pleasure in informing you that the response has been exceptionally interesting and an average of 100 enquiries reached us each day.

As a result of this we have decided to increase our allocation on Standard Battery advertisements and congratulate you on the strong pull which we can only assume has arisen due to an increased circulation.

Yours faithfully,
 STANDARD BATTERY CO.

F. S. S. Wates

REMEMBER!

"POPULAR WIRELESS" HAS THE LARGEST RADIO CIRCULATION
 IN THE WORLD—THEREFORE GIVES BEST ADVERTISING VALUE.

Advertisement Department, JOHN H. LILE, LTD., 4, Ludgate Circus, E.C.4. 'Phone: CITY 7261

BUY YOUR KIT FROM US FAMOUS FOR RADIO SINCE 1919

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

Any parts for Kits advertised in this Page supplied separately. If order value over 10/- sent carriage paid or C.O.D. Post charges paid.

TELSEN TRIPLE 3

Sets described in Telsen Radio-Mag.

● BASIC KIT

Comprising Kit of parts exactly as advertised by Telsen and sold in Sealed Pilot-Telsen Kit Carton. Less valves, panel, baseboard, terminal strip, connecting wire and screws.

CASH or C.O.D.

52'6

or 7 monthly payments of 8/3

● PILOT TELSEN FULL KIT

comprising Basic Kit as advertised by Telsen, with panel, baseboard, terminal strip, wire, screws and flex as above.

CASH or C.O.D.

55/-

or 8 monthly payments of 7/6

KIT-BITS

Selected Components

CASH or C.O.D.

You pay the postman. We pay post charges on all orders over 10/-

SPECIAL PETO-SCOTT COIL OFFER FOR COSMIC SETS

Complete set of Cosmic Coils comprising Peto-Scott Dual Range Coil, Peto-Scott Short Wave Coil and Peto-Scott Moderator Coil. Officially approved and made to fit the Blueprint.

CASH or C.O.D.

12/6

MODERATOR COIL. As solely specified in both Cosmic Sets. Soundly made in our up-to-date Coil winding department. The design of the Peto-Scott Moderator Coil is registered.

2/6

Sent Post Free - 2 9

COSMIC III

GYLDON Extender, with disc drive slow motion, Type Ex.5 16 6
Set of "Cosmic" Coils, comprising Dual Range, Short Wave and Moderator Coils 12 6
Set of Specified Valves 10 6
Cabinet as specified 17 6

COSMIC III STAR

1 ReadiRad Duotune Extender 18 6
Set of "Cosmic" Coils as specified 12 0
Set of specified Valves 10 6
Cabinet—to specification 17 6

COSMIC III FINISHED INSTRUMENT

Factory wired and assembled from specified components. Broadcast tested. Complete with valves and cabinet and including royalties. **CASH or C.O.D. 7 GNS.**
or 21/- down and 11 monthly payments of 12/6

COSMIC III STAR FINISHED INSTRUMENT

Factory wired and assembled from specified components. Broadcast tested. Complete with valves and cabinet and including royalties. **CASH or C.O.D. £8 : 0 : 0**
or 25/- down and 11 monthly payments of 13/6

RECOMMENDED ACCESSORIES FOR COSMIC SETS

Drydex 120 v. H.T. Battery 24/-
(Triple Capacity Type)
Drydex 9 v. G.B. Battery 1/-
Exide 2 v. 30/60 L.T. Accumulator 11/-
Blue Spot 100 U. Unit and Chassis £1-19-6
Ultra Imp Permanent Magnet Speaker £2-15-0

COSMIC III

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

**CASH
or
C.O.D.**

70'-

EASYWAY:

12 monthly payments of 6/5
Valves as specified, £1 : 10 : 6
Cabinet, 17/6.

KIT "B"

Author's Kit, with valves but less cabinet.

CASH or C.O.D. £5 : 0 : 6

EASYWAY:

12 monthly payments of 9/3

KIT "C"

Author's Kit complete with valves and cabinet.

CASH or C.O.D. £5 : 18 : 0

EASYWAY:

12 monthly payments of 10/10

COSMIC III STAR

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

**CASH
or
C.O.D.**

87'6

EASYWAY:

12 monthly payments of 8/-
Valves as specified, £1 : 10 : 6
Cabinet, 17/6.

KIT "B"

Author's Kit, with valves but less cabinet for "Cosmic" Sets.

CASH or C.O.D. £5 : 18 : 0

EASYWAY:

12 monthly payments of 10/10

KIT "C"

Author's Kit, complete with valves and cabinet.

CASH or C.O.D. £6 : 15 : 6

EASYWAY:

12 monthly payments of 12/5

COSSOR ALL-ELEC.

TRIGMELODY MAKER

(Type 235). For With A.C. mains. With Valves and Cabinet. **CASH PRICE, £9 19 6** order
Balance in 11 monthly payments of 18/3.

READI-RAD METEOR

3. Less valves With and cabinet.

CASH PRICE, 6/11
£3 15 0. order
Balance in 11 monthly payments of 6/11.

FORMO ECONOMY 3.

With coils, With less valves and cabinet.

CASH PRICE, £1 19 6. 5/6
Balance in 7 monthly payments of 5/6. order

COSSOR EMPIRE

MELODY MAKER 234.

With valves With and cabinet. **CASH PRICE, 10/-**
£6 15 0. order
Balance in 11 monthly payments of 12/6.

V.3 RADIO FOR THE

MILLION. Screen-grid, Detector and With Power. With valves, less cabinet. **CASH PRICE, £5 17 6.** order
Balance in 11 monthly payments of 10/10.

ALWAYS FIRST—ESTABLISHED 1919

PETO-SCOTT

CO. LTD.

77, CITY ROAD, LONDON, E.C.1. Telephone: Clerkenwell 9406-7-8. 62, HIGH HOLBORN, LONDON, W.C.2. Telephone: Chancery 8266

Messrs. PETO-SCOTT CO. LTD., 77, City Rd., London, E.C.1
Please send me C.O.D./CASH/H.P.:

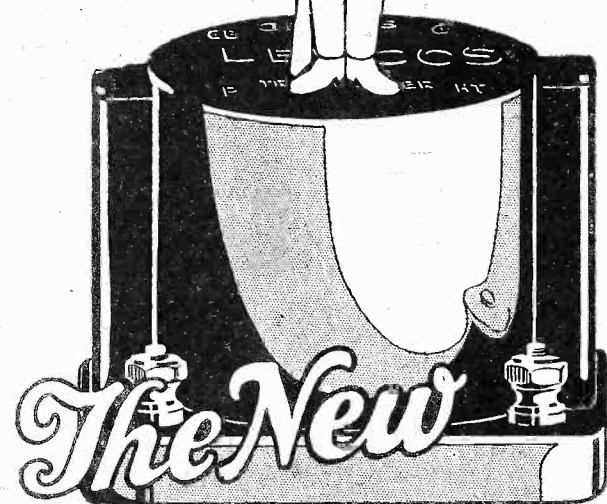
for which I enclose £ s. d. CASH/H.P. Deposit.

NAME.....

ADDRESS.....

P.W. 12 3-32.

**"TRAINED" TO
PERFECTION**



LEWCOS
Regd.

L.F. TRANSFORMER
(REF. L.F.T. 6)

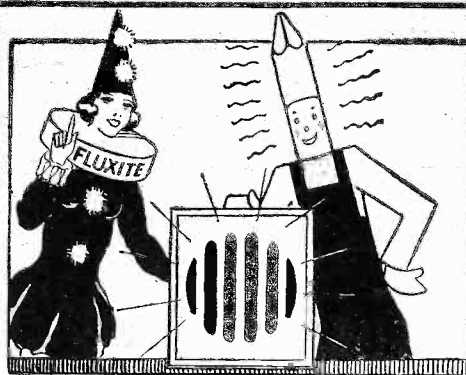
is a faithful sentry over your loudspeaker. From the recruiting stage—the raw material—it is "trained" to be on guard against the enemies of perfect reception—distortion, and lack of L.F. amplification. This LEWCOS Transformer is British to the core and reports of its conduct in action show that its performance is magnificent and has yet to be surpassed.

We respectfully request the public to order through their local radio dealer as we only supply direct to the trade.

PRICE
10!

LEWCOS RADIO PRODUCTS FOR BETTER RECEPTION

THE LONDON ELECTRIC WIRE COMPANY AND SMITHS LIMITED
CHURCH ROAD, LEYTON LONDON, E.10



"We're Fluxite and Solder, the reliable pair,
Famous for Soldering—known everywhere!
So don't dabble with Wireless and mess up your set.
Let US join the connections—then PERFECTION you'll get!"

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

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

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

NEW "JUNIOR" SIZE, 4d. per tin.

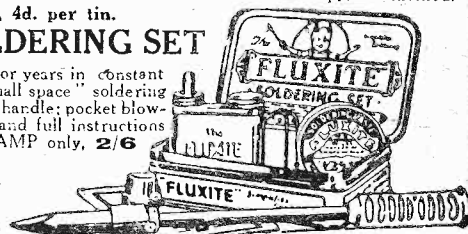
FLUXITE SOLDERING SET

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

FLUXITE LTD.

(Dept. 324),

ROTHERHITHE, S.E. 16



ALL MECHANICS WILL HAVE

FLUXITE

IT SIMPLIFIES ALL SOLDERING

PIFCO
ALL IN ONE
RADIOMETER



12/6

There is no instrument like it.
You must have one to secure
best reception.
Tests everything in your Set!

Your radio or Electrical Dealer
can supply. If any difficulty,
write: PIFCO LTD., HIGH ST.,
MANCHESTER.

EVERYTHING RADIO

THE NEW EASIWAY

Yours for 6/- Down

SPEAKERS . . .

ELIMINATORS . . .

6/- Down

Speakers

R. & A. "100" P.M. MOVING-COIL SPEAKER. With multi-ratio input transformer. (Cash price £2 17s. 6d.)

Balance in 11 monthly payments of 5/2.

AMPLION MOVING-COIL SPEAKER TYPE M.C.6. Permanent magnet, with output transformer. Complete. (Cash price £3 7s. 6d.)

Balance in 11 monthly payments of 6/2.

BLUE SPOT SPEAKER UNIT 66R. With Major Chassis and cone (37 cm.). (Cash price £2 10s. 0d.)

Balance in 11 monthly payments of 4/5.

EPOCH A2 PERMANENT MAGNET MOVING-COIL SPEAKER. Fitted with multi-ratio input transformer. (Cash price £3 3s. 0d.)

Balance in 11 monthly payments of 5/9.

ULTRA IMP PERMANENT MAGNET MOVING-COIL SPEAKER. Complete with input transformer. (Cash price £3 15s. 0d.)

Balance in 11 monthly payments of 5/-.

CELESTION PERMANENT MAGNET MOVING-COIL SPEAKER. Type R.P.M.8, with 8 in. reinforced diaphragm. Excluding input transformer. (Cash price £3 10s. 0d.)

Balance in 11 monthly payments of 6/5.

MAGNAVOX PERMANENT MAGNET MOVING-COIL SPEAKER. Type D.C.142. (Cash price £2 17s. 6d.)

Balance in 11 monthly payments of 5/2.

CELESTION P.P.M. PERMANENT MAGNET MOVING-COIL SPEAKER. with Impregnated diaphragm and dual impedance input transformer. (Cash or C.O.D. £2 7s. 6d.)

Balance in 7 monthly payments of 6/8.

BLUE SPOT SPEAKER UNIT AND CHASSIS. Type 100U. (Cash price £1 19s. 6d.)

Balance in 7 monthly payments of 5/3.

W.B. PERMANENT MAGNET MOVING-COIL SPEAKER. TYPE P.M.3. With 3 Ratio input transformer. (Cash price £2 12s. 6d.)

Balance in 11 monthly payments of 4/9.

B.T.H. MINOR PERMANENT MAGNET MOVING-COIL SPEAKER. (Valve. £2 10s. 0d. Cash or C.O.D.) And 11 monthly payments of 4/5.

Eliminators

ATLAS A.C.3 ELIMINATOR. TYPE A.C.244. 3 Tappings, S.G., detector and power. Output, 120-v. at 20 m/a. (Cash price £2 19s. 6d.)

Balance in 11 monthly payments of 5/5.

REGENTONE W.I.F. H.T. ELIMINATOR. Tapped 60/70 v. S.G., and 120 at 12 m/a. (Cash price £2 7s. 6d.)

Balance in 11 monthly payments of 4/2.

ATLAS D.C. ELIMINATOR TYPE D.C. 16. (For D.C. Mains). 2 fixed tappings at 120 v. and 150 v., one variable 0-150 v. Output 150 v. at 25 m/a. (Cash or C.O.D. £2 17s. 6d.)

And 11 monthly payments of 5/2.

REGENTONE MODEL W.I.C. (For A.C. Mains). Three tappings—two adjustable and one power. 120-150 volts—20 m/a. (Cash or C.O.D. £3 10s. 0d.)

And 11 monthly payments of 6/5.

Accessories

BLUE SPOT PICK-UP AND TONE-ARM, with Volume Control. (Cash or C.O.D. £3 3s. 0d.)

Balance in 11 monthly payments of 5/9.

GARRARD INDUCTION GRAMOPHONE MOTOR. Model 202. For A.C. Mains. Mounted on 12-in. Nickel Motor Plate with fully automatic electric starting and stopping switch. (Cash price £2 18s. 6d.)

Balance in 11 monthly payments of 5/3.

GARRARD 10B. CLOCKWORK GRAMOPHONE MOTOR. 12-in. Turntable. Double spring. Complete with fittings. (Cash or C.O.D. £2 13s. 6d.)

Balance in 11 monthly payments of 5/10.

B.T.H. SENIOR PICK-UP AND TONE-ARM. Complete. (Cash or C.O.D. £2 5s. 0d.)

Balance in 8 monthly payments of 5/4.

7/6 Down

PILOT PERMANENT MAGNET MOVING-COIL SPEAKER. In handsome solid oak cabinet, with multi-ratio input transformer. (Cash price £3 15s. 0d.)

Balance in 11 monthly payments of 6/10.

EKCO H.T. UNIT. TYPE A.C.25. For multi-valve sets requiring up to 25 m/a. 3 tappings, S.G., detector and 120/150 volts. For A.C. Mains. (Cash or C.O.D. Price £3 17s. 6d.)

Balance in 11 monthly payments of 7/-.

VOXKIT 1932 OAK CONSOLE. (Radio only.) Overall: 37 in. high x 22 in. wide x 15½ in. deep. Panel (Fret) 12 in. x 7 in. Baseboard 18 in. x 12 in. Front panel fretted or drilled to customers' specification. (Cash Price £3 15s. 0d.)

And 11 monthly payments of 6/10.

EKCO K.12. H.T. ELIMINATOR AND L.T. TRICKLE CHARGER. Delivers 12 m/a. Tapped at 80 v. (S.G.), 120/150 v. Charges ½ amp. at 2, 4 or 6 v. (Cash price £3 19s. 6d.)

Balance in 11 monthly payments of 7/3.

10/- Down

B.T.H. SENIOR PERMANENT MAGNET MOVING-COIL SPEAKER. (Valve. £5 12s. 6d. Cash or C.O.D.) And 11 monthly payments of 10/3.

EXIDE 120-VOLT W.H. TYPE ACCUMULATOR, in crates. (Cash price £4 13s. 0d.)

Balance in 11 monthly payments of 8/4.

REGENTONE W.I.A H.T. UNIT. For A.C. Mains. 3 tappings. S.G., variable and power. 120/150 v. at 25 m/a. (Cash price £3 17s. 6d.)

Balance in 11 monthly payments of 6/10.

ATLAS ALL-MAINS UNIT MODEL A.C.188. 3 tappings, 2 variable, 1 fixed. L.T. Trickle Charger at 2, 4 or 6 v. at ½ amp. (Cash price £6 0s. 0d.)

Balance in 11 monthly payments of 11/1.

ALWAYS FIRST—ESTABLISHED 1919

PETO-SCOTT

CO. LTD.

77, CITY ROAD, LONDON. E.C.1. Telephone: Clerkenwell 9406-7-8. 62, HIGH HOLBORN, LONDON. W.C.1. Telephone: Chancery 8266

Messrs. PETO-SCOTT CO., LTD., 77, City Rd., London, E.C.1
Please send me C.O.D./CASH/H.P.
I enclose

6/- first deposit for
(Cross out amount not required.) 7/6 " "
10/- " "

NAME

ADDRESS

P.W. 12-3-32



HERE is Britain's greatest All-Electric Wireless value—the Cossor All-Electric Melody Maker Model 235—a powerful 3-valve Screened Grid Receiver that works entirely from the electric light mains, for only £9.19.6!

Think of the convenience of being able to plug in to a light or wall socket and enjoy the programmes—no accumulator to recharge, no H.T. Battery to replace.

Because it uses the latest type of Cossor

A.C. Mains Valves this remarkable Receiver is exceptionally efficient—it gives you a wide choice of European programmes in addition to B.B.C. Stations. It is just as simple to use as a battery-operated Set and it uses less power than the smallest lamp in your home. Use the coupon below and get full details.

Cossor

EMPIRE

Melody Maker

Models 234 & 235

ALL-ELECTRIC MODEL 235

Price includes handsome oak cabinet Cossor Metallised Screened Grid, Metallised Detector, Power and Rectifier Valves, Heavy-duty Mains Transformer and all parts necessary for home assembly of the complete Receiver as illustrated. **£9.19.6**

Hire purchase terms: 20% deposit and 10 monthly payments of 20%.

BATTERY MODEL 234

Price includes latest type of Cossor Metallised Screened Grid, Detector and Power Valves, handsome oak cabinet and all parts necessary for home assembly. **£6.15**

Hire Purchase terms: 15% deposit and 9 monthly payments of 15%.

A new edition of the Cossor Station Chart is now available price 2d. Ask your Dealer for a copy of this useful novelty or write to us enclosing 2d. stamp.

To Messrs. A. C. Cossor, Ltd., Melody Dept., Highbury Grove, London, N.5.
Please send me free of charge a Constructional Chart which tells me how to assemble the Cossor Melody Maker.
(Fill in type required, viz., Battery-operated or All-Electric).

Name.....
Address.....
P.W. 12/3/32.

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

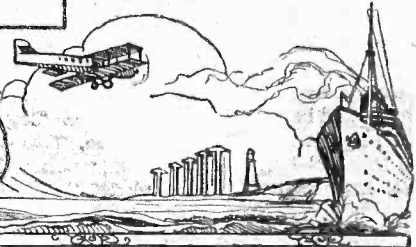
♥ 9934

Popular Wireless

LARGEST NET SALES



Scientific Adviser:
Sir OLIVER LODGE, F.R.S.
Chief Radio Consultant:
CAPT. P. P. ECKERSLEY, M.I.E.E.
Editor: NORMAN EDWARDS.
Technical Editor: G. V. DOWDING, Associate I.E.E.
Assistant Technical Editors:
K. D. ROGERS, P. R. BIRD,
A. JOHNSON RANDALL.



MUSIC OF HUNGARY
"ADMIRAL GUINEA"

MY WORD!
H. F. SURGERY

RADIO NOTES & NEWS

THAT FLASH
ON MY BLOTTER
AN ULTIMATUM
THE NEWCOMERS

Mass Music of Hungary.

ADMIRERS of Hungarian music will be interested to know that a magnificent concert of classical and modern items has been arranged for to-night (Thursday, March 10th). Quite a number of European stations are "hooked up" for this, and you can take your pick from the following: Budapest, 550 metres; Belgrade, 430.4; Vienna, 517 metres; Zagreb, 307 metres; Ljubljana, 574.7 metres.

In addition to the stations of South-East Europe given above, the concert will be relayed by Madrid, 424.3 metres, and Barcelona, 252 metres; and also by Hilversum on 208.8 and Huizer on 1875 metres.

Two Hundred Performers.

HALF-WAY through this concert of Hungarian music, which, by the way, is being sponsored by "Tungsrams," there is one item of very special interest—the Hungarian Coronation Mass Benedictus.

It will be sung by a choir of one hundred voices, supported by the full orchestra of one hundred players. This should be really magnificent!

"Cosmic."

I AM more of an ordinary "listener" nowadays than a technical tinkerer, but I see quite clearly that with the "Cosmic" my colleagues have given a new impetus to amateur construction; they have raised it to a different plane altogether, and lucky are the "new chums" who make a start with this extraordinary set. The letters which we have had concerning "Cosmic" have been lyrical in their praises. I quote at random from one: "Congratulations on your really greatest production yet—the 'Cosmic.' Three—exactly what many 'fans' have been waiting for a long time, as well as being a DX man's ideal all-round receiver." That is from E. D. (Southend-on-Sea), for whose letter and diagram we return thanks.

"Admiral Guinea."

THIS play, which was produced by the B.B.C. a few days ago, was one of Stevenson's "flops." He wrote it in collaboration with W. E. Henley shortly

after he began to live at Bournemouth in 1884, ten years before he died, and it was originally produced in London in 1897. In 1885, you may be interested to learn, he wrote to Henley as follows: "The repurusal of the 'Admiral,' by the way, was a sore blow; oh, gad, man, it is a low, black, dirty, blackguard, ragged piece: vomitable in many parts—simply vomitable."

A Somewhat Better Play.

ON Sunday next the B.B.C. are to broadcast a radio version of "Othello," a departure from the customary dead level of seventh-day fare which is courageous and commendable, though I think I could

negative electron upon an axis having north and south magnetic poles, the real cause of wireless echoes, magnetism, light, and heat." Isn't it rather debasing such a theory to apply it to the mere tuition of telegraphists, when it might instruct the world's greatest physicists?

My Word!

I UNDERSTAND, as a result of my assiduous study of the Press, that the Board of Governors of the B.B.C. has decided to ask for the resignation of any employee of the Corporation found to be the guilty party in a divorce suit. I say that I read that in the newspaper world; I cannot swear that it is true, but if it is, then I, who am something of a Puritan, yet all of an Englishman, say that the decision is abominable. Perhaps if we had men—and women, if you like—of the world on the Board of Governors, we should be better off. I am growing a little weary of "manse" rule in broadcasting. Even Bluebeard might announce fat stock prices satisfactorily to the people who pay for them—and pay the Governors!

International S.W. Radio League.

A HAMPSHIRE reader who has not been very happy in his experiences with this League asks for particulars about it, such not being given in its "News." Who is its secretary and president, what does it do besides compiling the "News," and does it publish a balance sheet? Why does it give its members no explanation for ceasing publication of the "News" for several months? All very pertinent and proper questions, and if Southport cannot answer them perhaps the Editor of the "News," Mr. C. J. Daly, will do so. We deserve that much attention, having given the "League" space out of the goodness of our hearts.

The Other S.W. Organisation.

A. E. B. (Rotherhithe) will have observed that from time to time I have given publicity to the club which he mentions in his letter; in fact, I have treated it quite as well as the "League" of South-
(Continued on next page.)

OLD FOLKS AT HOME



This is good old Charlie Coborn, the 80-year-old music-hall comedian, tuning in the London greetings on his golden wedding-day.

name one esteemed official of the Corporation who will have an acute attack of conscience about it. However, get ready your Shakespeares and prepare to hear a goodly matter. Henry Ainley is to represent the Moor!

The Cause of Heat.

I AM glad to observe that Mr. F. Waterhouse has invented an apparatus for use in teaching the Morse code, but the advertisement of it says: "From the theory of this instrument new light is thrown upon the nature of electricity with formulated proofs regarding the rotation of the

NEWS—VIEWS—AND INTERVIEWS (Continued)

port. Pending the shedding of light upon the matters dealt with in the preceding paragraph, I propose to retire awhile from the boosting business and devote any paragraphs which I may have to spare to the interests of local clubs, who never have appealed in vain to "P.W." for a "leg up" in the shape of a short notice.

Does your club issue a balance sheet? If so, may I have a copy, please?

High-Frequency Surgery.

INTENSIVE research in the realm of surgery by use of waves of about 6 metres is being carried on, and considerable progress has been made in the study of the effects of such high frequencies on living tissues, bacteria, blood, etc. There is evidently a vast field of knowledge to be opened up in this direction, but many frogs and other small living things must be sacrificed in the work.

Recent experiments included the paralyzing of a frog's leg and a chicken's brain. The chicken remained crouched, motionless, and with no apparent desire to eat for many weeks. It was then killed for anatomical examination. I hope this sort of thing is really necessary and not merely for curiosity.

That Flash.

WHAT a lot of valves are being smashed nowadays! If the makers knew how mighty is the flow of letters about the "flash" they would buy themselves Rolls-Royces. Many are the theories to account for the flash which is observed. I believe the correct explanation is that the metallic magnesium which is deposited on the inside of the bulb, not having a protective film of oxide, oxidises with such rapidity when the air rushes into the bulb that it is *burnt*; hence the flash or flame.

Several readers have given this explanation, and I back it myself. In the case of electric-light bulbs, I am told that phosphorus is used as a "getter," and oxidises when the bulbs are broken, emitting a smell of phosphorus.

Noted on My Blotter.

ALTHOUGH I cannot "keep" a diary, I can and do "keep a blotter," which zealous office boys frequently equip with clean sheets, throwing away my priceless records of telephone numbers, lunch appointments, debts, etc.

I find in the left-hand top corner of this week's sheet the 21st of March noted as the date of the B.B.C.'s international broadcast of

British music. On the 18th and 19th the O.B. Department will be heavily engaged with

the Grand National (snow permitting!), the Boat Race and the Scotland v. England Rugger match.

Wireless for Schools.

IHAVE opposed the school radio business consistently as a time-wasting irruption into the educational life of our young. Therefore I am rejoiced that the "Leeds Mercury" should print an article entitled "Too Much Wireless for the Schools," in which I see the words, "Whether the school broadcasts are any use or not, the point is that they are not the business of the B.B.C." There are too many distractions already provided for our kids. A young boy tells me that the last two *chemistry* lessons he has enjoyed consisted of shows of cinema films of New Zealand sheep farming!

SHORT WAVES.

Maid (a wireless fan, speaking at telephone): "Would you mind holding on, please? Madam won't be a minute or two. In the meantime, I'll put on a gramophone record." — "Punch."

The electrical pressure of an onion, we read, is equal to that of one-fiftieth of a single accumulator cell, and has, moreover, the consistency of an electric standard. It is suggested that a suitably wired bed of onions could be planted outside the drawing-room window for supplying H.T. to our wireless sets.

This news of the ohm life of an onion is, indeed, most enlightening.

A bachelor fan, so 'tis said,
Fixed his set to listen in bed;
But the talks and wails
And the thrice-told tales
Make him think he's married instead.

"The BROADCAST will begin at 9.15," says an American paper.
We want ours buttered, not jammed, please.

WISE CRACKS.

People who live in glass houses should not use indoor aerials.
Static in radio reception is like a mother-in-law in married life.

A WIRELESS LOVE SONG.
The force between us, you're aware—
You'll pardon my insistence—
Varies inversely as the square
Of intervening distance.

Who has short-circuited our arcs?
Let's banish all deterrents
And turn our intermittent sparks
To alternating currents!

New Australian Station.

TOWARDS the close of 1931 Riverina Regional station, 2CO, Corowa, the most powerful of the national broadcasting stations of Australia, was put into public service. It is situated about three miles outside Corowa, N.S.W., near the River Murray. It works on 538 metres (560 kc.), and would strain a "Cosmic" to its utmost, I'll bet.

However, "hope springs eternal," and there's no harm done by trying!

You License Yourself.

TAKE note! If you pay your wireless licence on Monday and peg out on Tuesday, the heir to your set should take out another licence on Wednesday. If the "van" cops him while he is attending your funeral, goodness alone knows what

penalties he may incur! I advise you, therefore, to leave your licence in your will to whoever inherits your set. That will make the lawyers sit up and think. But, I say, what rot! A similar ruling applies, I understand, to a dog licence. Better take out all your licences in the names of your heirs!

Television in the U.S.A.

A REPORT from Washington seems to indicate that in spite of the strides which television is said to have made in the U.S.A., the Federal Radio Commission, which regulates radio work and play in the States, does not consider that the art has reached a stage of commercial utility, largely on account of the small number of stations which can be operated without interference.

On the other hand the "Telegraph and Telephone Age" thinks that the time is not far distant when every telephone will have a television apparatus attached to it, and coins the word "Sightophony" for the business. But if television doesn't improve a lot they will have to use the word "myopiaphony," too!

An Ultimatum.

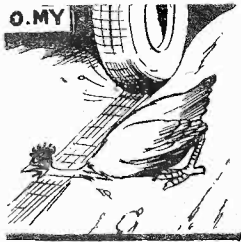
THIS is to notify the gentleman with a step-father in Heckmondwike and a snag in his "Magic" Three that most of his ink is wasted because he is so economical of punctuation marks. We are yearning to help him, but just as our combined brain-power has given us the drift of one letter, bang comes another and upsets our theories. Average length of seven letters is eight foolscap pages, in violet ink, all mixed up with the step-father. We should welcome a letter from the iron bedstead johnny as a change. Have you found the parrot yet? We are all on edge about her. Especially Mr. Bird.

Newcomers to Radio Research.

IHAVE the honour to announce, on the strength of advices received from America, that two newcomers to radio research have just arrived in Chicago, where they will get to work under the direction of a radio company, and will specialise in the study of the sounds which are outside the range of the human ear. These scientists are natives of Venezuela

and I believe they are man and wife—a charming combination, reminding one of the famous partnerships of the Curies, the Sidney Webbs, the Brownings, and so on. But I ought to add that their names are Poncho and Martina, and that they are ringtailed monkeys!

ARIEL.



ON THE OTHER SIDE A TALK WITH A SPANISH LISTENER

SPAIN may be behind the times in some respects, but in new trade it is getting very up to date. There is, I learned while in Paris, a sort of publicity organisation which distributes to visitors (at the Spanish frontiers) illustrated pamphlets and brochures detailing the advantages of Spanish holiday resorts and giving trade opportunities.

This same publicity concern, run by the Government, sends out agents into other countries when big international contracts are going. By a lucky chance I met one of these agents in Paris. He was engaged in electrical work and was in private life a wireless enthusiast.

The Madrid Station.

I asked him several pointed questions about Spanish broadcasting.

"The E A J 7 station in Madrid," he said, "works at intervals from about 11.45 in the morning, but if you look at the programmes of our biggest station, Radio Barcelona, you will see the sort of thing which we regularly get: 7 p.m., *Prio music*; 7.30 p.m., *Market prices*; 8 p.m., *Football talks*; 8.15, *Gramophone records*; 9 o'clock, *time signal and weather forecast*; 9.5, *Orchestral selections*; 10 o'clock, *News bulletin*; 11 o'clock, *Gramophone records till the close down at midnight*.

Not so complete as your B.B.C. stations, eh?"

"Your stations appear to shut early," I remarked.

Early Closing.

"Our stations appear to close down early, but it must be remembered that we do not go on British summer-time and, for a greater part of the year, Spain is behind the French and British programmes."

"Can you give me some hints on recognising Spanish stations?" I asked. "Most of us do not know Spanish: it is so different from French."

"Although Spanish is an easy language to understand when

No doubt you have often listened to the languorous music from Madrid or one of the other Spanish stations, and you may have wondered what the Spaniards themselves think of their broadcasting service.

Well, here is an interesting and right up-to-date account from the lips of a keen Spanish listener, in which many useful reception-hints are embodied.

written down, the rather guttural pronunciation, so different from French, probably makes it difficult for you to understand the Spanish announcers.

"The call E A J 7 given from Madrid, is pronounced *Eh-ah-hota-sieteh*. The words 'Union Radio Madrid' are pronounced in the French fashion. This call is given very frequently between items.

Easily Identified.

"It is easy to identify Madrid, too, because Siegfried's bugle-call theme from the opera is played with one finger on the piano, as a sort of interval signal. If you don't happen to pick up Madrid until the

end of the evening, then look out for the 'Buenas Noches, Senores, hasta manana,' which is the good-night farewell.

"The E A J 1 given out by the new Barcelona station is pronounced *Eh-ah-hota-ono*. At Barcelona also they announce that a station is *instalada en la cumbre del Tibidabo, Parque del Hotel Florida*, which you see, is a nice free advertisement for the hotel where the station is!"

I asked about broadcasting organisations, wireless licences and so on.

A Powerful Weapon.

"For the past two or three years," said my friend, "broadcasting has been in a state of flux, and since the revolution matters have been even worse.

"When Alfonso was on the throne, our Government was very anxious to keep all the various broadcasting concerns together and make one central company very much on the lines of your B.B.C.

"Not a bad plan. In fact, had they been able to get a State broadcasting concern together, before the political trouble started, it would have been a powerful weapon in the King's hands.

"But they didn't manage to get the organisation through in time, and although there have been more restrictions as a

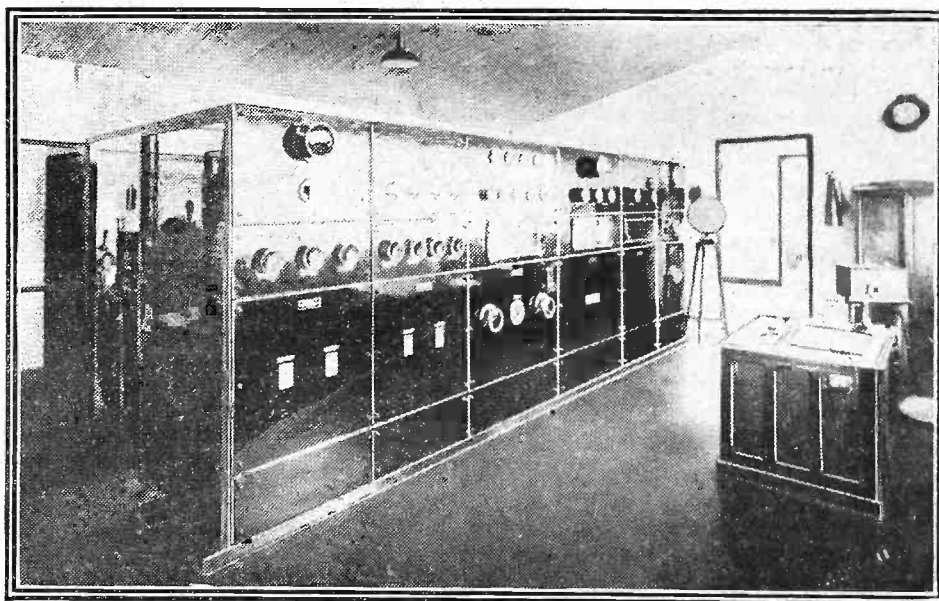
result of the revolution, the organisation of our broadcasting is still in a muddle. There are three chief companies, the Union Radio, Radio Iberica and Radio Espana.

On Commercial Lines.

"These run broadcasting on commercial lines and give a small amount of advertising. As many of your visitors to our Spanish holiday resorts will know, there are a multitude of small newspapers all over the country, and although none of them has any great weight, their combined effect has a big influence on the average citizen's mind.

"Their combined
(Continued on next page.)

HOW BARCELONA PUTS ITS PROGRAMME ON THE AIR



This is a general view of the Barcelona station, E A J 1, that works on 349 metres—a little below the London Regional. Although not a high-power station, it comes over with a great punch, announcing itself as "Radio-Barcelona."

A TALK WITH A SPANISH LISTENER

(Continued from previous page.)

effect is generally directed against broadcasting. There is a strong idea that the real use of broadcasting is for giving out news, and the minor newspapers feel that they will be wiped out if there is any extension of the present broadcast news service.

"Of course it is a mistaken idea, because most of our stations do not start a main programme until the early evening. A good many listeners, especially in the North of the country, tune in to your Daventry and Radio Paris and get the world's news before they go out to buy their own evening papers!

News Bulletins.

"From some stations a little news is broadcast in the early afternoon and an ordinary bulletin at ten, but it is mostly sports news and minor political stuff; nothing very important, I'm afraid."

"What about station jamming?" I asked.

"We have seven exclusive wave-lengths, not too many, I think, for a country of our size. The present stations are fairly well spaced and the only wave-lengths which are absolutely in the thick of the congestion are those of Barcelona, on 349 metres, and the new Valencia station, which is now testing on 268 metres with about five kilowatts.

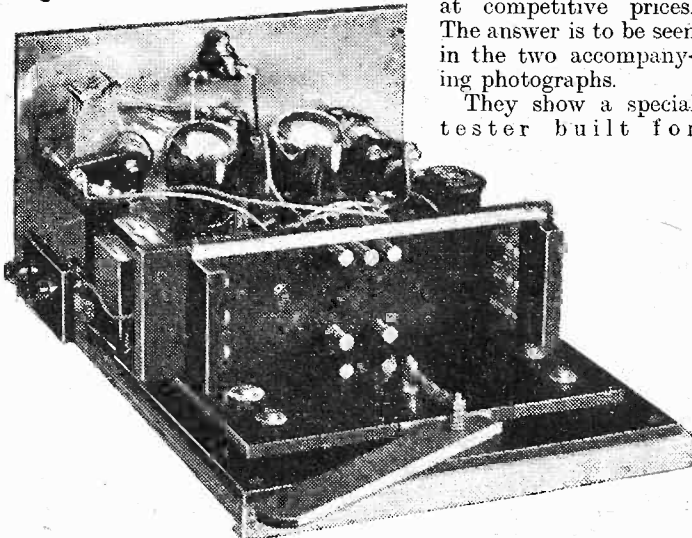
"The other stations are San Sebastian, Madrid (E A J 7), the Madrid Espana station, Seville, and the old Barcelona station which still works on 252 metres with an eighth of the power of the new E A J 1 station."

EDITOR'S NOTE.—We are pleased to be able to announce that we have secured, for inclusion in this exclusive and interesting "P.W." series, an article dealing with broadcasting in the Far East, and entitled "A Talk with a Japanese Listener."

DID YOU KNOW THAT?

If reaction with a differential condenser is too "fierce," the necessity of removing turns from

QUICK CONNECTIONS!



The special instrument designed and built by R.I. for testing their Cosmic coils.

the reaction coil can often be obviated by connecting a condenser of .0001 or thereabouts between the fixed plates which are earthed and the moving plates of the differential.

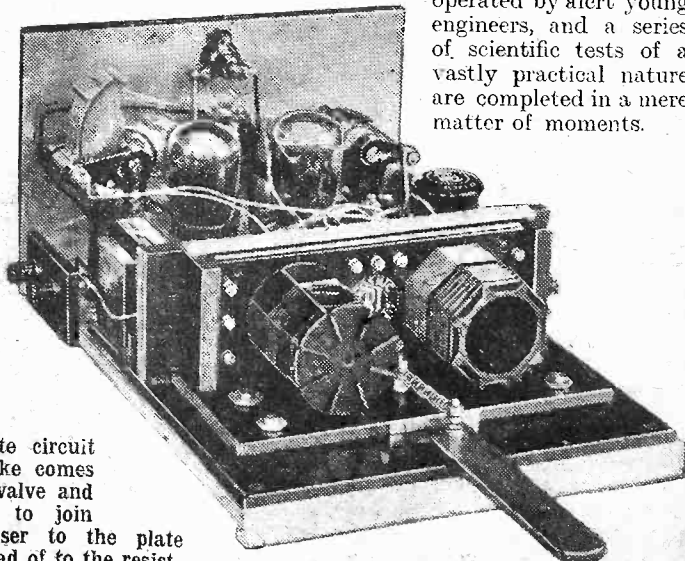
The sharpened selectivity obtainable by interposing a tuned circuit

Cosmic Coil units. It comprises, in effect, a two-valve Cosmic set with an ingenious quick connection arrangement for the coil units.

A coil unit is slid into the grooved carrier at the back and the lever pulled out. This lever causes the plungers you can see in the first photo to make efficient contact with the coil unit terminals.

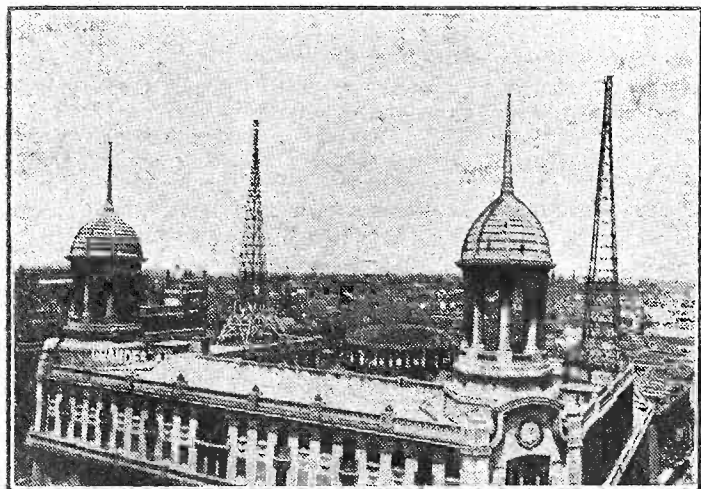
The various wave-meters, etc., are rapidly operated by alert young engineers, and a series of scientific tests of a vastly practical nature are completed in a mere matter of moments.

A COMPLETE TEST



Instantaneous connection is made to all the terminals of the coil unit.

IN THE CITY OF MADRID



These masts, erected in the heart of Madrid, will remind London listeners of the old 2 L O, which employed a similar pair of masts in Oxford Street.

"As far as wave-lengths go, we seemed to do very well out of the Prague Conference, but listeners all over the country are agreed that the present wave-length jamming is worse than hopeless.

"Judging by reception in other countries, stations are well heard even at Madrid, which is, of course, hundreds of miles inland. Perhaps it is because Spain is surrounded by water. The American stations come in wonderfully."

The Next Conference.

"They're having the next wave-length conference in Madrid, aren't they?" I inquired.

"Yes," he said, "it is a bit of ironic humour that the next conference is to be at Madrid. This is a conference not only of broadcasting stations officials but of commercial wireless engineers throughout the world, to whom broadcasting is only a side line—and we devoutly hope a new kind of Prague plan will be settled at Madrid, nobody would be more enthusiastic than us about cutting down station jamming.

between aerial and input to the set is frequently minimised or lost altogether by bad spacing between the new coils and the old.

When adjusting the trimmers of ganged tuning condensers, remember that the best trimmer position for results near the top of the dial may not be best for results near the bottom of the dial. (Generally speaking this latter is the more important setting.)

A common error in plate circuit wiring where the H.F. choke comes between the plate of the valve and a coupling resistance is to join the L.F. coupling condenser to the plate side of the H.F. choke instead of to the resistance side.



PICK-UP PROGRAMMES *on the* "COSMIC" THREE

THOSE who have built either the "Cosmic" Three Star or the earlier model of the "Cosmic" receiver will by now have realised that they have a truly remarkable set in their possession. For it is a set that is not only capable of world-wide radio reception, without any cost changing, but it is also capable of providing home-made concerts of your own exact choice through the medium of the gramophone pick-up.

An Alternative to Radio.

This alternative to broadcast reception is a very great asset, for it enables the owner of the set to have musical entertainment at whatever hour of the day he chooses.

"But," you will say, "this will cost much more than the set by itself, and it will entail a fairly intimate knowledge of radio-gram operation."

Nothing is farther from the truth. The addition of a pick-up need cost very little, and the other odds and ends such as gramophone motor, volume control, and so on, may not have to be purchased at all. You may have them on hand.

At any rate, you need not spend much even if you have to buy everything fresh. On the other hand, you can expend many pounds if you feel in a luxury mood. "It all depends on you," as the once-famous dance number has it.

Perhaps I should explain what I mean by this remark before I go any farther. Here goes!

The constructor of a radio-gram receiver—such as you will have when you have added a pick-up to your "Cosmic"—need only have in addition to his set a pick-up and a gramophone motor; the latter being supported on a very rough piece of wood.

"The Whole Hog."

On the other hand, he can go the whole hog and equip himself with the latest H.M.V. playing desk, with or without automatic record changer, and complete with pick-up and volume control. He can also go to the expense of a record cabinet of the latest self-finding variety. If he does he will have a bill of something like £40.

There is another alternative that I shall say something about later, and that is the purchasing of a complete radio-gram kit of the "Cosmic" Star, which is provided for a very modest sum by one of the well-known kit suppliers.

Meanwhile, however, let us see how we can use either the "Star" model or the

Constructors of the now-famous "Cosmic" receivers are in a unique position in the matter of providing themselves with exactly the programmes they desire. For in addition to the possibilities of finding broadcast entertainment on one of the three wave-length bands covered by the set, they are able to "broadcast" home-made programmes on their sets by means of the gramophone pick-up. The following article tells how this is done, and gives some valuable advice upon the operation of the "Cosmic" radio-gram.

By K. D. ROGERS.

original "Cosmic" receiver as a radio-gram receiver. The "Star" set is already provided with a pick-up switch, and in the case of the other this or a jack can very easily be added.

We will deal with the "Star" model first. Assuming that the set has been built without any idea of making it a complete radio-gram

receiver; without getting a complete kit of radio-gram parts as mentioned above, we can easily turn it into this dual-purpose set stage by stage.

Concerning the Cabinet.

We will assume for the moment that we have no gramophone, and therefore no gramophone motor and turntable. Therefore we shall have to get one at some stage of the proceedings. Before we come to that, however, we will decide whether we are going to house the whole outfit under one roof in a complete radio-gram cabinet, or whether we are to keep the set in an ordinary cabinet and have the gramophone motor and pick-up in another alongside.

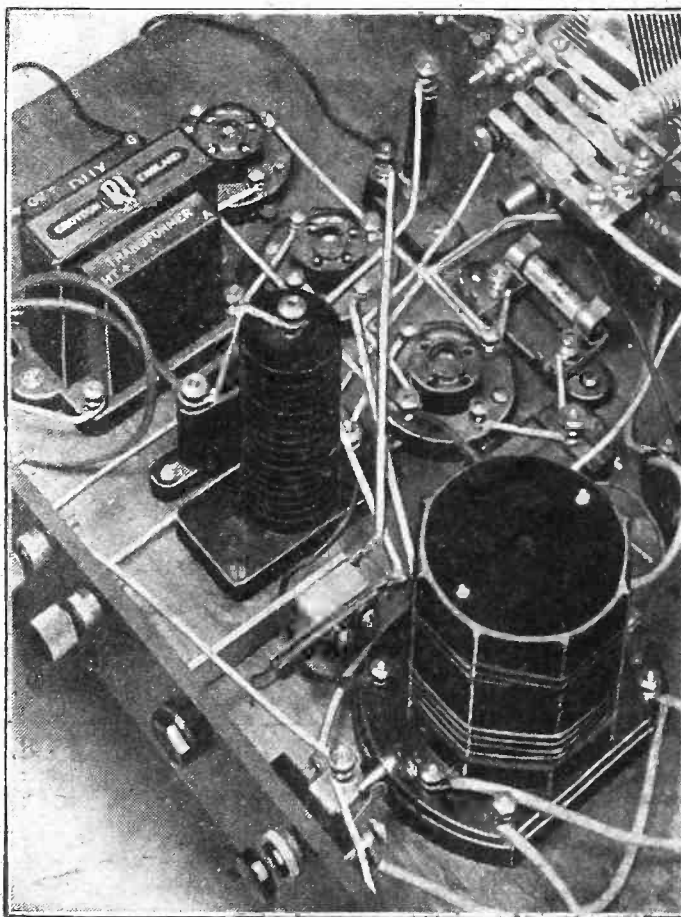
A Neat Job.

The former makes the neater job, and if no set cabinet has been purchased it will work out cheaper. On the other hand, if the set is already in a satisfactory home it may be preferred to keep the gramophone side separate rather than to scrap the set cabinet and put the whole lot in one piece of furniture.

This is easily decided, and whichever is done it makes no difference to the extra bits required to turn the set into a radio-gram receiver.

(Continued on next page.)

PROVIDING PRIVATE PROGRAMMES



This is a close-up of the pick-up jack inserted in the original model of the "Cosmic" Three. The jack is an ordinary break type, such as the Igranite P.62, known as a "single circuit closed" jack.

PICK-UP PROGRAMMES

(Continued from previous page.)

These are the pick-up, the gramophone motor and turntable, and a volume control to vary the power of the record reproduction. All these can be conveniently housed in with the separate gramophone unit, or in the radio-gram cabinet with the set.

The Driving Motor.

Let us discuss the motor first. This can be of two main kinds: clockwork or electrically driven. If you are working your set from a mains unit (for H.T.) and you can afford a few pounds, you will find an electric motor a very delightful luxury. I say luxury because it is really that. It makes absolutely no difference to the quality of the results, but it does save the somewhat bothersome winding up every one or two records.

The electric motor can be either of the A.C. induction type, or a general-purpose motor which will operate on either A.C. or D.C. If you have A.C. mains available the former type is the better. The cost will vary with the make and type from about £2 upwards.

A clockwork motor, on the other hand, can be obtained for half that price, and a reliable motor, too. This is a point, however, that the set owner will have to decide for himself.

The motor decided upon, it can be fitted in the cabinet leaving a fair space for the pick-up (it is perhaps best to get this latter before fitting the motor) and for the volume control.

A Wide Choice.

But let us pass on to the pick-up. Here again one has a wide choice. But unlike the motor a variation in the make or type of the pick-up can have a marked effect in the tone of the reproduction. The various motors can only offer more or less unimpor-

amplified and turned into sound by the set and the loudspeaker.

Various Loudspeakers.

Now you know that various loudspeakers have equally various "tones." They prefer to reproduce the different parts of the musical scale in various proportions. The perfect speaker gives all notes an equal chance, but that speaker is yet to be found, though near approaches have been designed.

I am referring to the speaker in rather a loose way as applied to one particular set, to which it may or may not be accurately matched. But that is how the combination of set and speaker will affect your choice of a pick-up.

For, continuing, if the set-plus-speaker combination (which I shall refer to in future as the speaker) gives very brilliant reproduction—the high notes coming out particularly well—then it will probably be best to choose a pick-up that has a useful bass lift, for we do not want anything above about 4,500 cycles to be reproduced in the gramophone music, for the simple reason that it is not there.

Cutting Out Scratch.

This may sound Irish, but the fact of the matter is that if the pick-up tries to reproduce notes above that figure it will merely succeed in producing a lot of surface noise from the record.

In this case you would only have to cut it out with a scratch filter before you could enjoy the reproduction, and it would be better to avoid this at the start by choosing a pick-up that does not have this tendency, but has a useful bass "lift" that will give well-balanced results with your particular speaker.

Such pick-ups are to be found in several makes, among which are H.M.V., Marconi-phonc, Blue Spot, A.E.D., etc.

Naturally, the reverse set of circum-

stances holds good. If you have a rather

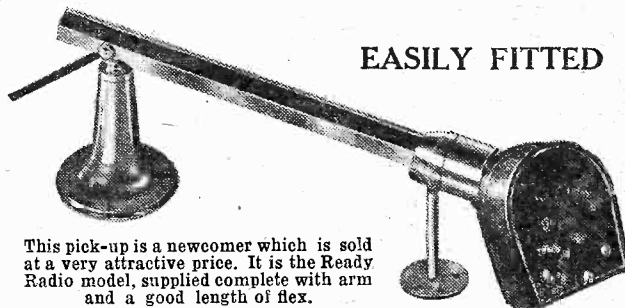
"mellow" speaker, perhaps you can do with a pick-up that has a particularly brilliant response, though it must not be deficient in low notes. Such an instrument can be found among the B.T.H., Audak, Graham

Farish, Ready Radio, and other makes.

Here, however, let me say that because a pick-up gives particularly good results at one end of the musical scale it must not be assumed that it is lacking elsewhere. And the best way to choose your pick-up is, of course, by getting it on trial if you can from your local dealer and testing it on your own set at home.

But the foregoing will, I hope, give some assistance to those who are adding the gramophone side to their sets.

There are other points to consider, but before I leave the subject of pick-ups I would remind you that these instru-



This pick-up is a newcomer which is sold at a very attractive price. It is the Ready Radio model, supplied complete with arm and a good length of flex.

ments can be obtained (not always in the same make) either with a tone-arm complete or as an adaptation to take the place of the sound-box on the ordinary gramophone.

This brings me to another aspect that I have not yet touched upon. If you have a gramophone you will not need the new motor, for with a pick-up that is of the adapter type all you have to do is to remove the sound-box of the gramophone, place the pick-up on instead, connect it to the set, and go right ahead.

Armchair Control.

An excellent pick-up for this purpose is the H.M.V. Model 11, as this is supplied with very long leads and an armchair volume control.

With the new motor, or the complete radio-gram cabinet scheme, the pick-up and tone-arm combined is, of course, the best. But whatever type you go in for it is absolutely essential that you have a volume control to enable you to adjust the power of the reproduction to your liking.

The volume control can be of two kinds: for fixing on the motor board, or of the armchair variety. There is no room on the set for it, and if there were it is far more desirable to have the control where the pick-up is than to have it on the panel of the receiver.

This is obvious when you remember that the set itself will not be touched during the time that records are being played, and that it is quite probable that the gramophone motor and the pick-up will be some feet away from the receiver.

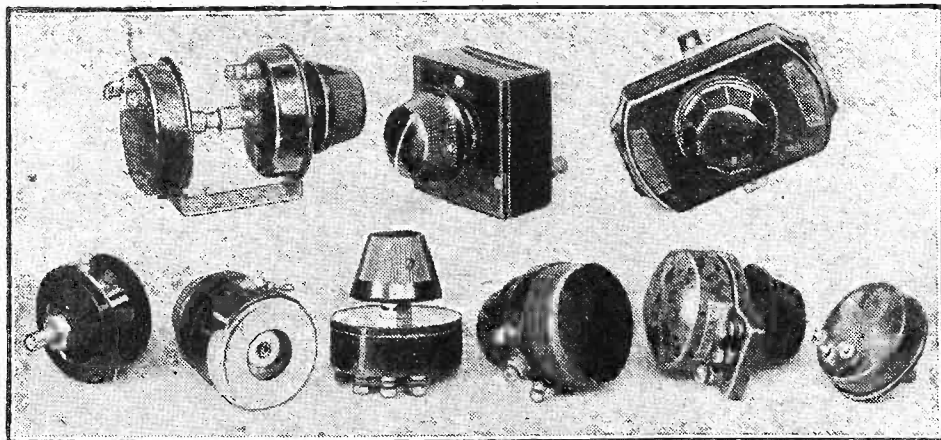
Just a Matter of Type.

That being the case, the choice of the volume control becomes a very easy job. All you have to decide is whether you will have the added luxury of an armchair control, such as is provided by the H.M.V. pick-up and volume control, or whether you will control the reproduction from the gramophone unit.

In any case, this control is not a question of constant variation, the control is merely set when the record begins and then left during the whole item.

(Continued on next page.)

ADJUST THE VOLUME TO YOUR LIKING



Here is a selection of volume controls which are suitable for pick-up work. The top row, from left to right, shows a ganged Magnum control (for use when it is desired to control two circuits at once—in the "Cosmic" only one of these units is required). Next we have the A.E.D., and the H.M.V. armchair control. Below, the illustration shows examples of the Varley, Clarostat, Ready Radio, Wearite, Sovereign, and Graham Farish controls.

tant differences; the pick-up is the vital part of the gramophone side of the set.

Let me explain. The pick-up is an electro-mechanical device which converts the wobbles imparted to its needle by the record into electrical variations that are

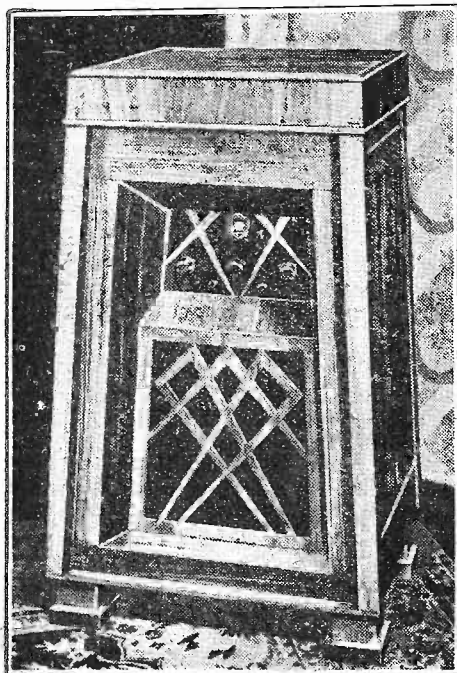
stances holds good. If you have a rather "mellow" speaker, perhaps you can do with a pick-up that has a particularly brilliant response, though it must not be deficient in low notes. Such an instrument can be found among the B.T.H., Audak, Graham

PICK-UP PROGRAMMES

(Continued from previous page.)

The ordinary type of potentiometer of a value of some 250,000 or 500,000 ohms is suitable unless the makers of the pick-up recommend some other value, and this can be mounted on the motor board of the gramophone very easily.

MODERN ART



If you wish to make your "Cosmic" Three into a really "posh" job it is a good plan to house it in an attractive radio-gram cabinet. A very modern design is provided by Messrs. Ready Radio, and is illustrated above.

The connections of the volume control are very simple, one end of it being taken to the one tag of the pick-up, and the other side of the control to the other tag of the pick-up and to a grid-bias plug. The centre terminal on the potentiometer goes to the set, as we shall see in a minute.

In connecting up the gramophone unit let us deal with the "Cosmic Star" first.

This has a special switch at the back (on the terminal strip) for changing over from radio to gramophone and vice versa. There are three terminals on that switch, two of which are already connected to various points in the set.

Not At All Difficult.

The third is left unattached—the terminal on the left of the switch as we look at it from the terminal strip.

This is now connected to the lead that comes from the centre terminal of the volume control that we have mounted on the motor board of the gramophone. The other lead from the volume control (which we said had to be connected to one terminal or tag of the pick-up and to a grid-bias plug) is plugged into the grid-bias battery at 1½ volts or so, or it can be connected into the G.B.I. plug that is already used in the set.

That is all that has to be done in the case of the "Cosmic Star." In the "Cosmic" original, set the addition of a pick-up is

quite easy, but it means the mounting of a jack on the terminal strip.

This jack is of the usual break type with three contacts. And it is easily mounted between the wave-change switch and the L.T. plus terminal.

The connections are as follow: Remove the lead that now joins the grid terminal of the second valve holder to the '01-mfd. condenser, and instead connect the grid to the outside contact on the jack.

Connecting the Jack.

The now free terminal of the '01-mfd. condenser is taken to the centre contact on the jack, the latter having been mounted so that the two springs that are close together are on the right as we look at the jack from the back of the set—i.e. the frame is to the left.

The remaining terminal (the frame) on the jack is joined to the terminal on the '5-meg. grid leak that goes to the grid bias—1 lead. The fact that we have the grid leak still in circuit when the pick-up is used will not affect the reproduction, and it will prevent any objectionable noise occurring when the pick-up plug is placed in position in the jack.

The connections of the pick-up to the plug are: Centre terminal of the volume control on the motor board to the terminal on the plug that makes contact with the jack spring, and one outside terminal on the control to the remaining side of the pick-up and to the remaining contact on the jack.

One Valve Idle.

If you are not sure which way round to connect the volume control (arranging it so that turning the knob to the right increases volume), a trial and error test will show whether it is correctly attached. If on test you find that the control works the wrong way, increasing volume when turned to the left, a reversal of the leads going to its two outside terminals will effect a cure.

In each case in the addition of the pick-up to the "Cosmic" sets the first valve is not used when the gramophone is employed, the introduction of switching into the detector circuit being inadvisable in a receiver that has to operate on the very short waves.

When you have chosen your pick-up and have got the alterations to the receiver completed, you will be anxious to try it out. If you have a gramophone, you will be able to give a test with some of the records that you will no doubt have on hand, but if you have previously not been interested in the realm of what is impolitely, but rather succinctly called "canned" music, you will be looking round for some records.

Naturally I cannot lay down any hard-and-fast rules on choosing records, but a few suggestions may be of use. There are certain features in radio-gramo-

phone reproduction that are not found with the acoustic gramophone (provided a good loudspeaker is used), and which a careful choice of a few records will enable you to demonstrate very easily.

I refer to the increased bass reproduction that is a feature of the electrical reproducer as compared with the acoustic type, and a cleanness of high notes that is particularly gratifying. To bring these out you want good records of such things as cinema organs, symphony orchestras, good dance bands, and piano records.

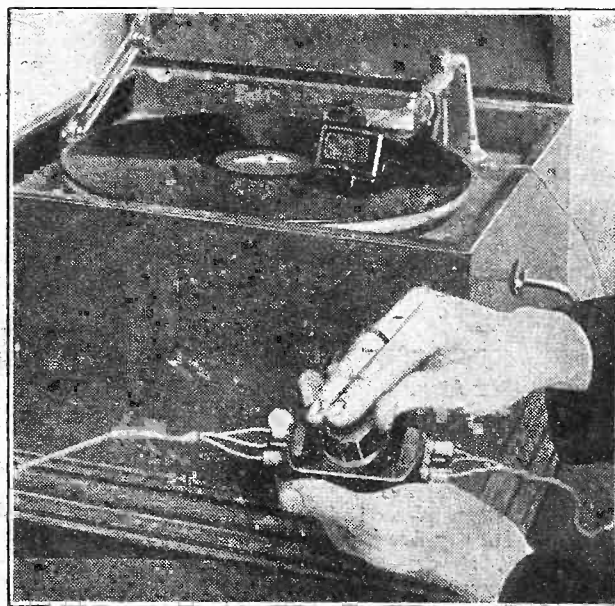
I will not mention any particular discs here, but if you have a look at the latest H.M.V., or other notable gramophone concerns' catalogue, you will soon be able to pick up the type of records you want. An alternative, of course, is to spend a few minutes at a fairly large gramophone store (where they will be likely to have a good stock), and hear a few records over.

Suitable Records.

But in order to give you a little idea of what to look out for, and so help to save time, I would suggest you hear some of the records made by Quentin Maclean and Reginald Foort, on various cinema organs; Ambrose, New Mayfair, Savoy Hotel Orpheans, and Jack Payne dance bands; and such orchestras as the Philadelphia Symphony, the Berlin State, London Symphony, and for lighter music the New Light Symphony.

Records with piano solos are made by most of the notable pianists, Mark Hambourg and Livitsky being particularly good recorders, while on the syncopated style we have Raie da Costa, and Billy Mayerl.

CONTROL AT A DISTANCE



This picture shows the convenience of the H.M.V. pick-up head (Model 11) which can be fitted on to the existing tone-arm of a gramophone, and also the H.M.V. volume control previously mentioned. An alternative to the provision of a pick-up and gramophone motor, etc., is the use of the playing desk shown in the heading—one of the complete outfits made by the Gramophone Co.

As regards needles, I must leave the choice to you. It will depend upon the actual pick-up which type will best suit. On the other hand, the standard loud steel needle will suit every make, but it has to be changed after every side.

TUNING YOUR SUPERHET

Getting the "feel" of a receiver is half the battle in long-distance reception, but there is a peculiar strangeness experienced when one goes on to a superhet. for the first time. In this article you will find many tips which will help you to feel at home more quickly.

By A. S. CLARK.

THE superhet. has returned with a vengeance, and apparently returned to stay. Which, of course, is not so very surprising since selectivity is its shining point, and is at the same time a most vital property of a real distance-getter.

There are many different superhet. designs, but in one way nearly all of them are alike. The majority have as principal controls an oscillator tuning condenser (or Extenser) and a main tuning condenser (or again, Extenser).

Single Knob "Supers."

I said the majority, because the science of efficiently ganging together the oscillator and main tuners is now sufficiently improved for single-knob supers to be getting about. What is here termed the main tuning is mostly aerial tuning, but in cases where an aperiodic H.F. stage is used this is not the case.

No reaction control is needed on a superhet., and in the absence of this it becomes one of the easiest receivers to tune. That is, if you know how.

But you must go about it in the right way, for it is somewhat different from the tuning of an ordinary set. In fact, anyone not used to superhets. can easily meet a number of quite puzzling things.

No, I won't go into the story of beat reception—this has been explained enough times already. I'll just content myself with the practical considerations, which after all are what count.

First of all, the tuning of the oscillator coil is bound to be on the sharp side, on both long and medium waves, though not quite so much so on the long. The sharpness of the other control depends upon the type of circuit in use, whether band-pass, frame or otherwise.

Anyhow, the first thing to get is the local programme or programmes on medium waves. Assuming the aerial tuning is quite sharp it's not a bit of good swishing the dials aimlessly backwards and forwards.

Systematic Searching.

You might be lucky and hit the local with a bang, but more likely than not you will simply be rewarded with a dead silent background. The first disconcerting thing!

More system please! Start with the tuning dial at say five degrees and slowly—mark that, slowly—move the oscillator from zero upwards. If you do not hear anything by the time you reach maximum, move the tuning forward another five degrees and come slowly down to zero on the oscillator again.

Carry on with this procedure until you do hear a station. You won't have to wait long, and it may be the local, or it may just as likely be somebody else's local.

That's a way superhets. have. When you've got a programme, tune it in to its maximum on the aerial tuning condenser, and if it is at all loud continue turning the oscillator dial until you hear it again.

Yes, that's all right. There are two oscillator readings for practically all stations on a super., so make a note of these three readings—one aerial tuning and two oscillator.

Logging the Stations.

Now, having found a point where the dials are in step, it will be easy to work upwards in readings and note down settings for other stations. Stick to the upper or lower oscillator settings according to which seems the louder on most stations, and you will soon have a lot of stations logged.

Generally, oscillator couplers are nowadays designed for the use of the lower readings. Still, that's no reason why you should not try both.

It is possible, supposing you are using

just possible for two transmissions to come in at once.

The bottom oscillator setting for one station may turn out to be exactly the top setting of another, and so they will both come in at once. That is, assuming, of course, that they can both crowd through the aerial circuit.

The remedy for this is to use the other oscillator setting for the wanted transmission. You will be extremely unlucky if this also turns out to be just right for two stations as well!

Sometimes, instead of the two programmes coming in on top of one another, one will come through with a heterodyne of the other on it. The remedy is just the same; simply turn to the other oscillator setting of the wanted station.

No Reaction.

One great advantage of a superhet. over a receiver that has a reaction control, is that once found the readings for stations remain put, and there is not one particular dial on which the setting depends upon the amount of reaction employed.

And as a last word, everything in the foregoing applies equally to the long wave-

A "PENNY-IN-THE-SLOT" RADIO RECEIVER



This automatic slot machine for radio programmes is being tried out in a barber's shop in Philadelphia. It is a five-valver which will work from mains or batteries, and a red light comes on as a warning about a minute before it stops, so that one can insert another coin in time to avoid missing a desirable part of some item. It should be a bit better than the usual papers that are provided to while away the time until one's turn comes to respond to "Next, please!"

the upper oscillator readings, that at the top of the tuning dial you will find that you cannot go high enough with the oscillator adjustment. If this turns out to be the case, then for these readings you must revert to the lower oscillator settings.

Dodging Interference.

When a "flattish" aerial circuit is being used, the procedure is just the same. But most of the tuning will be obtained on the oscillator dial, the setting of the other not being critical.

But there is one snag in this flat aerial circuit business. In spite of the stations being well separated by the oscillator, it is

band, with the exception that here there will most certainly be only one oscillator reading, which, if such is possible, makes things even simpler.

The reason for only one reading is not difficult to explain. The fact of the matter is that a given number of kilocycles means a much larger wave-range on long waves than on medium.

Thus there is a much bigger wave-length difference between the received long-wave station and the oscillator frequency on the long waves. Because of this the condenser will not cover a sufficiently large band to get both readings in on the oscillator condenser.

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 letters direct to Capt. Eckersley; a selection of those received by the Query Department in the ordinary way will be answered by him.

Reversing the Secondary Leads.

R. R. (Dulwich).—"Some time ago I had great difficulty in preventing motor-boating with a receiver using two transformer-coupled L.F. stages, and I found that the trouble was cured by reversing the connections to the secondary terminals of one transformer. I am unable to account for this, and should be pleased if you could give an explanation."

Motor-boating is caused by the low-frequency cascade connection of valve circuits bursting into momentary oscillation, which oscillation in building up paralyses itself, but a moment later builds up again—and repeats the process *ad infinitum*.

Oscillation will occur when the fortuitous couplings between valves arrange for electrical impulses to be thrown to and from the different valves in a certain phase relationship.

For instance, it is only by arranging the relative flux of windings of main coil and reaction coil in a receiver using the retroactive principle that the set can be made to oscillate; if the reaction coil is reversed the set will not oscillate.

So in your low-frequency circuits you stopped oscillation by reversing a coupling coil, and so reversing the phase of one of the voltages feeding back.

Why Not Tune the L.F.

B. R. (Hornsey).—"I understand that the only difference between an H.F. amplifying stage and an L.F. stage is the actual frequency amplified. Why is it that the H.F. stage requires tuning to the actual frequency (or the band of frequencies) and the L.F. stage does not?"

Suppose you arranged the high-frequency circuits to amplify equally over a range of frequencies from 1,500 kilocycles per second to 500 kilocycles per second (200 metres to 600 metres wavelength).

Then you would tune in every broadcasting station simultaneously! You could, if your set was sensitive enough, hear all the programmes at one and the same time. Not so good!

But if your high-frequency circuits only magnify sensibly between plus or minus 5 kilocycles around the frequency of carrier-wave of one station, then you are sensitive only to the transmissions from one station—much better!

Suppose you tuned your low-frequency circuits so that they could respond only to

plus or minus 10 cycles around, say, 1,000 cycles, you wouldn't hear music or speech, you'd just hear occasional squeaks. But if your low-frequency circuits respond equally from 50 to 5,000 cycles a second, you hear most of the required spectrum of music and speech. And that's what you want to do!

Fixing a Frequency Filter.

S. B. (Manchester).—"When designing a set where it is proposed to cut off frequencies above a certain point, where should the condenser and resistance be joined—across the loudspeaker, across the filter output choke, or in the first L.F. stage?"

Actually, you can use a filter anywhere.

formed from many components carefully calculated (and the calculations are pretty complex), give a sharp cut—it's a bit taily.

You can make very good high-impedance post detector filters with sharp cuts by using low-frequency tuned circuits, but how to do it would be giving away valuable trade secrets not mine to give.

Why Did the Lamp Glow?

R. D. W. (Highgate).—"I have an all-mains set using indirectly-heated A.C. valves. Across the heater circuit of the detector valve I have a small indicating lamp.

"When only one side of the mains is broken, the indicating lamp, instead of going right out, glows at half brilliancy. When, however, both mains leads are broken with a D.P. mains switch—or the switch is transferred to the other mains lead—the lamp is extinguished."

I can only suppose there's some complex system of earths which arrange for the primary of the transformer to pass current through its winding when the earthed side of the mains only is broken.

It's a little difficult to be more exact without a full diagram of connections, but I think you will find that my explanation is right in principle.

Using the Old H.T. Battery.

D. R. (Felixstowe).—"My H.T. battery is rather old. It started life with 120 volts, but now only registers 60 volts.

"I intended to add another 60-volt battery to bring the voltage up to the original 120 volts. My dealer says that this cannot be done. Why?"

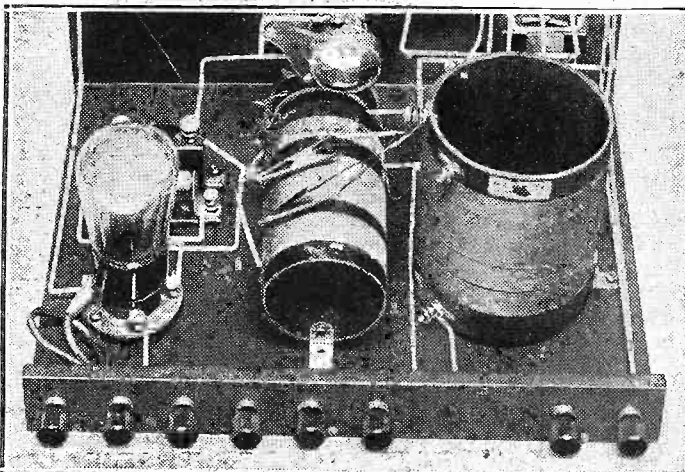
It can be done sometimes, as a matter of fact, but it's not good practice and may not work. Because when a dry battery runs down it develops a high internal resistance.

Another way of saying the same thing is that the run-down battery will only give so-and-so much limited power.

Thus suppose your set requires 1 milliamps. Suppose the run-down battery will only give $\frac{1}{2}$ I milliamps, then even with a new battery in series the old one refuses to give the necessary amount and your set is starved of the required power.

Sometimes a run-down battery will for a week or two longer give the required amount and then it is possible to use a new battery in series. But, in any case, the old one won't last long and it's better to chuck it away and dodge trouble.

DON'T FORGET THE CLIP ADJUSTMENT



If your set incorporates a "P.J." coil or any similar arrangement with a flex lead and clip, don't forget that to find by experiment the best position for that clip is the first step towards giving the set its correct degree of selectivity

It is preferable, however, to use the filter immediately following the detector because, suppose there's a lot of mush coming from the detector, it's better to clean up the signal before passing it on to the other valves.

This is not absolutely fundamental, it's merely better style. By the way, remember a resistance/condenser filter does not, unless

ONLY IN "P.W."

can you read Capt. Eckersley's replies to listeners' own problems.

AND REMEMBER—

Captain Eckersley's technical articles appear only in

"POPULAR WIRELESS" and "MODERN WIRELESS"

THE MIRROR OF THE B.B.C.

By O.H.M.

NONSENSE ABOUT "ENQUIRIES"

PUBLICITY FOR B.B.C. OFFICIALS — THE AMATEUR ORCHESTRA OF LONDON.

THERE has been so much nonsense published recently about the imminence of a Parliamentary enquiry into the B.B.C., and "growing public alarm," that it is perhaps worth while saying as a fact that the B.B.C. was never farther from such a contingency than it is at present.

The truth is that the B.B.C. is stronger by far than ever before. Licences in January increased by nearly 150,000, and that without any special Post Office enforcement campaign. Programmes are getting better if only because they are becoming more challenging and in some respects more acutely interesting.

This does not mean that the B.B.C. is perfect or anywhere near it; but it does mean that broadcasting in this country has taken a new lease of life, or has acquired a new measure of vitality.

Publicity for B.B.C. Officials.

This is a subject which I think needs "lining up," to use an expression which I hear frequently from friends at the B.B.C. When I was writing for "P.W." about six years ago, there was a rigid application of an anonymity rule for all regular members of the staff and the directors of the company. Things have changed a good deal in the interval and there may be excellent reasons for the change.

But, so far as I can see, while it is obviously right from the point of view of showmanship to publicise the names of programme performers, artistes, and conductors, there should be either a line drawn somewhere to prevent favouritism, or no line drawn!

My suggestion is that as a break has obviously been made in the old rigid rule,

THE POSTMASTER-GENERAL



This is Sir Kingsley Wood, who will be remembered for his recent interesting talk on Savings. His position as P.M.G. makes him responsible to Parliament for all the broadcasting in this country.

it should be abandoned and publicity given with due and dignified reserve to all microphone personalities and performers of interest to the public, whether they happen to be members of the staff or not.

The Amateur Orchestra of London.

I hear that the B.B.C. has decided to take half of the special concert of the Amateur Orchestra of London, conducted by Mr. Wynn Reeves, which will be given at the Kingsway Hall on April 11th.

Only one commentator, instead of two as in previous years, will describe the Oxford and Cambridge Boat Race on Saturday morning, March 19th. He is Mr. John Snagge, whose voice as an announcer is already well known to listeners and who counted the strokes and generally dealt with the progress of last year's contest.

The calling of the landmarks and the chatty stuff about the crowds and the aeroplanes will be cut out, since the race is no longer a novelty for listeners and takes only about twenty minutes, all of which is wanted for talking about the crews.

In other respects the commentary will follow the usual lines, in that a portable short-wave transmitter will be installed on the launch "Magician," which will follow the crews at a distance of about sixty feet, in their great effort from Putney to Mortlake.

The commentator stands in the bows of the launch, protected, with his microphone, from the wind and spray by a tarpaulin. The transmitter is in touch with a temporary receiving station on the roof of Harrods' depository, from where the commentary will be passed by land-line to Savoy Hill.

Immediately after the race, Mr. Gerald Cock, the O.B. Director, will dash from the "Magician" to Twickenham, where at

2.50 p.m. a commentary is due to begin on the Scotland versus England match.

By the end of the match Mr. Cock will have had quite enough hustling for one week, because his plans are to spend the night previous to Boat Race day motoring back from Aintree after seeing through the broadcast commentary on the Grand National that afternoon.

Our most famous steeplechase is one of the most difficult "O.B." jobs of the year, since it was decided that owing to the difficulty of keeping the runners in sight

CARDIFF'S CHIEF



Mr. E. K. Appleton, Director of the Cardiff Station, who is responsible for the Sunday afternoon "Joan and Betty" Bible stories.

the commentary on the actual race shall be given in two distinct parts.

This was done last year by Mr. R. C. Lyle describing its progress over that portion of the course on the Grand Stand side of Becher's and Valentine's Brooks, and Mr. W. Hobbiss watching events over the remainder of the course, including Becher's

(Continued on page 1558.)

THE LISTENER'S NOTEBOOK

A rapid review of some of the recent radio programmes.

HAVING heard all that the first of the Vaudeville critics has had to say, we are asking ourselves whether Mr. Herbert Farjeon has served any useful purpose. I am inclined to think he hasn't, because he didn't go far enough. His first talk was negligible as criticism; his last was merely a defence of criticism. The two intermediate talks criticised the producer, and not the *artistes* who needed the criticism. And yet I've read that the latter have raised their voices in protest. Against what? My impressions of B.B.C. Vaudeville—during the Farjeon period, at any rate—are that the shows are too unequal in quality to command a regular following.

The talked-of Raymond Watson is only another edition of Gillie Potter without the

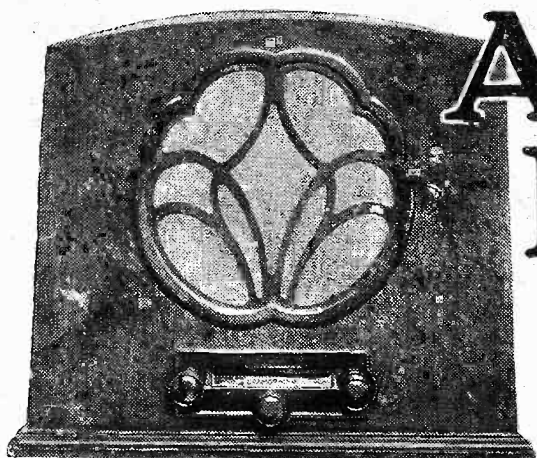
latter's pronounced mannerisms. However, he did his bit very pluckily, although the studio audience was, one could sense, very cold. I daresay they were fed-up directly they found him leading off by making fun of announcers. This is played out.

Those Vaudeville Turns.

Hyde and Burrill were in "It's Nothing Serious," and, it may be added, nothing new or really entertaining. Jeanne de Casalis is overdoing the Mrs. Feather business, and I wonder at the B.B.C. passing some of the patter. This was, to say the least of it, doubtful in places, and reminiscent of the days of Marie Lloyd and Bessie Bellwood.

Jack Morrison, as an impersonator,

(Continued on page 1558.)



An ingenious tuning-scale is fitted.

A BAND-PASS MAINS SET

Below are some interesting details of the latest all-electric band-pass receiver made by H.M.V. The set is known as model 435, and incorporates many ingenious features.

By K. D. ROGERS.

I HAVE recently had an opportunity of testing the first H.M.V. straight radio set—Model 435, and needless to say I was very glad of the chance.

H.M.V. have built up such a reputation in the world of mechanised music that I naturally expected something good. I was not disappointed, and the results obtained fully justified my expectations.

The sensitivity of the receiver is very high, and the selectivity of the band-pass circuits is all that is likely to be required by the majority of listeners.

Ample Selectivity.

On test in London the H.M.V. 435 very easily separated the local stations and left plenty of room between them for the reception of foreigners.

With the aid of reaction it was easily possible to get either the North Regional or Langenberg free from one another, though both stations came in at good strength.

Altogether some 20 or more medium wave stations were heard at good strength, while on the long waves a good half dozen provided real programme value.

Provision is made on the set for a pick-up, and with the H.M.V. playing desk a very fine radio-gramophone is obtained.

The set is A.C. driven, consuming but 25 watts, and delivering an output of between 1½ and 2 watts undistorted power. Provision is also made for additional loudspeakers besides the moving-coil speaker incorporated in the set itself.

The transformer coupling of the pentode L.F. stage (the set is S.G., Det., Pentode) is of the shunt-fed variety, but one of the most ingenious parts of the set is the control switch.

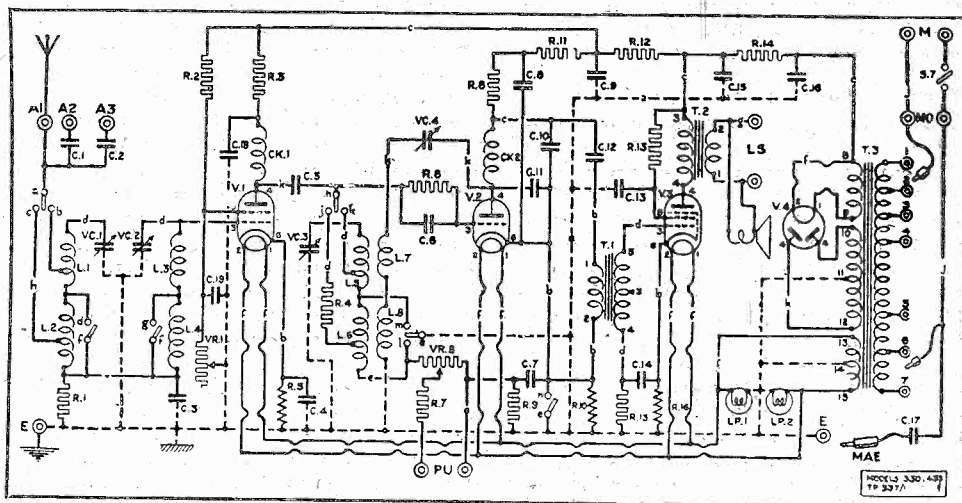
This is arranged as a longitudinal rotating dial scale with semi-exterior lighting. The scale rotates simultaneously with making the necessary wave-length switching

changes in the circuit, introducing a separate wave-length scale for medium and long waves.

When the word gramophone appears, the switch is in the gramophone position, and when OFF is shown the set is switched off.

The price of the 435 is not excessive, as for the 20 guineas asked, H.M.V. have produced an instrument that fully upholds the reputation for first-class workmanship enjoyed by the gramophone company for many years. The finish of the set is, of

HOW H.M.V. ARRANGE THE CIRCUIT



FROM THE TECHNICAL EDITOR'S NOTE BOOK.

Tested and Found-?



NEW SETS FOR OLD.

A MOTOR-CAR owner can always obtain an allowance on his old car against the purchase of a new one. But radio enthusiasts are not universally provided with such a service.

However, there is at least one firm which conducts business in the enterprising "part exchange" manner. It is Radialaddin, Ltd., of 42 and 48, Berners Street, London, W.1, and they are prepared to give allow-

have tried. They are made on a "minimum insulation," and "air-spaced" basis, and what little ebonite there is very good ebonite.

I can give them full approval for all "P.W." sets designed to take plug-in coils and for general experimental use.

Other useful and well-made Melbourne items to hand include a rotary switch, a wander plug fuse holder, and a pilot lamp. Useful gadgets all, and every one worth the close consideration of the discriminating constructor.

THE "MAGNADENSER."

Burne-Jones & Co., Ltd., are now making a solid dielectric variable condenser which they have styled the "Magnadenser." It is available in .0002 mfd., .0003 mfd., and .0005 mfd. capacities at 2s. 6d., complete with knob.

It is a well-made component and incorporates sound features of design, including a positive connection to the moving vanes.

The movement is smooth, and an H.T. test proved that its insulating qualities are above the average.

THE "AMAZING" THREE.

I have now been able to test the Graham Farish kit set, details of which appeared in our last issue.

You will remember that I paid tribute to its neatness and its cleanness of design.

I should also say that it is much smaller than the average "three" and we find its assembly to be particularly simple. It is hard to see how anyone, however slight his knowledge of the art of home-construction, could possibly go wrong.

And yet it bears a much more polished and refined appearance than the majority of home-assembled receivers.

The circuit comprises an anode bend detector and two L.F. stages. It is necessary carefully to adjust the detector H.T. and grid bias voltages, but when this is done very good results are given by the little set.

Remembering its price, a performance whereby at Tallis

House, in daylight, Radio Paris was receivable at good loud-speaker strength, clear of 5 X X, and the North Regional available also at good volume is certainly quite attractive for such an inexpensive instrument.

And all this was when the lower coil tap was in use. Greater power is available for those not requiring the maximum selectivity obtainable on the receiver.

The London National and Regional could be separated fairly easily, although it was essential that the G.B.'s and H.T.'s should be properly set.

PLEASE NOTE.

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!

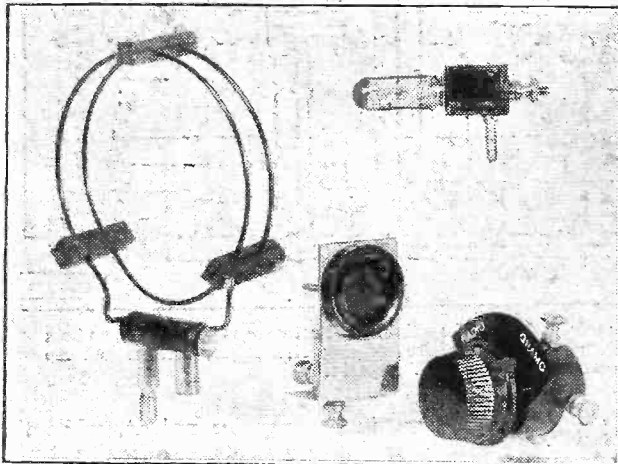
And readers should note that the subsequent reports appearing on this page are intended as guides to buyers, and are, therefore, framed up in a readily readable manner, free from technicalities unnecessary for that immediate purpose.

Altogether I consider the "Amazing" Three an interesting proposition. It is superior to some commercial kit sets selling at higher prices, although I must add by way of a P.S. that the general standard of these is not, in my opinion, a high one, and that is why I fancy the Graham Farish set should commend itself to many enthusiasts.

PERTRIX H.T. BATTERIES.

There is a leaflet obtainable from all good radio dealers which very clearly details the whole range of Pertrix H.T. batteries. It enables you to see at a glance the particular Pertrix which is likely to suit a certain type of set. In passing I must mention that I have always found Pertrix batteries to be very good, and this is quite an unsolicited appreciation!

COMPONENTS WORTH NOTING



The four Melbourne Radio items mentioned in this column.

ances on any types of old sets against the purchase of new sets.

There do not appear to be any snags whatever, and I can add that I have personally heard one or two good reports of the concern.

FROM MELBOURNE RADIO.

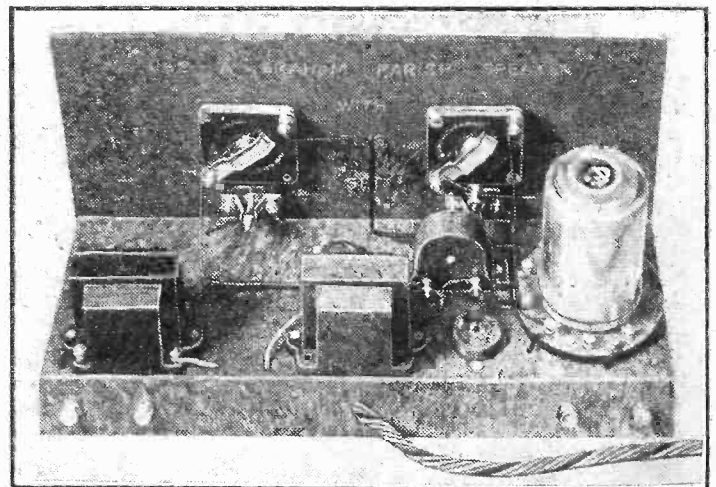
With all the interest that is now being devoted to the subject of short-wave reception there must surely be a strong demand for short-wave components.

Of these, coils are probably the most important. You must have special coils, of course, and on the short waves they must be efficient coils.

Melbourne Radio have an excellent line of them and I owe them an apology in that I should have included a report on their coils in this page several weeks ago, but I overlooked them and they did not even get their rightful turn in the rather long waiting list.

However, I am able to say that they are very good coils indeed, as good as any I

THE GRAHAM FARISH KIT SET



Excellent chassis mouldings are a feature of the "Amazing" Three.

MARCONI HL.2

The outstanding general purpose valve for 2-volt users

Marconi HL.2 is a medium impedance valve of exceptional merit, which should certainly fill at least one position in battery-operated receivers. Its long, straight steep characteristic (shown here) gives altogether flawless amplification, its performance as detector in sets with one or more S.G. stages being equally notable. All the most advanced features enter into its construction (lower inset) mica bonding and multiple filament suspension ensuring extreme stability and absolute consistency.

There are other Marconi 'HL' valves of similar merit for 4 and 6 volts (upper inset) and for A.C. Mains.

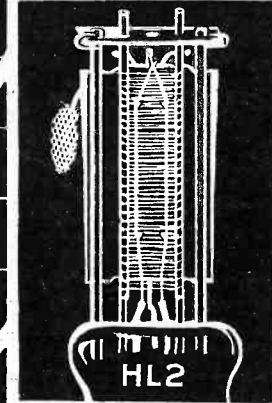
'HL' TYPES

HL.2	2 volt	- 8/6
HL.410	4 volt	- 8/6
HL.610	6 volt	- 8/6
MHL.4	A.C.	- 15/-

MARCONI VALVES FOR THE

'COSMIC THREE'

Detector	HL.2	- 8/6
L.F.	- L.2/b	- 8/6
Power	- P.240	- 13/6



ANODE CURRENT IN MILLIAMPERES

GRID CURRENT IN MICROAMPERES

4.0

3.0

2.0

1.0

4.0

3.0

2.0

1.0

GRID VOLTS

6

5

4

3

2

1

0

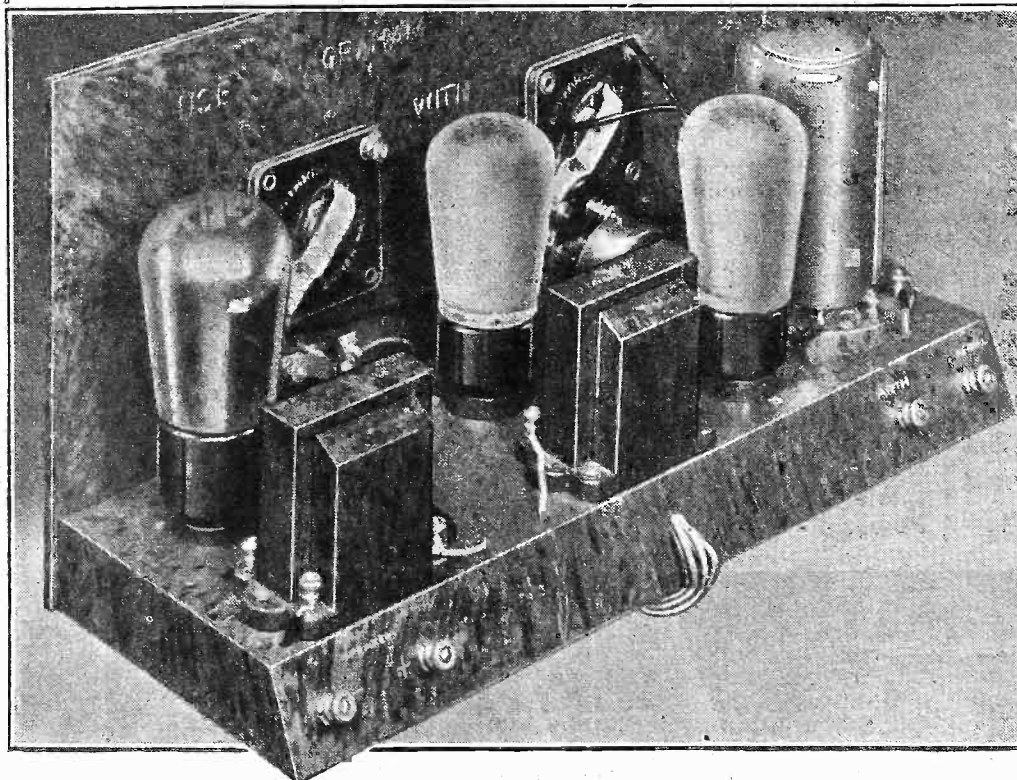
EA 150

EA 125

EA 100

75

See what the "AMAZING 3" offers YOU!



List of Components:

1 Moulded and Engraved Panel ..	3/6
1 Moulded and Engraved Chassis ..	4/6
1 Snap L.F. Transformer ..	5/6
1 Snap H.F. Choke ..	2/-
1 Snap L.F. Choke ..	5/-
1 Screened High-efficiency Coil ..	7/6
1 Littlos '0005 Log Mid Line Con- denser ..	2/-
1 Littlos '0003 Reaction Condenser ..	2/-
1 On-and-off Battery Switch ..	8d.
1 3-point Push-pull Switch ..	9d.
3 4-pin Sub-panel Valve Holders ..	1/6
2 Fixed Condensers ..	3/-
1 50,000 Ohmite ..	1/6
1 1-meg. Ohmite ..	1/6
1 Battery Cord ..	1/6
Wander Plugs, Terminals ..	2/-
Fixing Screws, Clips ..	6d.
Sleeving, Wire ..	6d.
Spanner and Screwdriver ..	6d.
Full-size Blueprint, easy instructions ..	6d.

TOTAL 47/3

SOLD COMPLETE FOR 38/6

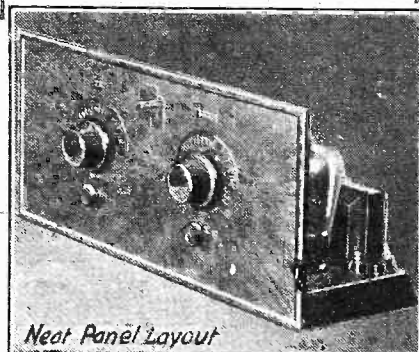
—The ONLY KIT with:

- A specially designed SCREENED COIL.
- A Moulded BAKELITE PANEL, with scale readings and indications in relief and fixing holes drilled.
- A Moulded BAKELITE well CHASSIS, with position for each component outlined in relief and fixing holes drilled.
- The majority of wires concealed beneath chassis.

- A factory-built appearance when finished.

- Single-knob tuning. No soldering.
- Spanner and Screwdriver — the only tools required—provided with each Kit.
- Each Kit packed in attractive Orange and Black Container.

AT ALL RADIO DEALERS.

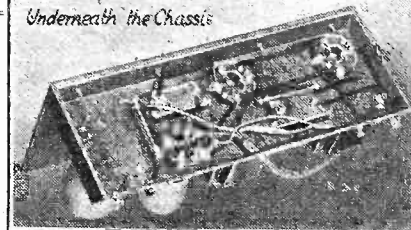


Neat Panel Layout

What others think:

- EASTBOURNE—**
"I got splendid results, both at home and abroad. I consider you are quite justified in claiming your Kit as the 'Amazing 3.'"
- NOTTINGHAM—**
"Have got the 'Amazing 3' built, and it is truly amazing. I have never heard a better set, and am more than pleased with it."
- LIVERPOOL—**
"I must first congratulate you on producing such a fine Kit as the 'Amazing 3,' which I think is great value for the money."
- CORNWALL—**
"On test the set is stable and the quality of reproduction excellent. Taking the set on finish and price basis, it is certainly an 'Amazing 3.'"

Underneath the Chassis



**Emergency
Coupon!**

In case of difficulty send this coupon for FREE Descriptive Leaflet to GRAHAM FARISH LIMITED, Bromley, Kent.

Name.....
Address.....

Use a Graham Farish Speaker for best results from your "AMAZING 3."
SEND DIRECT WITH CASH IF YOUR DEALER DOES NOT STOCK.

B.B.C. DEVELOPMENTS

Many knotty problems have to be solved by the B.B.C. Engineers from time to time, and technical developments are always following one another in rapid succession. Here is a very lucid account of this important side of the B.B.C.'s work.

By NOEL ASHBRIDGE, Chief Engineer of the B.B.C.

IN discussing the question of possible developments in broadcast transmission, I do not propose to go deeply into problems which only affect the economical working of the transmitter itself, but to deal more with possibilities which are of direct concern to the listener.

However, questions of efficiency and the development of new types of valves are extremely interesting to broadcast engineers, because although present-day transmitters are very efficient from the point of view of reliability and reproduction, they are not efficient from the point of view of the amount of energy wasted.

These Interfering Sidebands.

In other words, in order to get high-quality reproduction it is still necessary to work the power valves at a very low efficiency, and consequently vast quantities of power go to heating cooling water.

Incidentally, the permissible upper temperature of this cooling water is not high enough to allow much use to be made of the waste heat. As to valves, there is no doubt that there will be further steady development in connection with the high-power types used for broadcast transmitters.

The present valves we use are good, but not perfect, and the coming of more and further improvement to the sealed-up or glass type of valve, as well as development on totally different lines, including the continuously evacuated type, is almost certain during the next few years. However, special methods of transmitting, which would affect the service of broadcasting in a more direct way, are probably of greater interest to listeners generally.

At present all broadcast transmitters work on the plain, straight-forward double side-band system, and each one covers a total frequency band width of approximately 20-30 kilocycles. At the same time the separation between stations is 9 kilocycles in most cases, and it is only

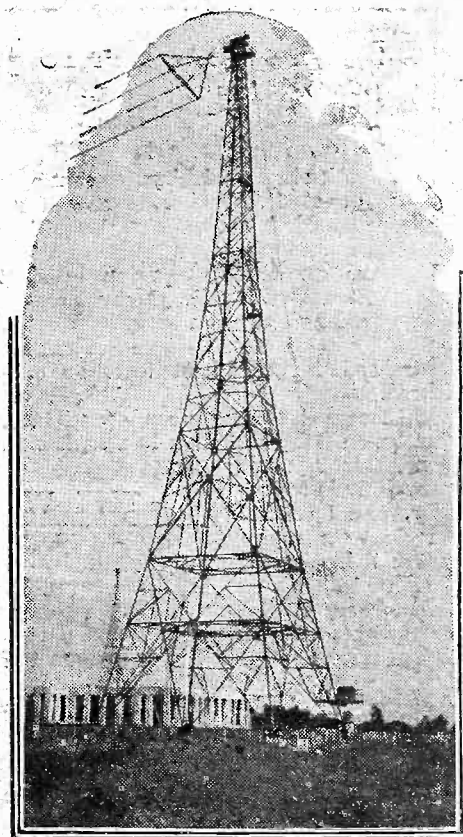
due to the fact that the higher musical frequencies are radiated at much less strength than the lower ones that prevent outrageous interference.

Three Possible Cures.

This does not mean, of course, that the higher frequencies are not radiated at their correct value, but that they are produced in ordinary speech and music at less strength than the lower ones. It is only too well known that frequently there is interference due to this small separation of 9 kilocycles, and that this interference is a serious international problem. The obvious cure of arranging the stations with wider separations between them has already been discussed very fully indeed. It is interesting to consider, however, whether any improvement could be effected by using some special transmitter, or unusual type of aerial. There are at least three fairly obvious possibilities of this kind:

1. The use of directional aeriols.
2. The use of aeriols which confine the radiation approximately to a horizontal plane.
3. The use of single side-band working.

First of all with regard to ordinary directional transmission, in general this would be quite feasible from the point of



view of aerial arrangement; in fact, it is already being done in this country and abroad.

For instance, 5 G B radiates slightly more energy in the direction of the densely populated districts of Birmingham and Wolverhampton than it does in the London direction. The aeriols for 5 G B are supported on the 500-ft. towers at Daventry, which also support the 5 X X aerial, and they take the form of two slightly-inclined vertical wires, one wire stretching from the top of each mast to the ground.

The supply of high-frequency energy to these two aeriols is by means of transmission lines, which can be made to give the correct phase relationship in the aeriols by adjusting their lengths. I believe, also, that some degree of directional effect is used for the new station of 120 kw., near Prague. There is no fundamental difficulty, therefore, in the use of directional aeriols for broadcasting.

Prague's Plan.

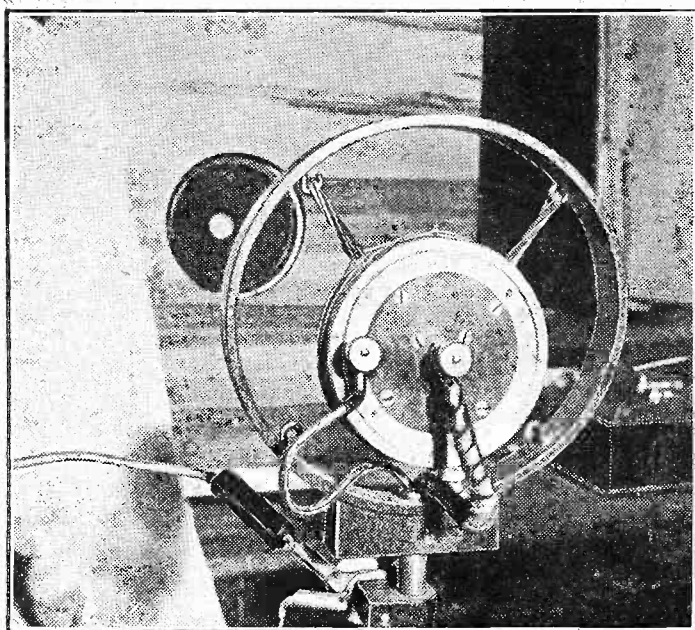
However, when one comes to consider this problem in a general way, in most cases there are serious difficulties. For instance, if one wished to prevent our stations in this country interfering with the Continental stations, it would be necessary for all the high-power stations to be situated on the East Coast and equipped with aeriols which radiate beams mainly in a westerly direction.

This would mean that the stations could not be placed in or near the dense centres of population, and for this reason a great deal of useful service area would be, to a large extent, wasted.

Nevertheless, I think that this method of working could be applied on the Continent to some extent in connection with the stations which have to serve a large city situated near the frontier, but this would

(Continued on next page.)

PUTTING A MIKE THROUGH ITS PACES



The B.B.C. have been testing out several new types of microphones recently, and their technical staff have made many interesting discoveries. This photograph shows a new "mike" undergoing test. The loudspeaker seen in the background produces standard signals, and the microphone's capabilities are judged by the strength and quality of the reproduction in its output circuit.

B.B.C. DEVELOPMENTS

(Continued from previous page.)

give protection in the neighbouring countries against direct interference, rather than that due to side-band jamming, since it is arranged normally that neighbouring countries have considerable spacing between their allotted wave-lengths. One such case is that mentioned already, namely Prague, and there are other cases where this method of transmitting might at least be considered.

With regard to the second possibility, namely, confining radiation to a horizontal plane, this is much more difficult technically, and I think I am right in saying that no high-power station in regular service has yet definitely obtained the desired results.

Service Area.

There are two possible advantages to be considered from eliminating radiation at an angle to the horizontal: first of all the question of whether mutual interference can be reduced as between different countries, and, secondly, the extension of the service area of the station itself.

In connection with the former, it has to be borne in mind that if there were no radiation at a steeper angle than about 10 degrees with the horizontal, it is probable that indirect ray reception at night would still be possible, but presumably such reception would only be strong at considerable distances.

It is perhaps difficult from the practical point of view to visualise an aerial which would allow no radiation at all other than horizontally, and therefore reception due to radiation at angles of the order of 10 degrees or thereabouts would always exist.

"Single Side-band."

This means that in the case of Stuttgart reception would probably still be strong over a large part of England. Thus it is doubtful whether this can be looked upon as a cure for mutual interference between neighbouring stations. However, some benefit might accrue in this connection if the indirect ray at distances of the order of 200 to 300 miles were reduced, and the allocation of waves were revised. Again, if this could be done, it might reasonably be expected that the range free from fading might be extended considerably, this meaning, of course, a very large increase of service area.

At the present time the service area of

most high-power stations is limited at night time by its own indirect ray, unless it has already been limited by the indirect ray of one or both of its neighbours. In most cases, however, the first state of affairs exists.

Therefore, if the value of the indirect ray at distances between, say, 80 and 150 miles from the station is reduced, we should get a greater range free from fading. This might be achieved if an aerial could be designed which gave no radiation above somewhere about 20 degrees to 30 degrees. Of course, the above assumes that the simplest form of reflection takes place at the Heaviside Layer.

Finally, with regard to single side-band working, we have to consider whether a reduction of mutual interference would be

THE WORLD'S FIRST RADIO CITY.



A view of the excavations in New York from which will arise "Radio City," a huge block of skyscrapers in which will be centred the radio and television activities of New York.

possible were all stations working on this principle.

It would seem clear that in cases where one particular station was experiencing mutual interference with its neighbour on one side, but not on the other, some benefit would result if the two stations in difficulties were to adopt single side-band working. If, however, there is interference generally, then the use of this method would not seem to be practicable.

Ultra-Short Possibilities.

There are, however, one or two peculiarities in connection with single side-band working, the principal one being the fact that unless square-law detection takes place at the receiver there will be distortion, and the present tendency is to obviate square-law detection in receivers and obtain straight-line detection.

Therefore, in considering this particular method for cutting out side-band troubles,

one has to take into account very carefully the normal design of receivers used by listeners.

Again, it is to be remembered that the power of a station with one side-band cut off is obviously less than when both are present, and generally some considerable modification of transmitters would be necessary. It would probably be rather difficult internationally to come to an agreement to make a drastic alteration to existing transmitters, having regard to the natural reluctance of engineers to modify an expensive transmitter which has only recently been put into operation.

Thus it will be seen that some of the newer forms of transmitter technique are not at any rate easy to apply to broadcasting transmitters; nevertheless, it would be a great mistake to ignore these possibilities when considering the future.

Another obvious transmitting development is afforded by the possibilities of transmitting by ultra-short waves, namely, wave-lengths between, say, 5 and 9 metres, but this is a separate question altogether.

COMPLIMENTS FROM CONSTRUCTORS

Some letters received from
enthusiastic "P.W." readers.

THE W. L. S. FOUR.

The Editor, POPULAR WIRELESS.

Dear sir,—Having constructed the "S.G." Four, designed by W. L. S., and having given the same a thorough test, I am forwarding you my results.

It certainly is a "hot-stuff" set, not only on the short-waves, but on the medium and high. On the short-waves I have Zeesen at tremendous strength from early afternoon onwards; also 2 R O, Moscow, and Pontoise, have also received W 2 X A F, W 1 X A 2, H V J, W 2 X A D, L S X, and many others.

On the medium-waves I have had over sixty stations, while on the high I have had nine. I have a large selection of plug-in coils covering from 15 to 2,000 metres. My aerial is 100 ft., and about 50 ft. high, clear of any roofs, but I am not blessed with a short earth. This wire is 50 ft. long; still I get some wonderful reception. I also use the set for gramophone work, having inserted a switch in the S.G. so that I can cut it out when using gramophone. My speaker is the 66R. Bluespot with large baffle-board, and the tone is perfect, either on radio or gramophone, with enough volume to fill a large hall.

I wish to thank W. L. S. for this splendid design which certainly brings in the stations. I am so pleased, that I am giving the set a new cabinet. When I have had the set going for six months I will be able to give further reports; in the meantime, thanks for a first-rate radio set, and best wishes for 1932.

Yours faithfully,

BRUCE FERGUSON.

Strathbungo, Glasgow, S.1.

THE KUKKA-BURRA AGAIN!

The Editor, POPULAR WIRELESS.

Dear Sir,—With reference to Short Wave Notes in POPULAR WIRELESS, dated 20th Feb., I live only a few miles from Virginia Water, and shall be interested to get into touch with W. H. C.

Incidentally, I am an "S.G.4" owner, and for the first time I tuned in Sydney on Saturday last at 12.45. I heard a piece by Sydney Cinema Orchestra, followed by a piece by Australian Municipal Orchestra. I heard the call-sign, V K 2 M E, and also the Kukka-burra. At 13.00 it was announced that a special call was to be made to W G Y (N.Y.), and I was able to take down the message of congratulation on the tenth anniversary of that station. I was able to get full headphone strength, and, in fact, it was understandable on the loudspeaker by other members of the family.

There is one point about the "S.G.4" which I put down as the cause of a lot of my troubles early on. This is the adjustable condenser on the metal screen dividing the H.F. from L.F. section. The terminals of the condenser go right through to the bottom, and must have been touching the metal screen which is, of course, earthed. I am now perfectly satisfied with my "S.G.4."

Yours faithfully,

G. NEWMAN.

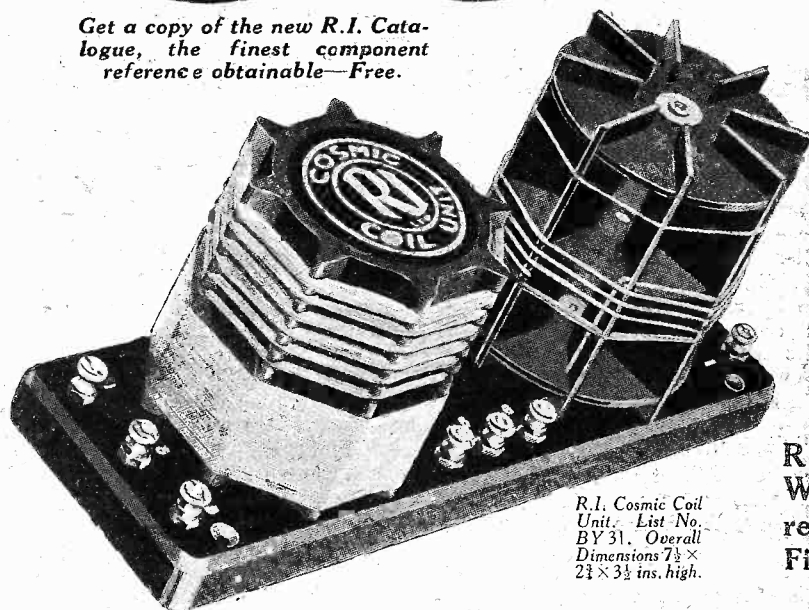
Sunmead Road, Sunbury-on-Thames.

Build the 'COSMIC' III

with the



Get a copy of the new R.I. Catalogue, the finest component reference obtainable—Free.



R.I. Cosmic Coil Unit. List No. BY 31. Overall Dimensions $7\frac{1}{2} \times 2\frac{1}{2} \times 3\frac{1}{2}$ ins. high.

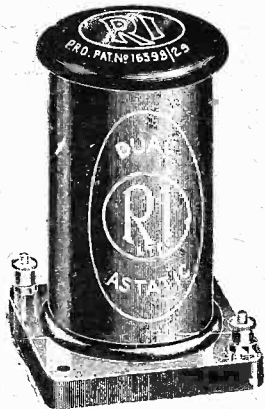
When you build any circuit with R.I. productions as the principal components you *know* the set is bound to give the best possible results as claimed by the designers. R.I. is the hall mark of British radio manufacture. Every designer and experienced set builder relies upon R.I. because he knows they are the unfailing components that never disappoint.

R.I. COSMIC COIL UNIT

The R.I. "Cosmic" Coil Unit is specified for the "Cosmic" III, because of the **distinctive and exclusive advantages** that it possesses. It combines in **one complete unit**, coils for long, medium and short waves, ensuring easiest fixing and most compact set assembly. A fact of paramount importance is the skeleton construction of the short-wave coil former, which **reduces dielectric losses to a minimum—a vital point in this circuit.** Every individual coil is **carefully tested**, before release, on the "Cosmic" III circuit, and checked with a wavemeter over the entire range of broadcast and short-wave bands.

12/6

R.I. have produced this full-sized **WIRING CHART** for the benefit of "P.W." readers. Ask for a free presentation copy. Fill in the coupon below, hand it to your dealer, or post direct to R.I.

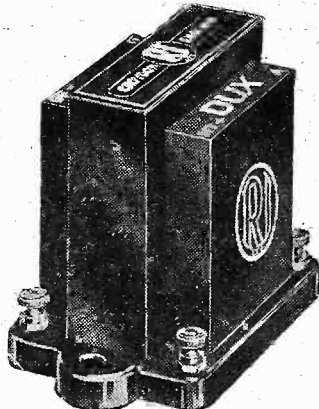


DUAL ASTATIC CHOKE

This choke is pre-eminently best for the "Cosmic" III and "Cosmic" III Star, because of its remarkable efficiency on the short waves as well as the medium and long waves. It is the only choke that cuts out all blind spots and resonant losses—an important feature for short-wave work. Freedom from H.F. interference with adjacent components is assured by its astatic winding and skeleton form of construction.

List No. FY1.

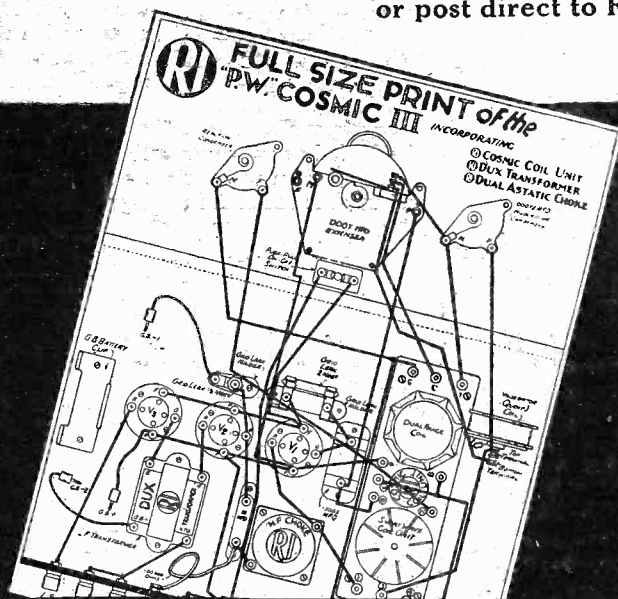
7/6



"DUX" TRANSFORMER

The "P.W." designers' first selection for the "Cosmic" III. A remarkable transformer that has attained enormous popularity by unequalled performance in hundreds of thousands of sets. "DUX" has been specified as first selection for the "Cosmic" III because it is the lowest-priced transformer that is really efficient and which gives the good L.F. amplification which is a vital feature in the circuit. Inductance 30 henries. Ratios: 1:3 $\frac{1}{2}$ (standard) or 1:4 $\frac{1}{2}$ (auto-connection). List No. DY29.

6/9



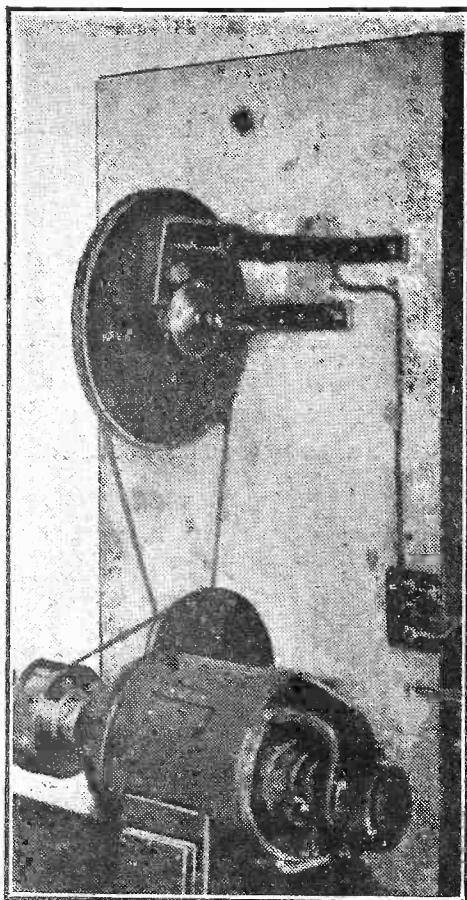
To Radio Instruments Ltd., Croydon, Surrey

Please send me a free copy of the full-size wiring chart for the "P.W." "Cosmic" III.

Name

Address

IT'S A CUCKOO!



This rather weird-looking apparatus is the "cuckoo" that comes on in the intervals between items at Ljubljana, the Yugo-Slavian station which works on 575 metres.

A GREAT many builders of the already famous "Cosmic" have found, when turning the dials to see what the set will do, that it has promptly introduced to them an amazing variety of foreign stations. And the babel of different tongues has been almost overwhelming to those who do not speak any foreign language.

Who Are They?

Who, for instance, is the lady announcer right at the bottom of the medium waves? And, on the long waves, what is the station

a little below Daventry's dial reading that rings a sleigh bell in the interval? Also which station is it near Glasgow's wave-length that blows a syren blast like a steamer?

These and other questions can best be answered by an imaginary tour of the tuning dials; and we will start from the bottom of the medium waves and go upwards, so that if you do not work from a tuning chart you will have some idea of where the stations come in.

The Best Way.

A tuning-curve or calibration chart is, of course, the best way to find and identify foreigners, and though you may not wish to go to the trouble of this, you must certainly have a pencil and paper near the set to record the more interesting dial readings for future reference.

Let us suppose, then, that the set is all ready and that we are going to explore the tuning-dials from 0 to 100. For simplicity's sake, we will deal throughout with the tuning-dial alone, although, of course, it is assumed that both reaction and moderator will be used to aid this when necessary, as already outlined in the previous articles in "P.W."

What will be our first station at the bottom of the dial?

Your "Lowest" Station.

If you live in the Belfast area you will probably find that your local station occupies that place, but in most cases it will not be a British station, but a foreigner that comes in right down the bottom of the dial. If it is a lady announcer, speaking clearly with a melodious voice, you can be sure that your lowest wave-length foreigner is Radio Trieste.

The lady in question pronounces it "Rahdio Tree-ess-tay." Trieste is now linked for broadcasting purposes to Turin and Genoa, so that any or all of these call signs may be heard at times.

All these stations, together with the new Florence station, will form the north Italian group, or, as they call it, the "Nord Italia."

Unmistakable.

Another hint that you are listening to Trieste is sometimes given by its interval signal, which takes the form of a night-ingale's song. Italian is such a pretty language that even a news bulletin sounds quite melodious, and the names of the towns particularly will often be sufficient proof that this is the country you are listening to.

FINDING THE



Every listener who likes to bag long-distance, primarily for "Cosmic" owners it is packed with what kind of set you use you should read the picturesque personalities of the ether,

By P.

Rome and Milan are referred to as "Roma" and "Milano," and if you pick up Radio Trieste sending an opera late at night be sure to wait for the good-night. Usually the Italian stations make quite a little ceremony of this, and after a little speech the lady announcer says very clearly "Finny Della Trans-missy-oh-knee," which

NEX
Lisbo
is tr
a spe
progr
Britis
at 10
Frida
m

DISTANCES FROM LONDON OF



A LONELY LISTENER IN SOVIET RUSSIA



This lonely old Siberian peasant has just made himself something hot in the teapot, and is settling down to enjoy a Russian programme. The Soviets contemplate an enormous radio "drive," with many high-power stations as part of their Five-Year Plan.

SE FOREIGNERS SMIC"



will enjoy this article, for although written
to-date reception wrinkles. So no matter
being tour of the dials, with its glimpses of
helpful hints on station identification.

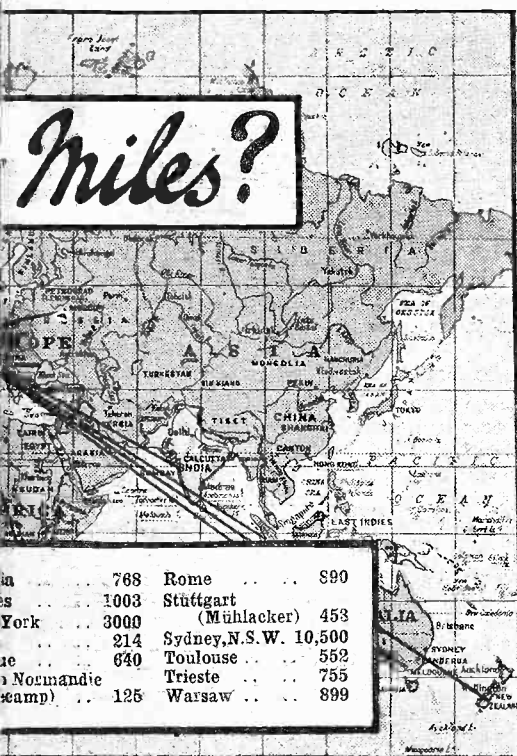
RD.

is really "finish the transmission."

Then come two fine martial airs, one
being the Royal Italian march and the
other the Fascist Hymn; and finally the
lady wishes you "Good-night" in the
words "Buona-Notte, Signore."

Immediately above Trieste there are
several low-power stations not worth

FAMOUS RADIO STATIONS



worrying about, but all the
following are worth noting:
253 metres, Gleiwitz, Ger-
many; 255 metres, Toulouse,
France; 257 metres, Horby,
Sweden; 259 metres, Leipzig,
Germany; and 261.8, Lon-
don National.

In the London area neither
Leipzig nor Horby have a
fair chance, with the London
National so close in wave-
length, but in other parts of
the country both are received
well. The Toulouse station
referred to is not the main
one, but one using low power
that does occasionally get over
well in Britain.

"Achtung, Achtung."

Gleiwitz may be recognised
by the fact that it relays the
Breslau programme. Like all
the other Germans, he precedes
his announcements with the
word "Achtung, Achtung,"
and in the intervals he some-
times puts on a very fast-
ticking clock, beating about
200 times to the minute.

Before going further, perhaps we ought
to make it quite clear that we do not expect
you to get all these stations the first time
that you turn the dials after reading this
article. Just how many foreigners your
set will bring in depends partly on where
you live, partly on how you handle the set,
and partly on components efficiency, and
so forth, so that it is impossible to say
which station you should, or should not,
pick up.

A Tremendous Field.

Moreover, as they transmit at different
times you cannot expect to go from one to
the other in the way we are able to work up
the dial in theory. But all the stations
named in this article are "probables," in
the sense that they have at different times
been picked up by "P.W." readers using
"Cosmics," or using sets of an inferior class.

The first station above London National
is Moravska-Ostrava, on 263.8 metres. The
station is often picked up (except in the
London districts) although it does not use
high power, and is situated in Czecho-
Slovakia. The name
is pronounced
exactly as it is spelt,
"Moravska-Ostrava."

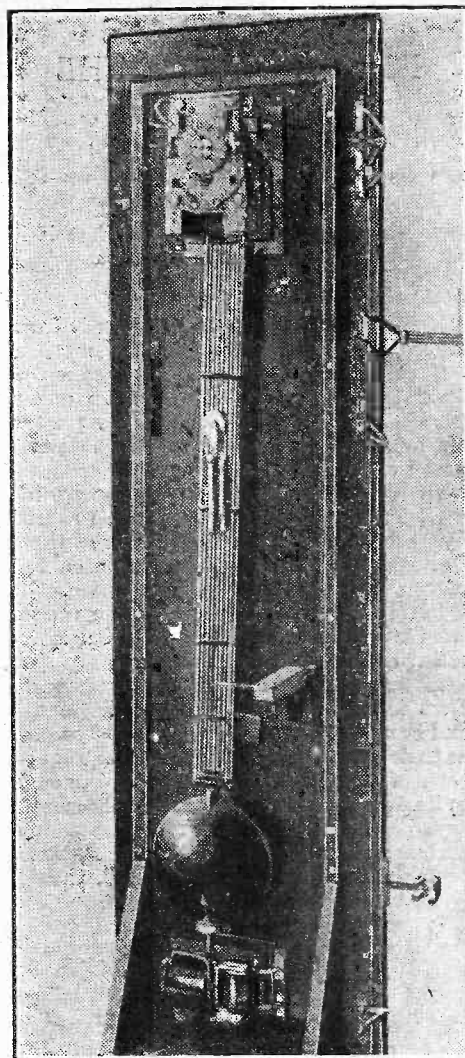
It frequently relays
the Prague pro-
gramme in which the
announcement comes
from Prague, and the
name of that station
is given as "Radio
Praha."

Italy Again.

Immediately above
this are four or five
comparatively unim-
portant stations, and
then we come to
Turin, Italy, on 273.7
metres; and Heils-
berg, Germany, on
276.5 metres.

This latter relays
Konigswusterhausen,

GERMANY'S "PIPS"

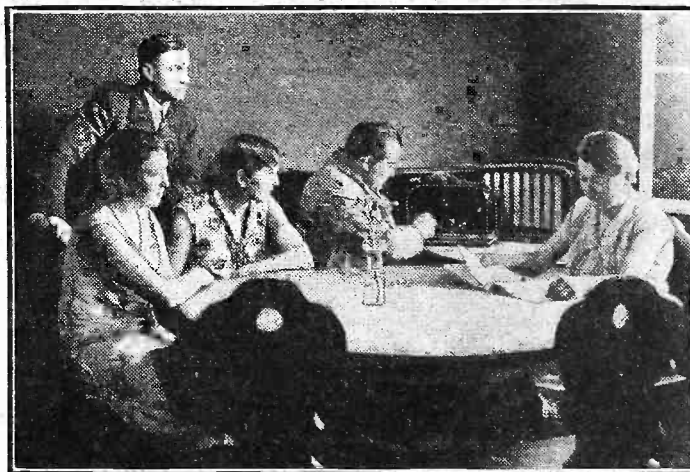


This is a photograph of the time-signal apparatus
controlling the radio impulses that go out from
the giant German station at Nauen. At one
time they were relayed by all German stations,
but nowadays only Konigswusterhausen and one
or two other broadcasting stations radiate the
Nauen time-signal.

and is easily recognised by the character-
istic German "Achtung." It is one of the
most reliable stations on the medium waves.

(Continued on next page)

HOME RADIO IN HAMBURG



Next to Britain, Germany has the largest number—about four millions—of
licence-holders in Europe. Here is a typical family listening to the pro-
gramme from Hamburg, on 272 metres.

FINDING THOSE FOREIGNERS ON THE "COSMIC"

(Continued from previous page.)

and although situated in Eastern Prussia it can sometimes be heard in daylight.

Areas of Jamming.

The next station working upwards from Heilsberg is Bratislava, on 279 metres; but neither this station nor Copenhagen, on 281 metres, will be picked up unless conditions are really good, for they are too far away to be heard well on the small power employed.

Above this are two of Europe's "common" wave-lengths—that is wave-lengths shared by several stations. There are three Germans and one Austrian station on 283 metres, and the result on a sensitive set is a burbling medley of sound, quite useless from a programme point of view, but interesting as a wave-length marker.

Listeners in Aberdeen, Bournemouth, Dundee, Edinburgh, Newcastle, Plymouth and Swansea will all recognise 288.5 metres as their local station's wave-length. Though each of these programmes is pure enough in its own district, the effect on a listener in, say, Kent, far away from them all, is a curious mixture, through which the National programme can be just recognised, though badly mutilated!

A "Hefty" Dutchman.

There are similar common wave-lengths occupied by foreign stations on 291 metres and 293 metres, so all that will be heard on

this part of the wave-band is a burble of unintelligible gurgles and whistles.

A little higher up, however, on 299 metres, we have Hilversum, and above it the North National on 301.5 metres. In the south and east of England Hilversum is an excellent programme, but farther north it is difficult to disentangle him from his neighbour, the North National, owing to the fact that the latter employs 50 kw., whilst Hilversum uses comparatively low power.

In Norfolk, Sussex, Essex and Kent, Hilversum is often strong enough to give good daylight reception. The next wave-length to North National is Bordeaux Lafayette, and this Frenchman is easily recognised because he is the only foreigner which comes in at good strength between the North National and the Cardiff wave-length, which is 309.9 metres.

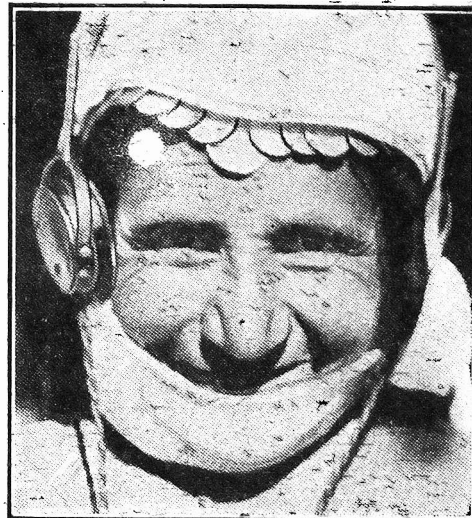
Another Common Wave.

Above Cardiff is another common wave-length, shared by a Polish and a French station with Genoa, Italy, which has recently been coming over well owing to improvements at the transmitter. Genoa will be often linked with the Trieste programme, already referred to, but is not usually clear enough from its neighbours to make a good recognisable announcement.

At this part of the dial the stations are packed very tightly and there is another common wave-length on 309 metres, but Breslau on 325 metres and Milan on 331.5 metres are worth singling out for special mention.

Still ascending the dial, we come to Brussels No. 2 station on 338.2 metres. About half the population of Belgium speak Flemish and the other half speak French, and this station, Brussels No. 2, announces exclusively in Flemish. It usually closes down with a brief news bulletin at 10 p.m.

"GO ON WITH YOU!"



This is an Armenian peasant laughing at a wise-crack on the radio. Only a few years ago such people led wild, nomadic lives and rarely, if ever, saw any signs of civilisation as we knew it.

Gramophone records are a favourite here, but there is often an orchestral concert commencing at 8 or 8.30 p.m.

Between this point and the London Regional on 356 metres the most likely station to stand out is Strasburg-Brumath, France, on 345 metres. This is a double-tongued or bi-lingual station, and gives its announcements in the French and German languages, because Strasbourg is on the Franco-German borderland.

We All Know Mühlacker.

A very famous German station lies just on the other side of London Regional, which comes next, namely, Stuttgart Mühlacker. This is one of the best of the German Regional stations and, as London Regional listeners know to their cost, it is so powerful that it is quite capable of interfering with their own Regional programme when long-distance conditions are good.

Several degrees above Stuttgart we have Hamburg on 372 metres, and Glasgow, who works on 376.4 metres. Hamburg is a well-received station—except in the Glasgow area, where the local, of course, is generally too much for him—and in addition to the usual German "Achtung, Achtung," Hamburg can be recognised by the blast of a siren which is used for its interval signals.

Those who can read Morse will also be able to identify Hamburg without a doubt by the letters H A (. . . . —) used as a preliminary signal, and during the intervals of the programmes.

Radio Toulouse.

A degree or so above Glasgow on 385 metres we have Radio Toulouse—surely one of the best known of the foreign stations. Frequent and clear announcements of the name make this station easy to recognise, and its Sunday gramophone concerts are well known to British listeners.

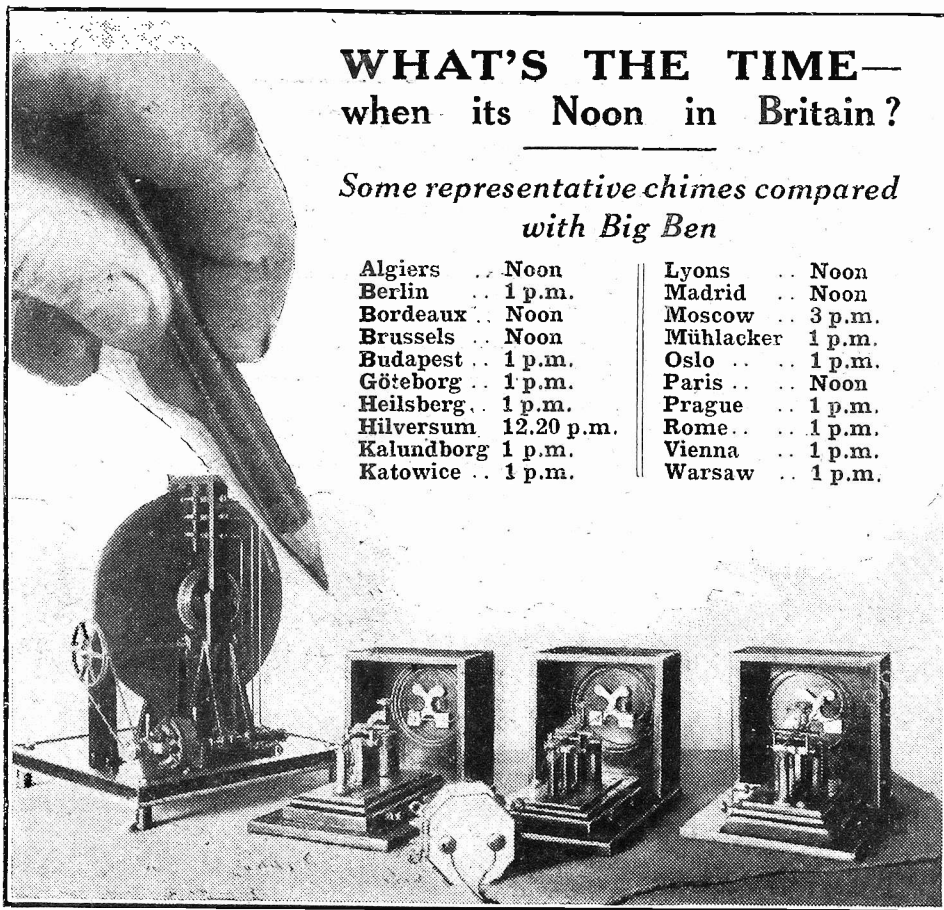
Still ascending the dial, the next station is the Midland Regional on 398.9 metres, and above this are three important foreigners, the first being Radio Suisse Romande (Switzerland). This station works on 403 metres, announces in French, and relays the programme from Lausanne or Geneva. It closes down fairly early in the ordinary way,

(Continued on page 1546.)

WHAT'S THE TIME— when its Noon in Britain?

Some representative chimes compared
with Big Ben

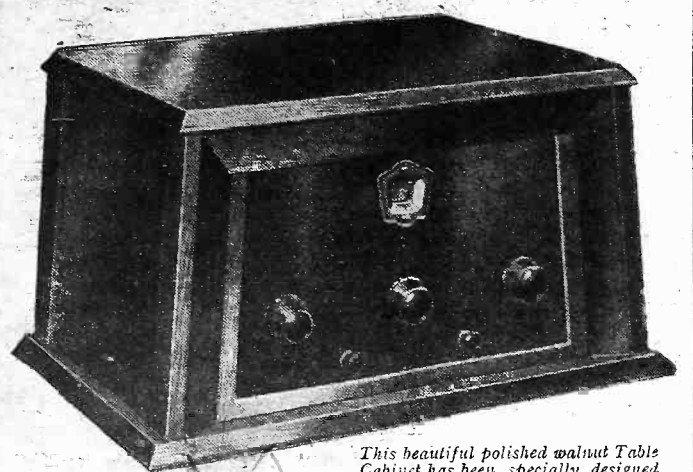
Algiers	Noon	Lyons	Noon
Berlin	1 p.m.	Madrid	Noon
Bordeaux	Noon	Moscow	3 p.m.
Brussels	Noon	Mühlacker	1 p.m.
Budapest	1 p.m.	Oslo	1 p.m.
Göteborg	1 p.m.	Paris	Noon
Heilsberg	1 p.m.	Prague	1 p.m.
Hilversum	12.20 p.m.	Rome	1 p.m.
Kalundborg	1 p.m.	Vienna	1 p.m.
Katowice	1 p.m.	Warsaw	1 p.m.



The READY RADIO

COSMIC STAR KIT

is the Official Blue Print Kit



This beautiful polished walnut Table Cabinet has been specially designed for the "Cosmic" Star, but is also equally suitable for any set with a panel not exceeding 12" x 7" and baseboard 14" x 10". Price **21/-**

LIST OF PARTS as shown on Blue Print

	s.	d.
1 Ebonite Panel, 12" x 7", drilled to specification	4	0
1 Plywood Baseboard, 14" x 10"	1	0
1 Ebonite Terminal Strip, 14" x 2"	1	0
2 L.T. Switches	1	8
1 Readirad .00075 Moderator Condenser	3	6
1 Duotune Extender	15	6
1 Slow-Motion Disc Drive for above	3	0
1 Readirad .0003 Extended Slow-Motion Reaction Condenser with Bracket	7	0
3 Valve Holders	1	6
1 R.I. "Cosmic" Dual Coil Unit	12	6
1 Readirad Moderator Coil	2	6
1 T.C.C. .001 Fixed Condenser, Type "S"	1	6
1 Readirad Standard H.F. Choke	4	6
1 Lewcos 100,000-ohms Spaghetti Resistance	1	6
1 Readirad Radiogram Switch	2	9
1 T.C.C. .0003 Fixed Condenser, Type "S"	1	3
1 Readirad Wave-Change Switch	1	6
1 R.I. Hypermite L.F. Transformer	12	6
1 Grid Leak, 2 megohm and Holder	1	4
1 T.C.C. .01 Fixed Condenser, Type 40	1	9
1 Grid Leak, .5 megohm, and Holder	1	4
9 Belling-Lee Terminals, Type "R"	2	3
1 Packet of Jiffilix for wiring	2	6
3 Belling-Lee Wander Plugs	1	2
Flex, screws, etc.		

£4 9 6

**Official Blue Print
FREE with every
READY RADIO KIT**

KIT "A"

Complete Kit of Components together with panel (ready cut and drilled), baseboard, Jiffilix for easy non-soldering wiring and free blue print.

89/6

OR BY EASY PAYMENTS
10/3 down and 9 monthly payments of **10/3**

KIT "B" Complete Kit of Components as Kit "A" **£5 . 17 . 0**
together with specified Mullard valves and free blue print.

OR BY EASY PAYMENTS **11/-** down and 11 monthly payments of **11/-**

KIT "C" Complete Kit of Components as Kit "B" **£6 . 18 . 0**
together with Table Cabinet illustrated above and free blue print.

OR BY EASY PAYMENTS **12/9** down and 11 monthly payments of **12/9**

BATTERY AND SPEAKER EQUIPMENT

1 Pertrix 120 volt H.T. Battery	15	6
1 Pertrix 2 volt 30 amp. Accumulator PXC3.11	0	
1 Pertrix 9 volt G.B. Battery	1	3
1 R & A type 40 Loudspeaker Chassis	16	6

£2 4 3

Kit A, including above. Deposit **12/6** and 11 monthly payments of **12/6**
Kit B, including above. Deposit **15/-** and 11 monthly payments of **15/-**
Kit C, including above. Deposit **17/-** and 11 monthly payments of **17/-**

Convert your present set to an **ALL-WAVE Receiver with Readirad Cosmic Coils**—recognised as the finest of their kind. Designed by G. P. Kendall, B.Sc.
Dual-Range Coil 6/6. Short-Wave Coil 4/6

EASY PAYMENT 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. 12/3/32

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. 12/3/32

CASH or C.O.D. ORDER FORM

FINDING THOSE FOREIGNERS ON THE "COSMIC"

(Continued from page 1544.)

and usually must be heard before 9 p.m., at which hour it gives the final news.

An Interesting "Pole."

Just above Radio Suisse Romande is Katowice, Poland, on 408 metres. This station has male and female announcers; and although generally the Polish language is used, it sometimes announces in French. The name as pronounced sounds like "Kattovvecha," and its interval signal is an unusual one, being hammer strokes on an anvil.

Late on Friday evenings Katowice gives out a sort of answers-to-correspondence by radio, conducted in the French language.

Frequently answers are given to British correspondents; their names and addresses being read out slowly and carefully, which alone serves to distinguish this station from its neighbours.

Immediately above Katowice there is Dublin on 413 metres. And coming in a degree or so above that is Berlin, who works on 419.5 metres. Like most of the German stations, Berlin closes down with "Deutsche Uber Alles"—familiar to English ears as the hymn-tune "Austria."

"Radio Roma" Calling.

Just above Berlin, Madrid and Stockholm may be received, but the next really outstanding station is Rome on 441 metres. The clear-voiced lady announcer, with her "Radio Roma" is too well known to need description, and as this programme is relayed by Naples the announcement is often "Roma-Napoli."

Apart from the common wave-lengths, the next important mark on the dial is 450

metres, occupied by Beromunster, the Swiss Regional. Beromunster serves German-speaking Switzerland, so it uses this language, and the programmes come from Berne or Basle.

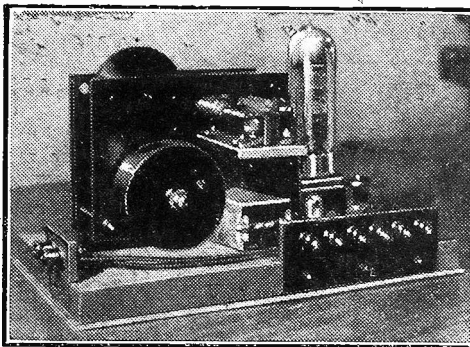
Incidentally, its official title is a real mouthful—"Schweizerischer Landessender"! and like the other Swiss Regional, Radio Romande, it usually closes down quite early, about 9 p.m.

Europe's Giant.

Lyons, on the next wave-length, is sometimes received, but more important is the station just above that, namely, Langenberg, on 473 metres.

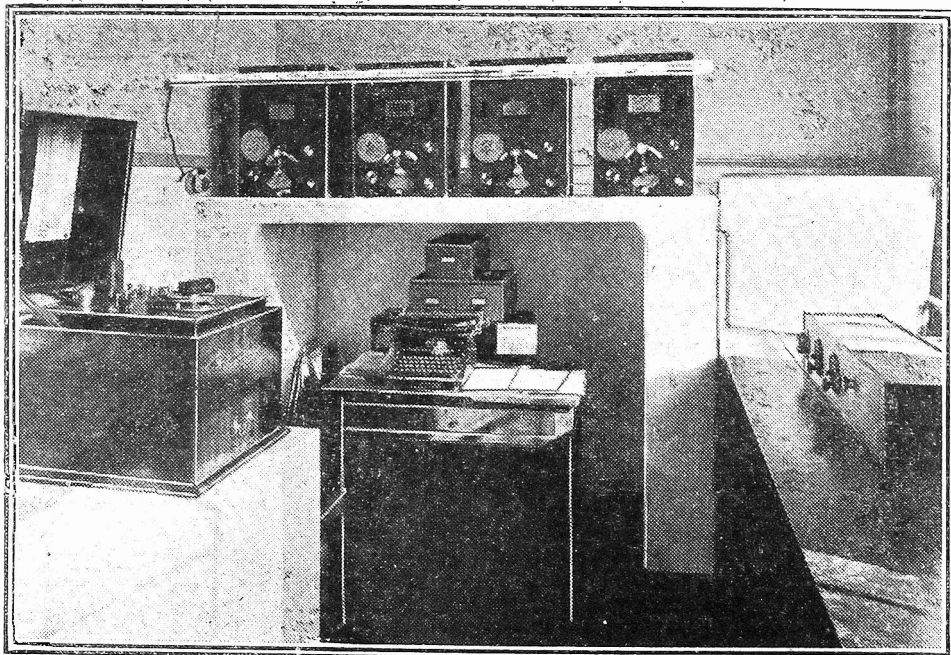
It is in the "West Deutscherrundfunk" Group (West German Broadcasting), and about one degree above

IN THE INTERVAL



Many stations use distinctive interval-fillers, on the lines of the B.B.C.'s "doomp, doomp," and this is the apparatus used at Budapest, on 550 metres.

WHERE THEY WATCH THE WAVE-LENGTHS



This is a view of the B.B.C.'s own receiving station at Tatsfield, Kent. Here a staff of engineers watches the ether, notes the wave-lengths and any tendency to wobble, and generally keeps a sharp eye on the broadcasting situation.

HOW THEY LISTEN IN JAPAN



A group of listeners in "The Land of the Rising Sun," where radio has made phenomenal strides and is now in a highly-developed state, quite comparable with our own service.

it we have the North Regional station on 480 metres.

The most powerful medium-wave station in Europe, Prague, comes next, using a wave-length of 488.6 metres, and thus it "sits on top" of the North Regional transmission! Both men and women announcers are employed here, and announcements are sometimes made in German, English and French, as well as in Czech.

Another interesting newcomer is Florence, just above Prague. Its strength is good now, and is likely to improve when the station has quite settled down on its full power.

LOOK OUT FOR LISBON!

The Lisbon short-wave station, CT1AA, who works on Fridays at 10 p.m. on 42.9 metres, will be sending out a special programme for British listeners

NEXT WEEK!

TUNE IN TO CT1AA

10 p.m.—March 18th—42.9 metres

We are now nearing the top of the dial, and one of the best stations in this region is Brussels No. 1, on 509 metres. It is usually going strong until about 10 in the evening, when a short news bulletin is given, the language used being French.

Vienna, who calls himself "Rahdio Veen," comes next on 517 metres, and the powerful German sometimes heard just above that is Munich, on 533 metres. He uses a musical box as an interval signal.

If you are able to hear any other higher wave-lengths than this it will probably be Budapest, on 550 metres, easily identified because it pronounces its name frequently, and as spelt. Space does not permit us to deal with the other wave-bands now, so we must leave consideration of these till next week.

READY RADIO COSMIC STAR RADIOGRAM EQUIPMENT

*The finishing touches
to a
wonderful receiver*

"COSMIC" STAR RADIOGRAM KITS BY CASH OR EASY PAYMENTS

Kit "B" (full set of components and valves)
with Radiogram Cabinet and R & A type 40
Loudspeaker Chassis £10:1:0 or
Deposit of 20/- and 11 monthly payments of 18/6

The above Kit may be purchased in combination
with any of the accessories listed. Examples:

Kit "B" with Radiogram Cabinet, Speaker,
Pick-Up, Volume Control and Gramophone Motor.
£13:7:6 or

Deposit of 25/- and 11 monthly payments of 25/-

Or Kit "B" with Radiogram Cabinet, Speaker
and Battery Equipment as detailed on page 1545.
£11:9:0 or

Deposit of 20/- and 11 monthly payments of 21/6

	£	s.	d.
ReadiRad Pick-up	1	7	6
ReadiRad Volume Control	5	9	
Collaro B.30 Double			
Spring Gramophone			
Motor with Automatic			
Stop	1	13	0
	£3	6	3

or 10/- down and 7 monthly
payments of 9/-.

As above but with Collaro A.C.
Induction Motor - £4 13 3

or 10/6 down and 9 monthly
payments of 10/6.

As above but with Macom Motor,
type A, suitable for D.C.
Mains - £4 5 9

or 10/- down and 9 monthly
payments of 9/6.

	£	s.	d.
ReadiRad Pick-up	1	7	6
ReadiRad Volume Control	5	9	
R & A type Loudspeaker			
Chassis	16	6	
	£2	9	9

or 10/6 down and 5 monthly
payments of 9/-.

As above but with R & A type 100
Permanent Magnet Moving Coil
Speaker, with Matching Trans-
former - £4 10 9

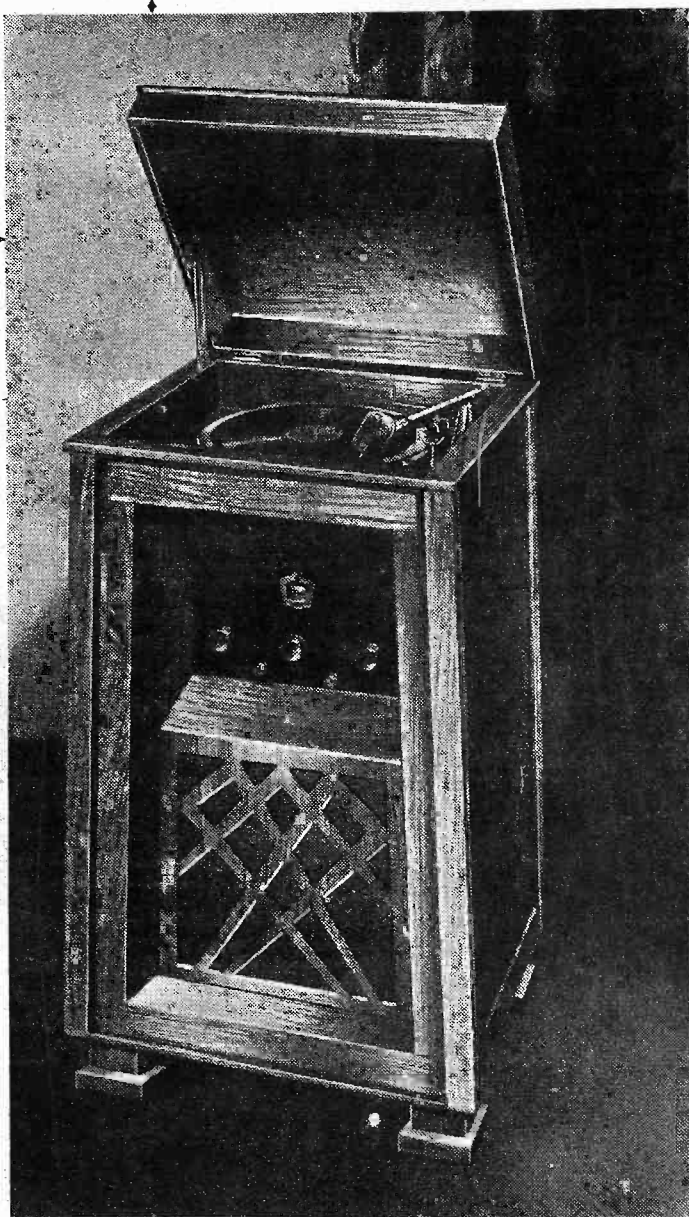
or 10/- down and 9 monthly
payments of 10/6.

ReadiRad type B.S. A.C. Mains
Unit, 150 volts H.T. & Trickle
Charger for 2, 4 or 6 volts £5 17 6

or 10/9 down and 11 monthly
payments of 10/9.

Atlas or Ekco D.C. Mains
Unit - £1 19 6

or 8/6 down and 5 monthly
payments of 7/-.



Ready Radio Radiogram Cabinet

With this beautiful cabinet you can convert your present
set to a Radiogram of the most modern and artistic
design. This cabinet is of highly polished walnut with lift-
up lid, automatic support and a needle cup. Overall size
3' 3" x 22" x 17". Suitable for any receiver having a
panel not exceeding 12" x 7" and a baseboard 16" x 10".

Price £3.7.6

or deposit of 15/- and 6 monthly payments of 10/-.

For Order Forms see page 1545.

TO INLAND CUSTOMERS.—
Your goods are dispatched post free
or carriage paid.

TO OVERSEAS CUSTOMERS.—
Everything Radio can be supplied
against cash. In case of doubt re-

garding the value of your order, a
deposit of one-third of the approxi-
mate value will be accepted and the
balance collected by our Agent upon
delivery of the goods. All goods
are very carefully packed for export
and insured, all charges forward.

READY RADIO

Advt. of Ready Radio Ltd., Eastnor House, Blackheath, S.E.3.

'Phone: Lee Green 5678.

'Grams: Readirad, Blackvil.

SEVEN-METRE RECEPTION

Very shortly the B.B.C.'s Seven-Metre experiments will be in full swing, and here is a contribution from a "P.W." short-wave expert dealing with the possibilities of this little-explored waveband.

EVERY reader of "P.W." who possesses a short-wave receiver seems to be writing to me lately to enquire just what this 7-metre broadcasting will mean to him when it arrives. Although that is a question that we shall not be able to answer properly until the B.B.C. actually starts up, some of us have had sufficient experience of wavelengths of this order to hazard a pretty shrewd guess.

Let us examine the facts and try to piece them together. Some four years ago amateur transmitters were licensed to use 8 metres for experimental work. There was very little difficulty, even then, in building quite a good receiver for the wavelength—the chief trouble was the transmitter. Since we may well hope that the B.B.C. has the technical side of this well in hand, we need not worry ourselves about the transmitters any more.

The Disappearing Trick.

From the receiving point of view, the results we used to obtain on 8 metres were rather curious. Work with portable receivers tuned to a fixed transmitter showed that, up to distances of 10 miles or so, signals on 8 metres were as strong "watt for watt" as on any other wavelength used. A 10-watt transmission at 10 miles distance produced quite a good, readable signal on a single- or two-valve receiver. But at some point between this and 20 miles the signal just disappeared, and the most sensitive receiver could not find it.

This sums up the most important property of these wavelengths—strong for a few miles, then—*nothing*. These experiments, of course, were on 8 metres. And, although you would not realise it until you were told, 8 metres is as far from 7 metres as 5 X X is from London Regional—and about *ten times* as far!

This rather startling fact is quite enough to suggest that the behaviour of the 7-metre wave may be very different. But, if anything, the difference will be that it will fall off still earlier. As evidence pointing to this we have two known effects: First, that 10-metre signals can be heard up to 40 or 50 miles before they disappear; and secondly that 5-metre signals seem to go after 7 or 8 miles at the very most.

Everything points to the fact that, as you go downwards from 10 metres, signals are absorbed after travelling for shorter and shorter distances. In passing, we might mention that when conditions for long-distance work are good the 10-metre waves "come down to earth" again.

They May Come Down Again.

British amateurs have put 10-metre signals of fairly low power into the United States, South Africa, and India. But, although long-distance work of this kind on 10 metres is very freakish, short distance work is as reliable as on any other wavelength known. Two amateurs can work across London on 10 metres as easily as

they can on 150 metres—sometimes it is even *more* reliable than the longer wave.

By studying this little collection of facts we can arrive at the following: That a broadcast transmission on 7 metres may be expected to be *very* strong up to a distance of between 10 and 15 miles, after which nothing more will be heard of it. It is just possible that there may be isolated freak cases of the waves "coming down" again in Australia or some distant point, but it seems very unlikely.

Ideal for Local Work.

Thus 7 metres would appear to be an ideal wave for purely local broadcast. The B.B.C. could run a 7-metre station in every big town and, moreover, run them all on the same wave without interference,

present a 7-metre receiver, it must be admitted, is a tricky thing to build and handle. I wouldn't go so far as to call it *difficult*, but "tricky" it certainly is.

Alternative Programmes.

But as soon as the 7-metre broadcast plan shows some signs of maturing, you will find plenty of good designs for receivers available, and certainly commercial models will appear on the market. I want to keep off the technical side of it in this article, so we will assume that the receivers *will* be available. (W.L.S. has apparently forgotten the very efficient and most practical Kelsey 7-metre adaptor which was recently described in "P.W."—TECH. EDITOR.)

This being so, you will probably have a simpler set than you use now, which will just bring you in your local programme, with perhaps an alternative from the same station. Your set will be designed for this purpose; there will be no complicated controls for searching for foreigners—it simply won't be any good! You will have a set that anyone in the family can operate, just to switch over from Clapham and Dwyer to a Symphony Concert at will. That is, if the plan comes to maturity and the alternative-programme scheme is

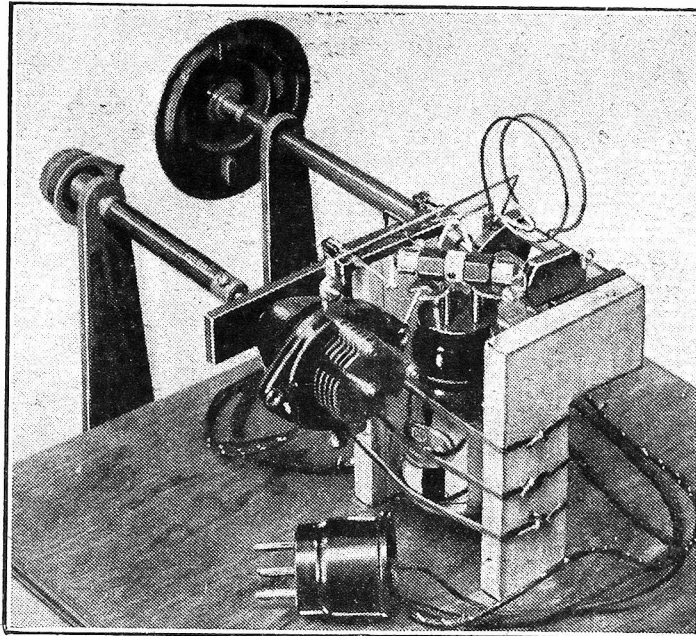
decided upon. Unfortunately, we dare not leave out that "if" at the present moment.

Two Receivers.

My own private opinion is that it *will* come, and that it will bring with it a very desirable state of affairs—one will be able to have an "exclusively-local" receiver for 7 metres, and a "long-distance-getter" covering all waves from 20-2,000 metres, or perhaps just from 180-2,000 metres. And our local programmes will be free from 9-kc. whistles, from Müh-lacker, and from all the characteristic interference noises of the 200-550 broadcast band.

So we have at least something to look forward to. May it come soon!

AN ULTRA-SHORT-WAVE ADAPTOR



The famous Kelsey 7-metre adaptor, which was described in "P.W." some weeks ago. The very small tuning and reaction coils should be noted, as they each have only one turn, with a diameter of about two inches. This novel device for ultra-short-waves is very simple in construction, and therefore remarkably inexpensive to build.

because of the limited range of the transmissions.

For the Towns Only.

You will probably think this a little hard on the country dweller (particularly if you are one yourself), but it is obvious that 80 per cent. of the B.B.C.'s audience live within a few miles of a town. Think of the number of licences accounted for by London, Birmingham and Manchester only! The country dweller will still have 5 X X and, perhaps, some of the Regionals within easy working range of him—he will just have to forgo the pleasure (perhaps a doubtful one) of tuning in a 7-metre receiver.

And now let us see what it will mean from the town listener's point of view. Just at

THE ECKERSLEY THREE

A letter from a reader who has made two, and is very pleased.

The Editor, POPULAR WIRELESS.

Dear Sir,—Re the Eckersley Three published in "Popular Wireless," 9th January.

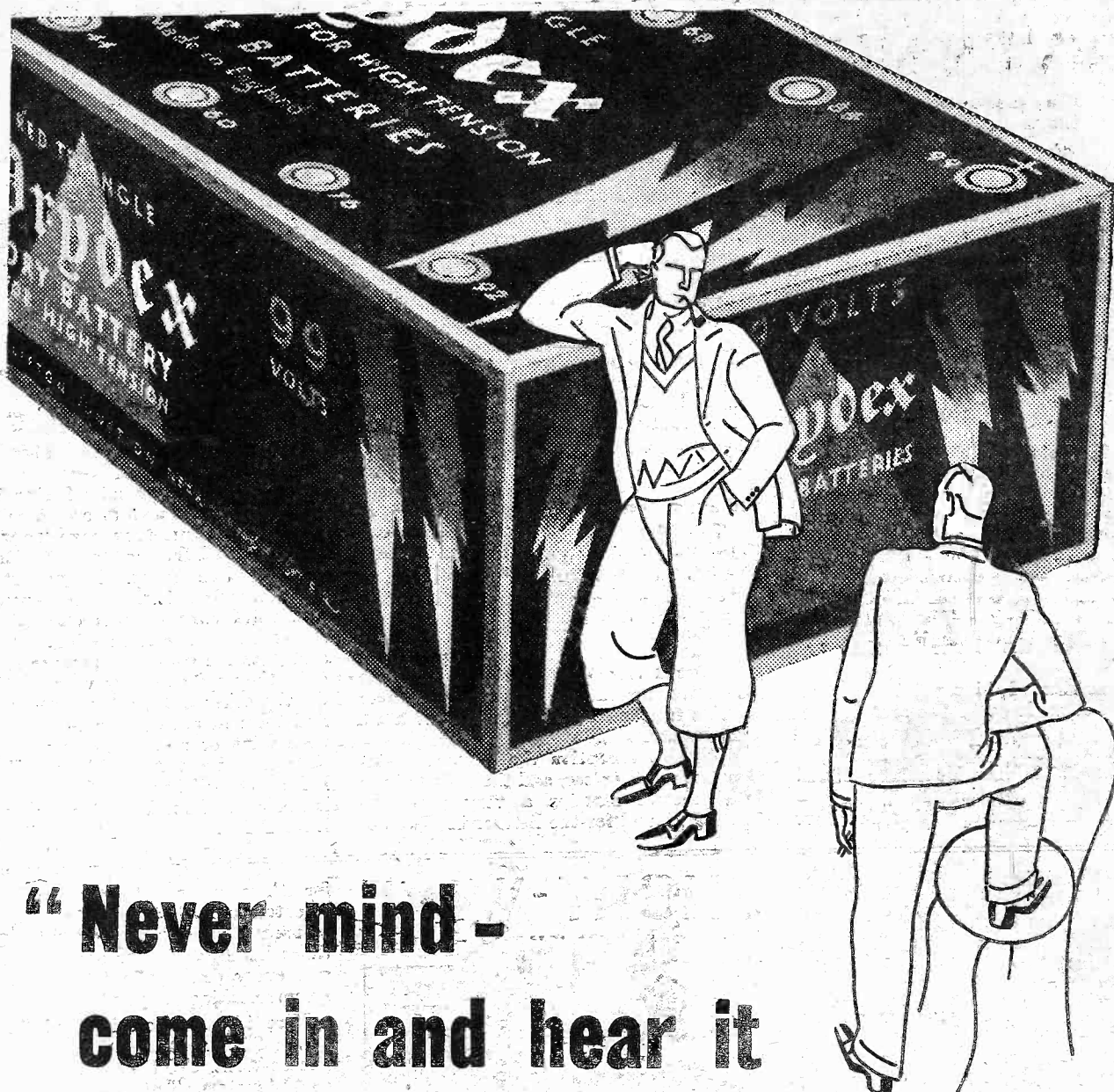
I have made up two sets, and find they do the job fine and quite up to the remarks made by Mr. Eckersley.

I came across one trouble—namely, that when the set was switched off I got a short howl. I put this down to my coupling the negative H.T. to the positive L.T. I reversed over to the H.T. being coupled to the negative L.T., altered the wiring necessary. This stopped the howl, and both sets are giving fine results.

Yours truly,

Deal, Kent.

F. E. WALDEN.



**“Never mind -
come in and hear it
on mine. I’ve just put in a new
Drydex”**

● THE Exide DRY BATTERY

Made entirely in England, employing British labour and British capital.

Obtainable everywhere from all good dealers in sizes and types to suit every wireless set. Also for torches, cycle lamps and bells. For wireless low tension use Exide 'C' or 'D' Type Batteries.

Mr. H. G. B. of E. Greenwich, S.E.10, writes:—

“... was surprised in the difference in tone and volume of my set, but apart from that I am still using the same battery after 9 months of continual use.”

Exide Batteries, Exide Works, Clifton Junction, nr. Manchester. Branches at London, Manchester, Birmingham, Bristol, Glasgow, Dublin and Belfast

It is a curious instance of the irony of fate that heterodyne interference should have shown a big increase at the very time when by all the rules it should have been on the wane. In winter time, when the ranges of stations are at their greatest, a heterodyne may easily occur between two stations hundreds of miles apart.

As the nights shorten heterodynes normally tend to become less and less in evidence owing to the diminution of transmitting ranges. But this year two new factors have complicated the situation.

Increased Separation.

First of all it has been found necessary to increase the separation between certain high-powered stations from 9 to 10 or 11 kilocycles; the London Regional, for instance, now works on 843 kilocycles, and Muhlacker on 832 kilocycles, whilst there is a 10-kilocycle interval between Moravaka-Ostrava and the London National, and again between the latter station and Leipzig.

The provision of bigger intervals has naturally not made easier the arrangement of stations in the already overcrowded medium wave-band. The second factor is the coming of a considerable number of new and fairly powerful stations.

Some are in regular operation and have

STATIONS WORTH HEARING

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.

had more or less to elbow their way in; others are still in the experimental stages, and certain of them appear to regard it as their right to conduct their experimental transmissions on any wave-lengths that they feel inclined to grab.

This business of wave-length-snatching by experimental or unauthorised stations has lately assumed very serious proportions. In a recent week nearly thirty of them—mainly unidentifiable—were recorded as being at work, and in few instances did they use the same wave-length on two consecutive nights.

Long-Waves Best.

The number of heterodynes have naturally reduced the list of stations from which really good reception is obtainable. The long waves are the least affected, though a Russian transmitter has interfered at times with Radio-Paris.

With this exception the long-wave stations are mostly clear, and the region above 1,000 metres remains a very profitable hunting ground for the listener in search of

genuine alternative entertainment.

Despite the heterodyne trouble, there remains a very respectable number of good stations on the medium wave-band, particularly above about 270 metres. The portion below this limit is on many nights in a state of chaos unparalleled

since the introduction of the present wave-length plan.

My list of star stations on the medium band at the present time is: Prague, Langenberg, Rome, Stockholm, Katowice, Toulouse, Brussels No. 2, Goteborg, Hilversum and Heilsberg.

A Few "Probables."

Others which just miss falling into the star class on account of occasional heterodynes, or because they have "off" nights every now and then, are Gleiwitz, Bordeaux, Breslau, Strasbourg, Lwow, Hamburg, Milan, Brussels No. 1, and Budapest.

A third class consists of stations of a rather more uncertain kind. They are always worth going for, because if they are good they are generally very good indeed. On the other hand, one may be unable to find them at all, or hear them as no more than faint or rather muzzy voices. This class includes Vienna, Beromunster, Paris P.T.T., San Sebastian, Grenoble, Genoa, Bratislava, Nuremberg, Cologne and Toulouse P.T.T.

THE past week has been, for me, a week of tests—another name for *hard work*. So much has this been the case that I have not found a moment to listen for short-wave broadcast, having spent all my time on the amateur bands.

As I remarked before, half our talk of bad conditions is occasioned simply by the fact that the stations are not on the air, and this week has proved it up to the hilt. Put up some tests that bring all the "hams" into action, and "conditions" will appear good at once!

What can be wrong, for instance, when we hear South Africa and Ceylon before mid-day on 20 metres, Japan and Hawaii at 8 a.m. on 40 metres, and Hong Kong, India, Malaya, and the Antipodes practically all day? Not much, I should say.

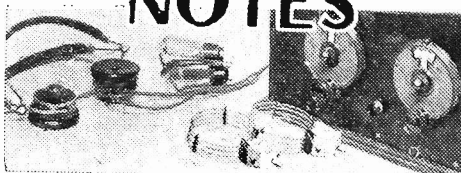
"Doing His Bit"!

I can imagine some of the victims of my Competitions gloating at the thought of W. L. S. himself having to keep the phones on for twenty-four hours at a stretch. But don't worry—he rather likes it!

By the time you read these notes, the second half of the "International Good-Will Tests" will be due. Even if you have no transmitter, and are not a member of the A.R.R.L.—the organisers—they will be interesting to you if you are keen on listening to the amateurs.

For the first three days, March 11th,

SHORT-WAVE NOTES



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

By W. L. S.

12th, and 13th, there are "rotated" listening periods for the amateurs of each continent. Thus for three stretches each day of two hours each, all Europe forgets that it has transmitters and settles down to listen to distant signals. And very quiet and peaceful it is to have the European babel off the air now and then!

There is no need for me to give you the exact times—they will be obvious if you listen. For the last three days—March 14th, 15th, and 16th—every owner of a transmitter, great or small, is making it function as hard as he can, trying to get into touch with the DX men that he has heard during the first three days.

The results will be reported in QST, the A.R.R.L. Journal, probably in August,

for these reports take some analysing. Eventually every transmitter will be listed in such a manner as to show how many times his signals have been heard in any and every country in the world. That's an undertaking for you!

Here is one small item of "red-hot" news. The experimental station at Vienna (Radio-Wien, U O R 2) is now transmitting on 49.4 metres. Tests are made on Tuesdays and Thursdays from 13.30 to 18.00, and from 19.00 to 21.00 G.M.T.

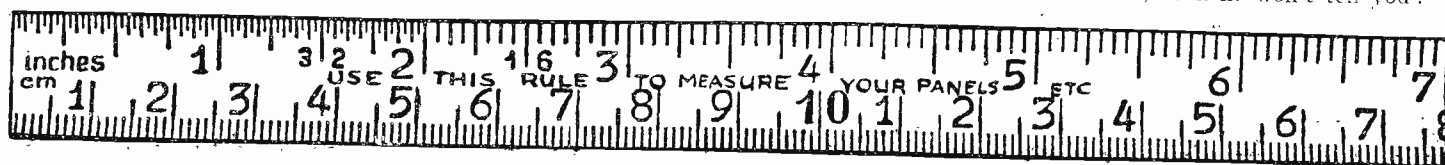
Have You Heard Him?

The station directors ask for reports of reception to be sent on postcards to Radio-Wien, Johannesgasse 4b, Vienna. All reports will be acknowledged by QSL card.

My informant, N. V. P., of Cologne, tells me that the station announces in German, but sometimes asks for reports in broken French and English.

W. F., of Aberdeen, believes that he has traced my identity, and that I am Mr. E. J. Simmonds, of G 2 O D, who used to write short-wave articles for "P.W." May I assure him—and others who have made the same suggestion—that he is quite incorrect?

I know Mr. Simmonds well, and am sure he would be hurt at the thought that my disconnected ramblings should be attributed to him! As to my real identity—ask "Ariel"; even he won't tell you!

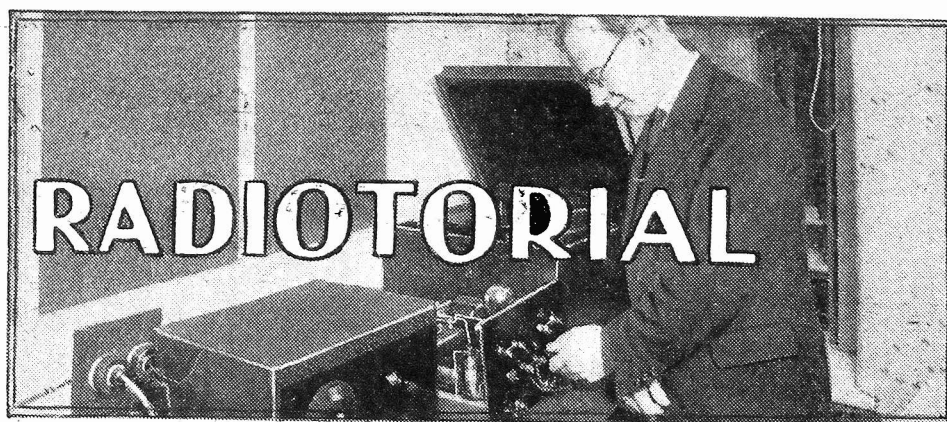


*Colvern Coils
exclusively specified
for the S.T. 300
Now chosen for
the A.C.
model.*

The Colvern Coils
chosen for the A.C.
Model of the S.T.300—
1 pair Colvern Coils,
Type S.T.300,

12/- pair.

COLVERN LIMITED, MAWNEYS ROAD, ROMFORD, ESSEX



RADIOTORIAL

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

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

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

DE-COUPLING THE DETECTOR.

P. A. (Motherwell).—“My only trouble is a fall-off in quality which commences after the high-tension battery has been in about a month. Up till then the speech is very clear, and music good, but after that time music becomes a little harsh and speech is distinctly less clear.”

“I am told that all it requires to put this right is for the detector to be ‘de-coupled’ by a resistance and condenser. Tracing out the circuit from the original blue print I see that the detector valve has got a separate high-tension supply from the H.T.+1 terminal. Is it possible, therefore, to make the alteration in the lead to this terminal, and not interfere with the internal wiring at all? If so, how should I connect the resistance, and what value is required?”

With separate detector H.T. supply it is quite easy to de-couple successfully outside the set. All that you have to do is to disconnect the H.T.+1 lead from the battery and proceed as follows.

Join the H.T.+1 battery tap to one side of a resistance holder. The other side of this holder to the H.T.+1 terminal, and also to one side of a 2-mfd. fixed condenser.

Then join the other side of this condenser to H.T. neg. (or L.T. neg., or any point connected to these), and when you have inserted a 20,000- or 30,000-ohm resistance in the holder the alteration is completed.

Note that the condenser will now be joined right across H.T.+1 and H.T.—, so it must be of good quality. And don't be surprised if your set needs a few more volts than you formerly gave the H.T.+1 terminal.

WHO WAS RIGHT?

H. L. (Bestwick).—“I wish to contradict a statement or so made by Captain Eckersley in his ‘Query Corner,’ when replying to M. K. C. (Eltham Park) in a recent issue of ‘P.W.’”

“M. K. C. asks if a .0005 variable and a .0005 fixed condenser in series would result in a .00025 variable condenser. I say it would, and Captain Eckersley says that it would not, although his formula proves that .00025 is the proper result. His formula is $C_1 \times C_2 = .0005 \times .0005$

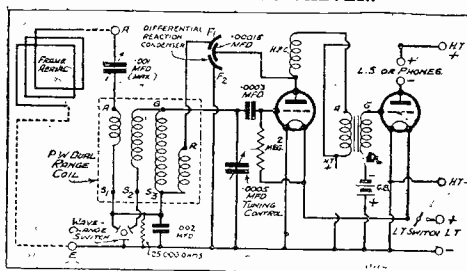
$C_1 + C_2 = .0005 + .0005$, which when worked out is .00025, as M. K. C. wanted, not .000166 as Capt. Eckersley evidently thinks.

“He also says that M. K. C. wanted .000125 when he really wanted .00025. My opinion is that Capt. Eckersley has gotten himself properly mixed up!”

We are afraid you have misunderstood the reply H. L. It is not Capt. Eckersley who is “mixed up” but you!

What M. K. C. asked in the original question was: “My set has a .0005-mfd. condenser. Can I place a .0005-mfd. fixed condenser in series with it to

MISSING LINKS No. 30 A SIMPLE TWO-VALVER.



Here is the circuit of a Det. and L.F. receiver with two components purposely omitted. Can you fill them in correctly?

LOOK OUT FOR THE ANSWERING DIAGRAM NEXT WEEK.

reduce its capacity and so obtain the same effect as a .00025-mfd. variable condenser.”

Capt. Eckersley replied “not quite,” and he showed, by a brief example, why not.

We have italicised part of M. K. C.'s question, because we wish to emphasise that part. For what is “the effect of a .00025-mfd. variable condenser,” when tuning?

In effect it is a .00025-mfd. condenser when “all-in,” (maximum capacity); it is a very small condenser indeed when “all out” (minimum capacity), and it varies proportionately in the intermediate positions.

Thus, half way on a .00025-mfd. condenser gives a capacity of .000125 mfd. And what Capt. Eckersley emphasises is that when a .0005-mfd. fixed condenser is joined to a .0005-mfd. variable condenser you get a .00025-mfd. maximum, but the tuning effect is not quite the same.

For, as the formula shows, the half-way position under such conditions does not give .000125 when the variable condenser is half-way, because the fixed condenser has not altered.

If you apply $\frac{C_1 \times C_2}{C_1 + C_2}$ to the half-way position you get the following values:

$$\frac{.0005 \times .00025}{.0005 + .00025} = .000166 \text{ mfd.}$$

“P.W.” PANEL, No. 62. OUTPUT CONNECTIONS.

It is well known that when a power valve is in action interference with its input (grid) connections may cause damage to the valve.

It is not generally realised that with pentode output valves interference with the loudspeaker connections may also cause damage.

This is particularly true of mains pentodes, unless an “equaliser” is connected across the choke, which has the effect of guarding against the trouble.

What M. K. C. had hoped was that a half-way setting would give .000125 like the other tuning condenser. But as Capt. Eckersley so clearly puts it, “a variable condenser does not, if a fixed series condenser of its maximum value is connected in series with it, behave all the way round as a halved variable condenser.”

WAVE-CHANGE SWITCHING FOR “POP VOX” FOUR.

R. A. W. (Twickenham).—“I have made one of your ‘Pop-Vox’ Four sets, but using only medium waves employing P.J.3 and P.J.2 coils.

“I wish to add 2 long-wave coils. I have purchased two commercially-wound coil quitoes, first coil marked (E.G.T1.T2.), second coil marked (AR E.G.T1.T2.).

“I wish to use 3-point and 4-point wave-change switches and ordinary .0005 V. condensers (I cannot afford Extensers yet).

“(a) Could you tell me the connections for same? Also, I wish to use a 1-meg. volume control, 3-terminal type, in lieu of 1-meg. grid-leak.

“(b) Is this O.K., and what are the connections for this?”

With regard to (a), you do not mention the make of the coil, but if this is one of the approved coil quitoes the connections for this and for the three-point switch will be as follows.

Y on the P.J.2 will now go to G on the coil quito instead of to earth, and also to one of the contacts on the wave-change switch. X on the P.J.2 will go to a .001-mfd. semi-variable condenser, and will also go to another of the contacts on the three-point switch. E on the coil quito will go to the negative H.F. grid-bias terminal, to the .01-mfd. condenser, to the moving vanes on the first tuning condenser, and also to the remaining contact on the three-point wave-change switch.

That will complete the alterations for this part of the circuit, the remaining side of the .001-mfd. condenser being put on T1 or T2 as desired.

The other circuit is treated in much the same way, and the moving vanes of its variable tuning condenser will still go to L.T.—, etc., but they must be disconnected from P.J.3. The second coil quito will then be joined up in the following manner:

E on the second coil quito goes to the L.T. and earth, etc. G on this coil quito goes to Y on the P.J.3 and to one terminal of the four-point switch. “A R” terminal goes to other contact on the four-point switch and to Z on the P.J.3. X on the P.J.3 is connected to the third contact on the four-point switch and also by means of a flexible lead to the clip, which is tapped on to T1 or T2. Finally, the fourth contact on the wave-change switch is joined to the moving vanes of the second variable tuning condenser and so to earth, L.T., etc.

(b) It is quite O.K. to use a 1-megohm volume control in place of the 1-megohm grid leak and all you have to do is to join the terminal which is connected to the slider to the grid of the third valve, and simply use the end terminals as a grid-leak, one of which will go to the G.B.—3 lead and the other to the .01.

USING THE OLD H.T. BATTERY AGAIN.

L. G. (nr. Hertford).—“Here in the country with nothing to do in the evening but listen to the wireless, the set is usually on for about six hours a day, and that is very hard on the H.T. battery. The expense for this is the worst part of keeping up a wireless set, I find, and in this connection perhaps you can give me some advice.

To give the ‘Cosmic’ a fair chance I bought a new battery instead of trying to use the old one, although there is still some volts left in it. And when the set was tried out I certainly did not grudge buying it a battery for itself!

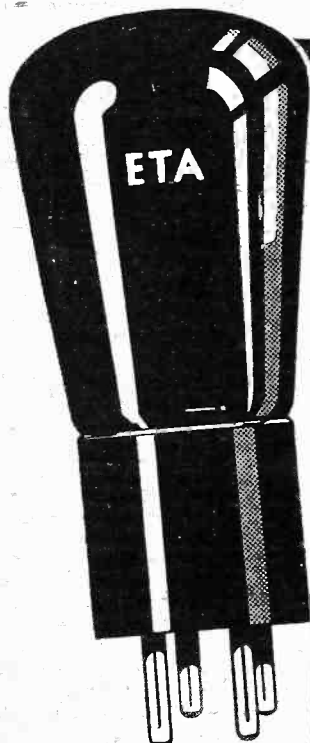
“However, the other one has still a good deal of useful life in it; I believe, although it could not give quality results on three valves at the strength handed out by the ‘Cosmic.’ So I am wondering if I can use it to supply just one

(Continued on page 1534.)

From Abroad

MORNING
 10.—Stuttgart.—Concert.
 10.10.—Huizen.—Songs and Piano Recital.
 10.25.—Hilversum.—Gramo.
 10.40.—Hilversum.—Orchestra conducted by
 11.—Heilsberg. Berlin (Königs Wustehausen).
 E. Wilken. —Gramo.
 11.5.—Stuttgart.—Gramo.
 11.10.—Huizen.—Piano.
 11.30.—Beromünster.—Orchestra.
 11.35.—Stuttgart.—Künzel Orchestra.
 11.40.—Huizen.—Gramo.
 11.55.—Huizen.—Orchestra. Hilversum.
 Orchestra.
 12.5.—Langenberg.—Orchestra: Dances

If you want more Stations FIT ETA VALVES



ETA valves are never weary of searching for "lost" stations and finding them for you. So, if your set refuses to recognise the existence of any but the very biggest Continental stations, all you have to do is to fit ETA valves and your troubles are over.

The world produces no more efficient valves than ETA, no matter what you pay. Why then pay more than you need? ETA's price is the right price for the right valve.

ETA

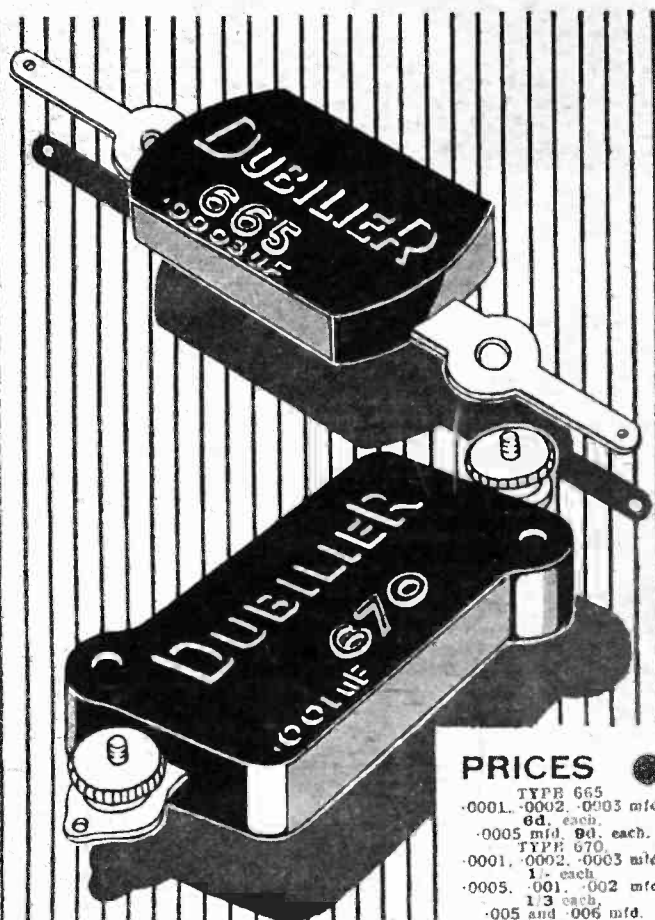
THE INTERNATIONAL VALVE

THE ELECTRICAL TRADING ASSOC. LTD.
 Aldwych House, Aldwych, London, W.C.2
 Telegrams: Eltradax Estrand, London
 Telephone: Holborn 8139

PRICES FROM
7/-

Hutcheonad

YOU CAN PAY TWICE AS MUCH



PRICES

TYPE 665
 .0001, .0002, .0003 mfd.
 6d. each.
 .0005 mfd. 9d. each.
 TYPE 670
 .0001, .0002, .0003 mfd.
 1/- each.
 .0005, .001, .002 mfd.
 1/3 each.
 .005 and .006 mfd.
 1/6 each.
 TYPES 610 and 620
 Prices from 1/8 to 3/-
 each.

—BUT YOU WON'T GET BETTER CONDENSERS!

Never before in the history of radio have there been such consistently efficient and reliable condensers at so low a price.

Built up to a standard—the Dubilier standard—only enormous production has enabled the price to be pared to this minimum. Light in weight but robust in construction, the Dubilier moulded mica condensers types 665 and 670 are used by leading set manufacturers and designers. You can't do better than follow this lead. Build with Dubilier.

DUBILIER

CONDENSER CO. (1925) Ltd.,

Ducon Works, Victoria Road, N. Acton, London W.3.

C.2.

RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 1552.)

of the valves, as I have seen explained in POPULAR WIRELESS?

"If this is possible, please give the full connections for the battery leads themselves, as well as any that may be necessary in alterations of wiring."

Although it is quite useless to expect a really old battery to give satisfactory service, in the circumstances in which you are placed it would be a pity not to try and use the battery if there is really a limited service life open to it. The alterations are so very simple that you could try them in a few minutes.

We suggest you use the extra battery to supply the high-tension to V1, and we will describe the alterations as they are particularly simple.

IS YOUR SET GOING WELL?

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.

LONDON READERS, PLEASE NOTE: Inquiries should NOT be made by phone or in person at Fleetway House or Tallis House.

First of all, stand your extra battery near the main battery and join its H.T. to the other H.T. by means of a flexible lead. (This lead, of course, can go to the H.T. terminal on the set or to the H.T. negative terminal on the battery, as these points are really the same.)

To supply H.T. to V1 via the extra battery instead of from the main battery, all you now have to do is to take the plug that comes from H.T.+1 on the set out of the main H.T. battery and put it in to the desired voltage on the extra battery. That is all!

REACTION IN THE "MAGIC" THREE.

M. R. S. (East Ham).—"My set is a 'Magic' Three, which I made myself from 'P.W.' On the local station it is A1, but I find it rather difficult as regards to trying for foreigners owing to its floppy reaction.

"I can hear the stations through the reaction, but when I attempt to decrease same it goes out altogether with a loud plop, and I hear nothing else. Could you tell me what is the cause of this and if there is anything I can do to the set to stop it?"

We are very surprised that you get this trouble with the "Magic," for one of the strong features of this set was its smooth and easy reaction control. The commonest cause of the trouble you describe is incorrect value of grid leak, and the trouble will be more marked if the grid condenser and the high-tension values are not right.

Sometimes the actual grid leak is O.K. but a fault occurs in connecting it, so that it is not actually in circuit at all, and a very high resistance takes its place—composed of spurious resistances such as the leak across the insulation. So make sure that all the grid-leak connections are O.K. and that it is firmly held in place in its clips, and then borrow another, or several grid leaks of different values, and replace the present one, at the same time varying the H.T.

Unless you have gone hopelessly away from our specification it is improbable that you will notice any difference owing to an alteration of grid condenser, but the variation of the H.T.+1 plug is important to get best results. In some cases, this partly depending upon the particular detector valve in use.

You do not say what coil values you are using, but it is easy to obtain a floppy reaction effect if too large a reaction-coil is used, so this is a point deserving attention. Do not forget also that a very important part in smooth reaction control is played by the adjustment of the slider on the potentiometer

Keep it in about the half-way position for the above tests, and then when the set is going well you can adjust it finally on a weak station.

The main facts about the setting of this control is that if the slider is pushed round to that end of the potentiometer which is connected (via a switch, etc.)

TECHNICAL TWISTERS

No. 104.—MODERN TUNING COILS.

CAN YOU FILL IN THE MISSING LETTERS?

Modern tuning coils are nearly all of the type wound on a former.

Sometimes the coil is divided into two sections connected in and wound astatically.

The object of this is to reduce the "spread" of the magnetic field and prevent undesired interaction. Such an arrangement may be a coil.

Although this type has a very restricted magnetic field it is not so efficient as the plain using external to prevent unwanted interaction.

Last week's missing words (in order) were: Voltage, Voltage. One cell. Forty. Battery.

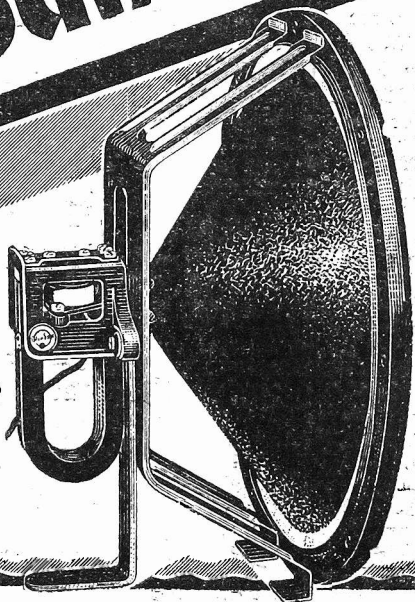
to L.T.+ you get maximum sensitivity, combined often with a certain tendency to ploppiness; whereas if the slider is pushed round to the opposite position, and is thus brought near to the end which is connected

(Continued on page 1536.)

**YOU WILL
BE
Astounded**



Registered Trade Mark



WHEN you hear the marvellously life-like reproduction of BLUE SPOT 100U you will laugh at other speakers.

100U gives you the real thing. It gives more than clarity—it gives you the exact tone and personality of speaking and singing voices, the real verve and spirit of music, whether "highbrow" or "low brow." It carries your ears to the studio; it is the essence of reality.

This wonderful inductor type speaker is the equal and even the superior of the most expensive dynamic speakers.

If you are building a kit, crown your efforts with the best speaker in the world, BLUE SPOT 100U. Write for catalogue. P.W. 30U

100U
BRITISH MADE

Complete
mounted to
chassis
39/6

THE BRITISH BLUE SPOT COMPANY LTD.
BLUE SPOT HOUSE, 94-96, ROSOMAN STREET,
ROSEBURY AVENUE, LONDON, E.C.4.
Phone: Clerkenwell 3570. Gram: "Bluspot, Isling, London"
Distributors for Northern England, Scotland and North
Wales: H. C. RAWYSON (Sheffield and London), Ltd.,
100, London Road, Sheffield; 22, St. Mary's Parsonage,
Manchester; 183, George Street, Glasgow.

Hutcheonad

ANNOUNCING

PERTRIX TRADE MARK JUNIOR

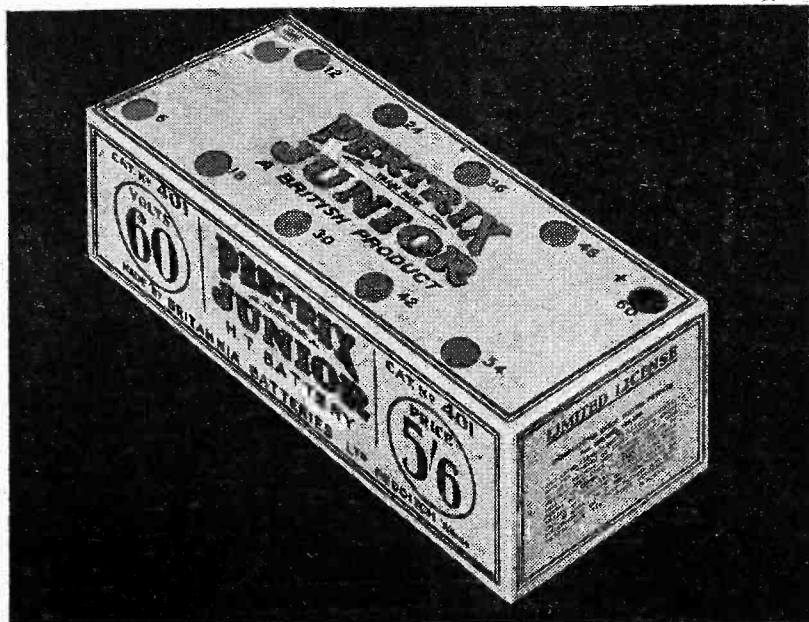
Now, to meet an incessant demand we introduce the Pertrix "JUNIOR," a non-sal-ammoniac battery, at a popular price.

At its price there is no other battery to equal it, no other battery which will give the life or possess the same capacity.

All the skill and the high quality chemicals that go into making the most expensive Pertrix batteries go also into making the Pertrix "JUNIOR."

ALL DEALERS ARE STOCKING THEM

MADE AT REDDITCH BY BRITANNIA BATTERIES, LIMITED



5/6

60 Volts

9/-

100 Volts

11/-

120 Volts

emission—nine milliamps



RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 1554.)

to the L.T.—lead, reaction control becomes much smoother, but there is not quite so much sensitivity as is obtained in the other position.

Thus the slider alone gives a very complete control over reaction in all the other values are O.K., and it is for this reason that we are surprised you have been having trouble in getting a smooth decrease in reaction.

A final hint worth remembering is that if you have a spare general-purpose or similar type valve on hand, it may give better reaction control than the valve which you are at present using in the detector position of the receiver.

H.F. OR L.F.?

T. G. W. (Liverpool).—“All I have decided so far is that I shall need three valves to work the moving-coil speaker at good strength. But I cannot find out what are the merits of the different ways of arranging these three in circuit.”

“Either an H.F., Det. and L.F. arrangement, or the more usual Det., 2 L.F., will give the necessary strength, I am told. And the choice of the latter type of circuit with its enormous ‘punch’ obviously does not mean I shall be tied to local stations; for reports of this class of set getting far distant foreigners are quite common.”

“What then is the advantage of H.F. instead of one of the L.F.?(if any). Assuming a fairly average sort of outdoor aerial, 50 ft. at one end, dropping to 30 ft. at the house end, which sort of set would be preferable for quality ‘local’ work; and ample alternatives when the set is handled as a ‘DX-er’?”

“It will be fixed about 30 miles from the North Regional, and used all day for this station, and for touring Europe on those evenings when the Northern programmes don’t appeal too strongly. What should it be—Det 2 L.F., or ‘H.F., Det. and L.F.’?”

Yours is an easy question to answer because you are so suitably situated for good results from a Det. and 2 L.F. set.

Perhaps the best way to illustrate the respective merits is to say that in the Det., 2 L.F. type of receiver the great volume obtainable is the chief advantage, and this is accompanied by very easy handling for all normal purposes.

Against these advantages there is the fact that two or more main tuning circuits are used, though this is counteracted to some extent by the receding of the reaction’s importance as a control. And the two tuned circuits can be ganged if desired, so that the first rough adjustments are carried out as for one condenser. The tendency nowadays is towards a need for greater selectivity, but it seems probable that

NEXT WEEK’S NUMBER OF “P.W.”

Will be another splendid three-pennyworth, and will include a long and absorbing account of

A TALK WITH A JAPANESE LISTENER

For the “Cosmic” builder there are two special features:

A FILTER FOR YOUR “COSMIC”

also

“COSMIC” QUERIES

And every long-distance listener will enjoy

FINDING FOREIGNERS

—full of practical reception hints covering the long- and short-wave programmes

NEXT WEEK’S “P.W.” ORDER TO-DAY. USUAL PRICE

There is only one main tuned circuit, but reaction is rather important on distant stations with this class of receiver.

The merit of the H.F., Det. and L.F. circuit is that it is often much more selective than the other. Great volume is obtainable with it, and a much higher reliability factor where very long-distance programmes are concerned, many of these being rendered almost as reliable after dark as “locals” by efficient H.F. amplification.

the Det. and L.F. will definitely remain as the most popular set for all-round use in conditions like those described.

A surprisingly high degree of selectivity can be obtained with sets using a Detector as first valve, if a “hotted-up” input circuit is employed, as in the “Cosmic.” (Certainly the older type of Det., 2 L.F. would not bear comparison with these later types—

(Continued on page 1558.)

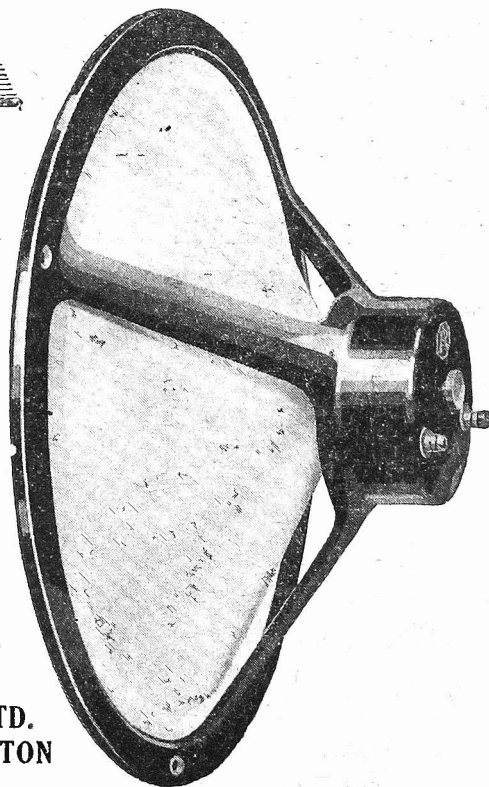
More than a Speaker

R & A Reproducers, as the name implies, are something more than “loud speakers.” They are designed to reproduce speech and music with a fidelity as closely resembling the original performance as is possible in the present stage of development.

As the Wireless World Test Report on the “R & A Type 40,” so aptly states, “Speech is exceptionally good . . . Bears all the marks of a thoroughbred . . . It stands in a class by itself.”

You will appreciate the reproduction of speech and music with an “R & A”—the purity and truth, the volume, the clarity—qualities for which the R & A are so well known. Your dealer can supply you. The R & A “Type 40” illustrated, is more than moderately priced at sixteen shillings and sixpence.

REPRODUCERS & AMPLIFIERS LTD.
FREDERICK ST., WOLVERHAMPTON



R & A is a Reproducer

GOLSTONE COILS

FOR "COSMIC" CIRCUITS

MODERATOR
COIL
AS SPECIFIED
CM/26 2/6

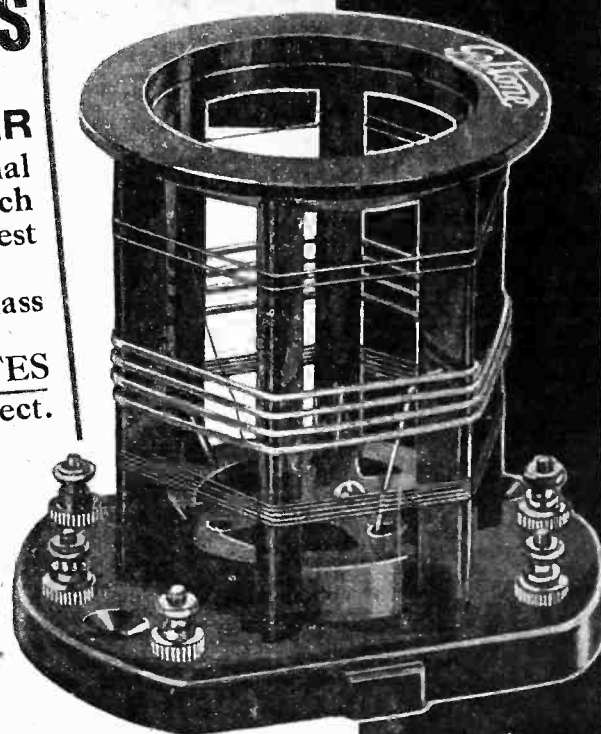
ONLY
10/-
PER PAIR
OBTAINED
IF SEPARATELY,
DW/19 - - 4/6
DW/18 - - 5/6

FULLY APPROVED AND
SPECIFIED BY DESIGNER
Insist on "GOLSTONE" original
"P.W." COSMIC COILS which
have been designed to obtain best
possible results.
Obtainable from all First-Class
Radio Stores—
REFUSE SUBSTITUTES
If any difficulty write direct.

Radio Catalogue Sent On Request

**IMMEDIATE
DELIVERY**

Ward & Goldstone
PENDLETON MANCHESTER



DW/19

When did you
last examine
your "EARTH"?

SATURATE

it **NOW**
with
TERRA-VIVER

the CONDUCTIVITY
Chemical

A Good Aerial
is spoilt with
a Bad Earth—

So do Not Neglect
Yours
for **ONE SHILLING**

SENSITIVITY
Definitely
Increased

within **24 hrs.**

From all Radio Dealers or
ERIC J. LEVER (TRIX) LTD.,
8/9, Clerkenwell Green, E.C.1

ALL
applications
for
Advertising
Space in
"POPULAR
WIRELESS"
"MODERN
WIRELESS"
and

"WIRELESS
CONSTRUCTOR"
must be made
to the Sole
Advertising
Agents,
**JOHN H. LILE,
Ltd., 4, Ludgate
Circus, London,
E.C.4.**

Phone: City 7261.

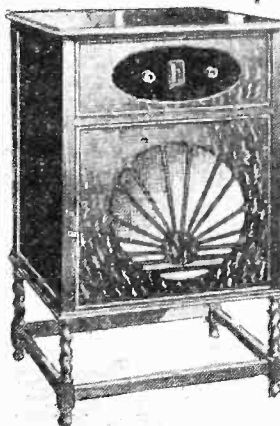
2 GNS Still Buys Our HANDSOME !!!! RADIO-GRAM CABINET OF EXCELLENT DESIGN AND QUALITY

These Cabinets are soundly constructed in selected OAK
etc., and polished a rich Jacobean shade.
SIZES: 3' 3" HIGH 22" WIDE 17" DEEP
Gramophone 3 1/2" CLEAR FOR PICK-UP
Compartment 3 1/2" MOTOR
Wireless For PANEL up to 18" x 7"
Compartment BASEBOARD 14 1/2" deep
Speaker 20" x 15" x 14" allowing ample
Compartment room for speaker and batteries.
AND AT THE ASTOUNDING PRICE OF
2 GNS.!! PACKED FREE CARR. PAID

Cash with Order or C.O.D.

Sole Manufacturer and Distributor: **W. S. WILKIN,**
Cabinet Manufacturer, 12, Nelson Mews, SOUTHBEND-
ON-SEA, ESSEX. Trade Enquiries Invited.

Illustrated Name.....
Leaflet Address.....
Post Free. Address..... P.W.3.



Another OSBORN RADIO CABINET

for the
"POPULAR WIRELESS"
"COSMIC" THREE

Model No. 197. Jacobean Radio
Cabinet in Figured Oak, 3 ft.
6 ins. high, 2 ft. wide, 1 ft.
4 ins. deep. Real twisted legs.
Opening at back and top. Takes
panel 21 ins. by 8 ins. or smaller.
Baffle board 1 ft. 9 ins. by 1 ft.
6 ins. Ample room for any type
of batteries in cabinet.

PRICES:

Machined Ready to Assemble,
£1.15.0.
Assembled Ready to Polish,
£2.10.0.
Assembled and Polished, £3.5.0.
All Models carriage paid.

The Regent Works, Arlington St., London,
N.1. Telephone: Clerkenwell 5095. And at 21
Farr Road, Islington, N.1. Telephone: Clerkenwell
5634.

Made by
Craftsmen
for particu-
lar people.

SEND 30. IN
STAMPS FOR
NEW 1932
BEAUTIFULLY
ILLUSTRATED
CATALOGUE.

CHAS. A. OSBORN
(Dept. P.W.)

RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 1556.)

in fact not long ago it would have seemed impossible to get the equivalent of "Cosmic" selectivity on a simple set.)

On no account be persuaded to try one of the old-fashioned Det., 2 L.F.'s—if it is to be this class of circuit get one of the "Cosmic" standard where really good selectivity is obtainable. This would give you numbers of foreigners, and even if the ether does "crowd-up" still more than it is at present, you would, in the situation described, have ample selectivity in reserve.

Perhaps the best, if not the only way to decide your problem in general terms is to decide, once and for all which is more important—the foreigners or all-round reception? If the main requirement is powerful, easily-handled local-station work and foreigners, decide on the Det. 2 L.F.

If, on the other hand, it is really the distant foreigners that you are chiefly counting on, decide in favour of the H.F., Det. and L.F. circuit.

WINDING COILS FOR ECKERSLEY TUNER.

R. W. (Peterhead).—"For the pleasure of constructing it I am going to make up an Eckersley Tuner of my own, and I have been reading over the details which have appeared in 'P.W.', namely those in the December 12th issue, and those in 'P.W.' dated February 20th.

In one case the directions of the tuned windings are given as the same and in another case the direction of the medium-wave is given as opposite to that of the long winding. Which way is right?"

Although there appears to be a discrepancy in the two descriptions, actually this is not the case, for the relative "direction of windings" will depend not so much on the way the turns are originally put on the coil as on the method of connecting them when completed.

In the original brief description this point was not touched upon, but in the fuller description in the "Radiatorial" columns of February 20th the method of winding and the connections for that method are given in detail. These should be followed closely, when the coil will resemble the "officially" manufactured models.

MIRROR OF THE B.B.C.

(Continued from page 1534.)

Brook, the Canal Turn and Valentine's Brook.

An announcement will be made of the change-over from Mr. Lyle to Mr. Hobbs, and at the conclusion of the race there will be another change-over to Mr. Lyle, who will repeat the result several times.

There will, of course, be the usual opening description of the general scene before the race, with the names of runners and jockeys and an account of the parade of horses to the starting post.

The New Dance Orchestra.

So much limelight has been focussed on Henry Hall and the New B.B.C. Dance Orchestra that their opening broadcast on Tuesday, March 15th, will be looked forward to by millions of listeners anxious to hear how they compare with Jack Payne and his "Boys."

Coincident with the debut of the new band, hundreds of cinemas will show a short sound news film of the band in action in Studio 8a on the top floor of Broadcasting House.

The film will include an introductory announcement by the B.B.C.'s chief announcer, and the band playing the specially written 'Signature' and "passing out" numbers. "It's Just the Time for Dancing" and "Till Next Time."

The New Dance Orchestra will take part in their first vaudeville on Saturday, March 19th, when the artistes include Harry Tate, the Carlyle Cousins, Ronald Gourley, and Alexander and Mose.

THE LISTENER'S NOTEBOOK

(Continued from page 1534.)

selected such songs as "Meet me in the Cowshed," and dragged out Gus Elen's "It's a great big shame." All very mediocre. Not even could Marius B. Winter's dance orchestra save the situation, his vocalists certainly failing to please my ear.

If this is the sort of stuff now being put on at our big London music halls, it is not to be wondered that these places are losing money and patrons.

The Gilbert and Sullivan hour, on the contrary, was sheer joy; and made one long for more. Both clarinet and cornet came through well—as they always do. It was a pity that, after the Overture to the "Pirates of Penzance" we were given only "The Mikado." I would have preferred excerpts from the other G. and S. operas. But that, perhaps, is a treat in store for us.

This wasn't the only Gilbert and Sullivan we were favoured with. The Commodore Theatre Orchestra included selections from "The Gondoliers" in one of their lunch-time programmes, while Copenhagen concluded a programme of English music one evening with selections, unfortunately, again from "The Mikado."

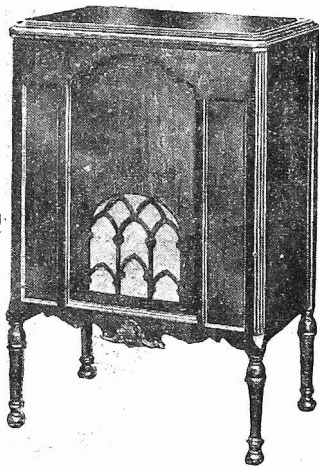
I realise, after listening frequently to French transmissions, how fortunate we are to be spared from the accordion vogue. It is a dreadful instrument, real, or at least,

(Continued on page 1560.)

●A finer
HAND
finish

●MODERN
designs

●Stronger
CONSTRUCTION



The "MERTON"

A Cabinet of graceful, modern design and perfect construction. The front is walnut veneered arched with burr giving a delightful two tone effect in shade walnut with satin finish; ends and top are also veneered. The attractive grille is backed with black and gold silk. Height 36", Width 24 1/2", Depth 15 1/2", Baffle Board 22 1/2" x 13", Set Board 22 1/2" x 12". In Walnut.
£5 - 5 - 0

Whatever your needs in Cabinets, there is a Smithcraft Cabinet exactly suitable. And—being a Smithcraft—it will be solidly constructed, beautifully polished (by hand) and modern in design. Yet despite craftsmanship that comparison will soon show you to be outstanding, Smithcraft Cabinets are definitely lower in price than even ordinary cabinets. See a Smithcraft against any other make . . . You'll choose a Smithcraft.

Smith's Cabinets LTD

Send for illustrated folder of models (Table and Pedestal, in Oak, Mahogany and Walnut). Prices from £1-15-0 to £5-17-6

18/20, HERTFORD ROAD, N.1. Telephone: Clissold 3725.

**Short
Waves**

**FREE FROM
FLUCTUATION**

BRITISH MADE.

A4 FOR 1-2 VALVES

10S-v. 3,000 m/a - - - 28/3

D6 FOR 3-4 VALVES

10S-v. 6,000 m/a - - - 34/9

Other capacities up to 24,000 m/a. Any Voltage as required.

Any voltage and any capacity for **5/-** DOWN.

Tray containers extra if required.

WRITE FOR DETAILS OF THIS BATTERY THAT LASTS FOR YEARS.

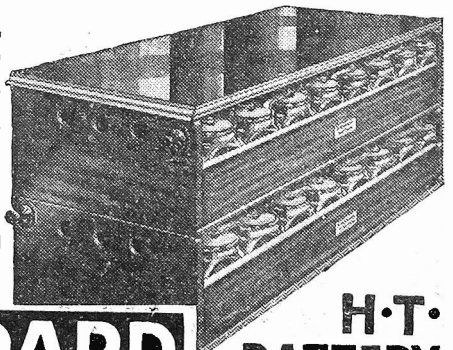
STANDARD BATTERY CO.

Department P.W.

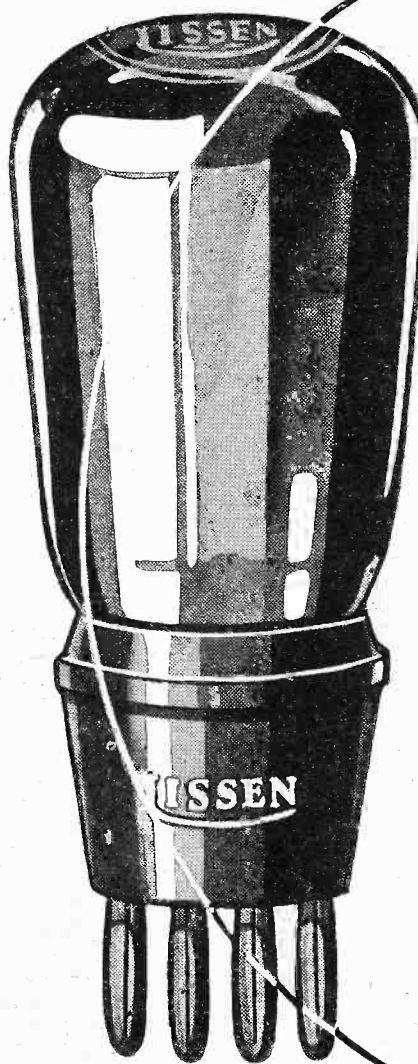
184-8, Shaftesbury Avenue, LONDON, W.C.2.

**WATES
STANDARD**

**H.T.
BATTERY**



All the VOLUME you want from 2 and 3 valve sets!



THE LIVELY DETECTOR

The Lissen Detector Valve—H.L. 210—liven up your tuning, gives you extra range, greater sensitivity. It is so responsive that it brings the foreign stations in like magic. Not only this, but it passes a crisper more powerful signal on to the L.F. stage of your receiver, and you get louder, clearer radio altogether.

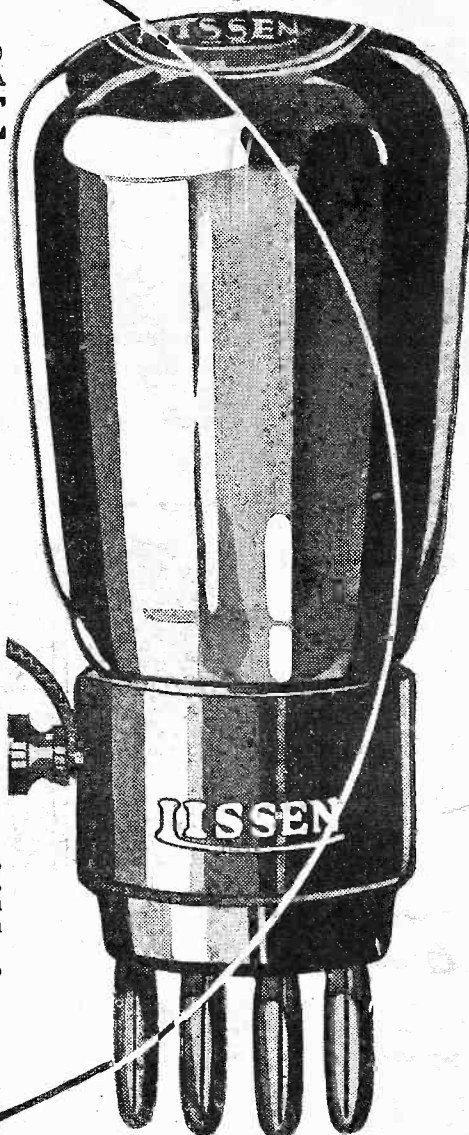
Ask for Lissen H.L. 210. Price .. **5/6**

THE POWER PENTODE

The Lissen Power Pentode Valve—P.T. 225—converts any set with one stage of L.F. amplification into a fine, full-volume "Pentode-output" receiver. This valve puts new power into your loud-speaker, and new brilliance of tone, too. Use it instead of a power valve and at once you get an amazing step-up in volume. Where before you got a whisper, now you get a torrent of pure sound. And it takes no more current than the power valve it replaces—its H.T. consumption is only 7 m/A.

Ask for Lissen P.T. 225. Price .. **12/6**

Put these two valves into any two-valve set, or any set with one stage of L.F. amplification, and you will be amazed at the results you get, the mighty loud-speaker volume you enjoy, the distance-searching you can do. Ask for Lissen Valves and insist that no others will do.



Other Types and Prices

H210	5/6
L210	5/6
P220	7/3
PX240	8/-
S.G.215	12/6

Four- and six-volt types also available

LISSEN

LISSEN LIMITED,
WORPLE ROAD,
ISLEWORTH,
MIDDLESEX

A BRILLIANT BRITISH BEST

THE LISTENER'S NOTEBOOK

(Continued from page 1558.)

it seems to be after a time. On the other hand, do we appreciate the B.B.C. orchestra (all sections) as much as we ought? I was very struck with the Mendelssohn programme given by Section D, under the direction of Stanford Robinson, the other evening. How well all the instruments seemed to combine, and how restrained the playing was! This was particularly noticeable when accompanying the soprano solo in Psalm 95, "Come let us Sing."

* * * * *

The least said about "The Forsaken City" the better, but I would like to ask whose was the brain that conceived such an idea? "Bring out your dead!" isn't the sort of thing we want to hear repeated ad infinitum at any time; but now when a 'flu epidemic is raging it seemed to be adding insult to injury. Surely there are many more illuminating stories in the pages of history than the Great Plague of 1665. Let us have these for preference, if we are to be given history!

* * * * *

It makes me wonder whether the kiddies will have to listen to the "Murder of the Princes (1483)," or to a detailed account of the "Burning of Ridley and Latimer

TUNE TO CT1AA!

Our issue on sale

NEXT WEEK

will tell you all about

"P.W.'s"**BROADCAST FROM LISBON**

Full details of the two-hours' programme arranged by this journal and radiated to our readers from Portugal will be given

NEXT WEEK

ORDER YOUR "P.W." NOW
USUAL PRICE

(1555)," one of these evenings. There's no telling, for they've already had "The Last of The Niblungs!"

* * *

Much has been, and is still being written, about the attractions of Sunday Continental broadcasts, but reference is generally made to musical turns. To those who are interested in British politics (and there must be many), I can warmly recommend the talks on British Statesmen given by Copenhagen, and broadcast by Kalundborg at noon every Sunday. They are splendidly delivered, the English being quite as good as the best we hear from our home stations. Pitt, Melbourne, Peel, Canning and Palmerston are some of those I have listened to, and I hope I shall not miss Gladstone and Beaconsfield.

This may sound a bit heavy for a Sunday noon, but I shall be surprised if you don't find these talks very interesting. I couldn't switch them off!

TECHNICAL NOTES

Some diverse and informative jottings about interesting aspects of radio reception.

By Dr. J. H. T. ROBERTS, F. Inst.P.

Reaction "Overlaps."

I DARESAY you have noticed that sometimes when reaction sets in you have to turn the knob back a little way before the reaction ceases. Suppose, for example, that reaction starts at a position 80 on the dial and you turn the knob beyond this point and then turn it back, you might expect reaction to cease again at the same reading of 80.

When the set is operating under the proper conditions the reaction will cease at the same point—or practically the same point—as that at which it starts. If there is a considerable overlap, however, it shows that the conditions are wrong and in these circumstances you will find it impossible to get that nice balance between reaction and tuning which is so necessary for picking up weak or distant stations.

If you are troubled seriously with "reaction overlap," the best thing to do is to look to the value of H.T. voltage which is used and also to the values of grid leak and condenser. The trouble may also, by the way, be traced to an unsuitable detector valve. The ordinary values of .0002 microfarad, and 2 megohms for the grid condenser and leak, will generally be found suitable with a voltage of perhaps up to 100 volts.

Effect of L.F. Coupling.

If, however, instead of using the ordinary L.F. transformer of a conventional ratio, the detector happens to be followed by a transformer with some special ratio, this having an unusual primary inductance value, or if resistance coupling is used, you will naturally require a different value of H.T. Sometimes, for instance, the H.T. voltage may need to be considerably lower and the grid leak may often be increased with good effect.

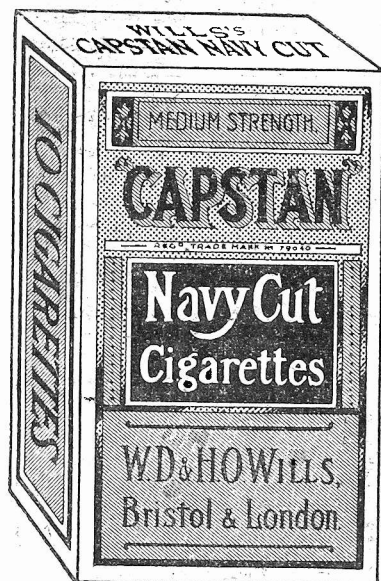
By the way, you will often find that a mains valve will work very well in the detector position without seeming to be so critical as the corresponding battery-driven valve. In such a case you are not so likely to get into trouble with reaction overlap, and altogether reaction seems to be much more manageable.

With regard to mains-driven detector valves, you may, however, get a bit of trouble with A.C. hum, and this is often made worse by a bad earth connection. The poor earth connection will also upset the tuning and reaction at the same time, so that if you find this trouble with a mains detector you should give particular attention to the earth.

Use Twisted Flex.

Another important point with the detector or, for the matter of that, any of the valves in a mains-set, is to prevent any stray A.C. field from the filament leads. One of the simplest ways to do this is to use twisted flex for the leads.

(Continued on next page.)



WILL'S
CAPSTAN
ARE
CAPITAL

They suit everyone

6^D FOR 10 11^{1D} FOR 20

Issued by The Imperial Tobacco Company
(of Great Britain and Ireland), Ltd. C.C.366.

TECHNICAL NOTES

(Continued from previous page.)

Often enough I am told by people that they cannot get very many stations on their sets, sets which are specified to give quite a large number of Continental stations. Generally, the trouble is simply due to the fact that the owner of the set does not take sufficient care with the proper management of the tuning and reaction.

These must be smoothly applied so as to bring the detector to a point just short of oscillation and get the maximum sensitivity. Unless you operate the set very carefully in this way, a fraction of a degree at a time, you are practically certain to miss some of the fainter stations; you cannot simply set the reaction knob and expect this setting to serve for different adjustments of the tuning control. The two must be operated together.

Mains Valves.

With an A.C. mains valve, whether fed by raw A.C. current or indirectly heated, readers are sometimes a little puzzled with regard to the application of the grid-bias voltage. As a matter of fact, it is really quite simple, as a moment's consideration will show.

You know that with an ordinary battery-heated filament we have a difference of potential at the ends of the filament about equal to the voltage of the filament battery (assuming there is no filament rheostat in series). Clearly, we have to reckon the voltage of the grid in relation to some part of the filament, and the point we take is the negative end.

So that if there is a grid-bias voltage of, say, 9 volts, and the voltage of the filament battery is 6 volts, then the grid will be 9-volts negative with respect to the negative end of the filament and 15 volts negative with respect to the positive end of the filament.

The same thing, of course, applies with the anode voltage. We may have 100 volts between the anode and the negative end of the filament, but if the filament has 6 volts on it there will only be an anode voltage of 100 minus 6—that is, 94 volts—between the anode and the positive end of the filament. At any rate, it doesn't matter very much so long as we have some definite point from which to reckon.

A.C. Output Valve.

But with a filament supplied by alternating current you might at first think that there was no such "anchor" point. In practice, with the indirectly-heated cathode, the position is simpler than with the battery-heated filament, because the indirectly-heated cathode is insulated from the A.C.-operated heating filament inside and, although it receives heat and becomes an electron emitter, its potential is "floating," unless it is connected to some definite source of potential.

So if we connect the cathode by any point to the grid via a grid-bias battery, we have that many volts (whatever the voltage of the G.B. battery may be) between the whole of the cathode and the grid. As a matter of fact, it is usual to connect the cathode to the centre tapping of the transformer winding which supplies the heating current. This centre-tap,

(Continued on next page.)

WHEN IS A FUSE? NOT A FUSE?

—WHEN IT IS SO LONG that its resistance couples together the circuits which it protects, making the set unstable.

—WHEN IT IS TOO SHORT to check a powerful surge of current, allowing it to 'arc' across the end-caps instead of ceasing when the fuse wire melts.

Belling-Lee fuses are made in two lengths, for safety and efficiency; $\frac{3}{4}$ " long for H.T. and G.B. circuits (60 m/a, 150 m/a and $\frac{1}{2}$ -amp.); $\frac{1}{4}$ " long for mains leads (1, 2 and 3-amp.), shorter fuses being unreliable with mains voltages. SPARE FUSES, all ratings 6d. each.

FUSE HOLDERS

26 SAFETY TWIN

1/4 WANDER FUSE

1/4 FLEX LEAD

1/4 SINGLE BASEBOARD

BELLING-LEE
FOR EVERY RADIO CONNECTION

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

EASY TERMS

WE supply all good quality Radio Receivers, Components and Accessories on deferred terms. We carry adequate stocks and can give PROMPT DELIVERY.

NEW CELESTION MOVING-COIL PERM MAGNET UNIT. with Transformer. Cash Price ... £2 7 6

Or 5/- with order and 9 monthly payments of 5/3.

12 EXIDE W.H. HIGH-TENSION ACCUMULATORS (120 volts, 5,000 m/a). Large capacity type. Cash Price ... £3 15 0

Or 6/6 with order and 11 monthly payments of 7/-.

Carriage charged on all orders from Scotland.

N.K. FARLAND INDUCTOR LOUD-SPEAKER UNIT.—Quality of reproduction almost equal to a moving-coil speaker. Cash Price ... £3 10 0

Or 5/6 with order and 11 monthly payments of 6/6.

SET OF 3 VALVES S.G., Det. and Power. Mullard or Cossor. Cash Price £1 19 0

Or 6/- with order and 7 monthly payments of 5/4.

NEW BLUE SPOT 6ER UNIT. The finest balanced armature movement on the market, complete with large Cone and Chassis. Cash Price ... £2 10 0

Or 5/- with order and 10 monthly payments of 5/-.

NEW HEYBERD A.C. ELIMINATOR KIT C.150. Complete kit of parts for building an H.T. Eliminator, including steel case. Output 25 m/a, 150 volts. 3 H.T. tappings, one variable. Cash Price ... £3 16 0

Or 6/6 with order and 11 monthly payments of 7/-.

Send list of requirements, and quotations will be sent by return. Price List FREE on request.

LONDON RADIO SUPPLY CO.

11, OAT LANE,

NOBLE STREET, LONDON, E.C.2

TELEPHONE: National 1977.

MAKE A RADIOGRAM OR GRAMOPHONE

at quarter price. Order loose kits or sets and assemble them at home, making your own cabinets or box. Get for 3d. our new 64-p. catalogue, No. 222/1932, with scale drawings and instructions how to make them. We sell motors from 7/6; Toncarins, soundboxes, 1/6; Pick-ups, Horns, Loud Speakers, Radio Kits, complete Receiving Sets, Gramophones, Radiograms. Established 1903.

THE REGENT FITTINGS CO.

(P.W.), 120, Old St., London, E.C.1.



KAYS CABINETS
The "Ashley," 36" high, 21" wide, 14" deep, with hand-carved paw feet and 1" hinged top. Vignette cut to suit control knobs of set, or 14" x 6" oval, as shown. Speaker chamber 18" square, fitted with 7-ply sub-baffle. Hole cut to suit type of speaker used. Grill backed with art silk. French polished. Mahogany or Walnut finish. PRICE 30/-
Illustrated lists of 60 Cabinets free.
H. KAY, Cabinet Manufacturer,
Mount Pleasant Rd., London, N.17.
Phone: Walthamstow 1626.

LOUD SPEAKERS REPAIRED, 4/-

(Blue Spot a Speciality, 5/-)

Transformers 4/-, Headphones 4/-, all repairs magnetised free. Tested, guaranteed, and ready for delivery in 24 hours.

Discount for Trade. Clerkenwell 9069

E. MASON, 44, EAST ROAD, N.1.

It pays you to ask your Retailer for genuine guaranteed

WAVEMASTER

Variable Condensers and Extensers for all the latest circuits

WEBB CONDENSER CO., LTD.,
42, Hatton Garden, London, E.C.1.

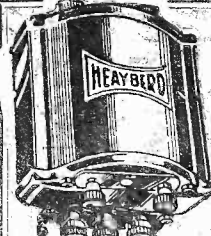
REMEMBER! "POPULAR WIRELESS" has the largest sale of any WEEKLY WIRELESS JOURNAL.

AMPLIFY!

Let your Cone (or Horn) Speaker give that Moving Coil Quality and ample distortionless volume without extra valves by adding the "Magna" Amplifier (Pro. Pat.) Something new in amplifiers, for it is worked by L.T. supply only. Needs no valve alterations to set, wiring, or expensive parts, and is very compact. Actually GUARANTEED to amplify reception three times. Special Electrode material, Reed and Rubber Blocks, 2/6, together with full-size, clear constructional blue-prints and diagrams. Simple to construct—Agent, L. Cook, 182, Cranston Rd. S.E.23

ALL

APPLICATIONS for Advertising Space in "POPULAR WIRELESS" must be made to the Sole Advertising Agents, **JOHN H. LILE, LTD., 4, LUDGATE CIRCUS, LONDON, E.C.4**



MAINS TRANSFORMERS

No. 803

PRICE EACH	250V	250V	2V	2V	2V	2V
32/6	75 ma	1 amp	5 amps			


These transformers are specially designed for use with valve rectification. They will produce a rectified H.T. output of 250 volts at 60 ma. Low tension is also provided for five 4-volt 1-amp. A.C. valves.

-----**POST NOW**-----

I enclose 3d. stamps for fully descriptive lists containing circuit diagrams of the latest Heayberd Mains Transformers, etc.

NAME _____

ADDRESS _____



HEAYBERD
MONARCH OF THE MAINS.

10, FINSBURY ST., LONDON, E.C.2.
(One minute from Moorgate Und. Stn.)

ALDRIDGE'S
St. Martin's Lane, W.C.2.

WIRELESS SALE

100 LOTS. MOSTLY WITHOUT RESERVE.
NEXT WEDNESDAY
and Every Wednesday at 12 noon.

Including Brunswick D.C., Majestic 8 V., Apollo 7 V., R.G., Ekco All-Mains Sets, D.C. & A.C., Radiograms, Portables, Battery Sets, Loud Speakers by well-known makers.

DEMONSTRATIONS MON. & TUES., 10 to 5.
NOW ON VIEW. CATALOGUE ON APPLICATION.
Entries invited for next sale. Tel.: Tem. 5013.

Guaranteed!

Purest Ebonite.
SPECIFIED FOR
"COSMIC" III STAR.
NEVER DISCOLOURS
Magnificent mirror polish.
Black, Mahogany or Walnut finishes.
Easy to cut and Drill.
Highest insulation.
Specified continuously by leading journals.

Ask your dealer or write for list. Any panel size cut. Cash or C.O.D. by return.

British Hard Rubber Co. Ltd.
Ponders End, Middlesex.

Less than 1/2 per square inch

A 7x18" panel costs only 4/6

PERMCOIL

PLEASE be sure to mention "Popular Wireless" when communicating with Advertisers. Thanks!

TECHNICAL NOTES

(Continued from previous page.)

together with the cathode, then become, for the purpose of reckoning voltages, equivalent to the negative end of the filament in the case of a battery-heated valve.

Magnifying the Hum.

I should say something about the power stage of an A.C. set, because here we sometimes use a valve the filament of which is supplied with raw A.C. In this case the filament itself is used as the electron emitter or cathode, instead of being used (as in the case of the ordinary indirectly-heated valve) as the heater for the cathode which surrounds it.

Now, at first sight, you might think that this would cause all kinds of complications due to A.C. hum; but bear in mind that it is only the last stage, and there is no amplification following the valve to magnify the hum.

This is one of the reasons why there is no serious trouble due to the hum of the raw A.C. A further reason is that the filament of such a valve is usually comparatively thick, and so the variations in temperature with the alternating current are lessened.

Grid Bias with A.C.

Obviously, in this case your grid-bias connections must be somewhat modified, and the usual thing to do is to connect to the centre of the output winding of the heating transformer for your "negative filament connection."

Sometimes this centre tap of the transformer is not available, and therefore a potentiometer resistance is connected across the output of the transformer and a centre-tapping taken on this potentiometer, which amounts to the same thing. The total resistance of the potentiometer may be up to about 100 ohms.

The use of the potentiometer instead of the centre-tapping of the winding of the transformer is also sometimes a distinct advantage, because if there should be any slight error in the electrical position of the centre-tap on the transformer winding (that is to say, if it should not be at the precise electrical centre) you would get more A.C. hum than need be, whereas with the potentiometer you can adjust the slider until you find the best position.

A New Principle?

Concerning improvements in valves, it is really wonderful, on the one hand, what great strides have been made in the design of valves for special purposes, which give us the opportunity of choosing highly efficient valves for particular circuits, whilst, on the other hand, it is perhaps equally surprising how little there is new in the way of principle.

One of the drawbacks of a low-impedance valve is that it consumes a relatively high H.T. current and perhaps it may be possible before long, to have a valve of this kind which is much more economical in anode current than those at present in use. If such a valve were forthcoming it would be a great advantage.

Changed Conditions.

Ever since wireless began we have heard rumours of the valve which is to operate

(Continued on next page.)

CLIX NEW "MASTER" PLUG


A COMBINED BANANA AND WANDER PLUG

The widely variable and non-collapsible prongs of the Clix Master Plug make it equally effective with Continental sockets and the smallest standard battery inserts. The entrant end is especially curved to facilitate insertion.

The wiring device provides a positive metal to metal contact. The importance of this feature should not be overlooked.

Type A: long shank and insulator. Type B: short shank and insulator. Red or black. Full range of markings.

PRICE 1 1/2 D. EACH.



An all-purpose British fitment of outstanding merit.
Illustrated leaflet M.S. on request.

Cheapest PERFECT Contact

Lectro Linx Ltd., 254, Fenchurch Lane, S.W.

Engineers' Guide

Containing the widest choice of engineering courses in the world.

Quality for a well-paid post in Engineering by studying at home with The T.I.G.B. Become an A.M.I.C.E., A.M.I. Mech. E., A.M.I.E.E., A.F.R.Ae.S., etc. Training until Successful is Guaranteed for the one fee. WRITE NOW for "The Engineers' Guide to Success," stating the branch, post, or qualification that interests you, to

THE TECHNOLOGICAL INSTITUTE OF GT. BRIT.
26, Temple Bar House, London, E.C.4.

Founded 1917. 18,000 successes.



To Success

EXACT TUNERS

250 to 2,000 metres.
Thousands of these tuners are in use, and we can strongly recommend them. No further coils are required. Send P.O. for particulars and circuits—FREE.

THE EXACT MANUFACTURING CO.,
Croft Works, Priory Street, Coventry.



WET H.T. BATTERIES

Solve all H.T. Troubles.

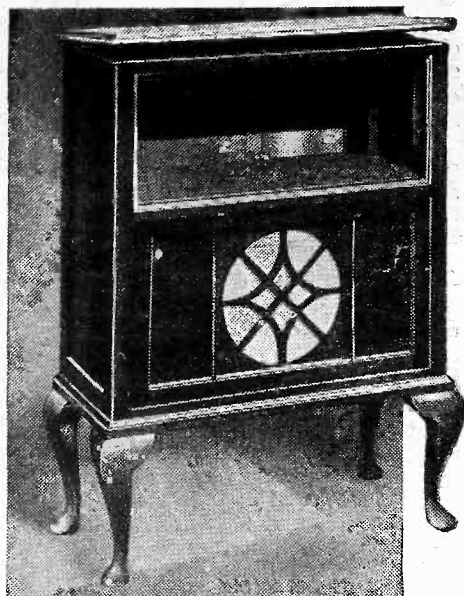
SELF-CHARGING, SILENT, ECONOMICAL

JARS (waxed), 2 1/2" x 1 1/2" sq. 1/3 doz.
ZINGS, new type 10d. doz. Sacs 1/2 doz.
Sample doz. (18 volts), complete with bands and electrolyte, 4/1, post 9d.
Sample unit, 6d. illus. booklet free.

Bargain list free.

AMPLIFIERS, 30/- 3-valve set, £5.
P. TAYLOR, 57, Studley Road, STOCKWELL, LONDON

REMEMBER! "POPULAR WIRELESS" has the largest sale of any WEEKLY WIRELESS JOURNAL.



NOW YOU HAVE BUILT YOUR SET—

house it in the Camco "Master" Cabinet, a most handsome piece of furniture, in beautiful Oak or Mahogany finish—only 90/-. Panel Sizes 14 ins. by 7 ins. to 21 ins. by 7 ins. Additional polished wood panel to match can be supplied. When ordering state exact size of panel. Write for FREE copy of the Camco Radio Cabinet Catalogue.



CARRINGTON MFG. CO., LTD.

Showrooms: 24, Hatton Garden, London, E.C.1.
Phone: Holborn 8202. Works: S. Croydon.

NAME _____
ADDRESS _____ P.W.31

EASY PAYMENTS

"There's no place like HOLMES."

The first firm to supply wireless parts on easy payments. Seven years' advertiser in "Popular Wireless." Thousands of satisfied customers.

	Deposit	Monthly Payments
TELSER VICTOR 3 KIT	39/6	5/5 7 of 5/5
COSSOR KIT	£6/15	10/- 11 of 12/8
OSRAM KIT	£10/15	19/6 11 of 19/8
METEOR 3 KIT	£3/15	6/10 11 of 6/10
EXIDE H.T. Accum. 120v.	£3	6/- 9 of 6/8
BLUE SPOT 66R & CHASSIS	£2/2/6	5/6 9 of 4/5
BLUE SPOT 100 U	39/6	5/8 7 of 5/4
AMPLION M.C.6	67/6	7/5 9 of 7/5
CELESTION M.C.	47/6	5/3 9 of 5/3
EKCO Eliminator A.C. 18	67/-	7/5 9 of 7/5

New Goods Obtained for Every Order.

Send us a list of the parts you require and the payments that will suit your convenience, and we will send you a definite quotation. Anything Wireless.

H. W. HOLMES, 29, FOLEY STREET,
Great Portland Street, London, W.1.

Phone: Museum 1414.

"PAULETTE" ALL WAVE TUNER
(REGD.)
250-2,000 metres. No coils to change. Greatly improved selectivity and range. PRICE, with Switch, 7/- post paid. Send stamp for FREE WIRING DIAGRAMS of PAULETTE 3-VALVE SET. Easy to construct. Parts cost £2.12.6.

PAUL'S WIRELESS STORES,
43, Caroline Street, Cardiff.

HEADPHONES. Sullivan's Double. 2 receivers with metal headbands. 120 ohms, 3/-; ditto, 8,000 ohms, 4/- pair; field service phones, leather headbands, L.R. British, 2/6 pr. in makers' cartons; single earpieces, L.R. 1/6; all as new, guaranteed 2 yrs.; microphone inserts 2/-; 91b. Parcel useful oddments, 6/- post free. Electradix Radios. 218, Upper Thames St., E.O.4

THE PICTURE PAPER WITH THE
MOST NEWS
SUNDAY GRAPHIC
and Sunday News

TECHNICAL NOTES

(Continued from previous page.)

without any filament-heating current—the "cold" valve, in fact—but whilst many extremely ingenious suggestions have been made for the construction of such a valve, so far as I know no valve of this kind has been successfully made and used.

Incidentally, talking about the cold valve, which at the beginning of broadcasting seemed such a highly desirable object, I should doubt very much whether it would cut nearly so much ice in these days because, after all, the mains-operated valve takes a lot of beating, and if electric mains are available the heating current is really a matter of very little importance.

I do not know whether statistics are available as to the number of radio amateurs who are without electric light supply; I have heard the figure put at between fifty per cent. and seventy-five per cent. of the whole body of wireless users.

How Many Battery Users?

If it is even as high as fifty per cent. it shows that there are a very large number of people who still have to haul their batteries about for recharging or rely upon a recharging service.

But even here again the dull-emitter now has its filament-heating current reduced almost to vanishing point—after all, you can scarcely expect a valve to operate on much less than 1 amp.—and so a cold valve would have to be very efficient and very attractive, and its cost would have to be at most very little greater than the present cost of an average receiving valve, if it were to have any chance of gaining a footing.

The Output Stage.

I was talking in these Notes a little while back about output stages, and several readers have written to me on this point, in some cases describing their experiences with particular types of output transformer.

You know that you may have a perfectly good receiver and a perfectly good loudspeaker but, if the output of the receiver is not suited to the speaker, the quality is bound to suffer.

Not only does the output circuit prevent a considerable proportion of the H.T. voltage from being cut off from the valve, but also, by isolating the loudspeaker, it prevents any danger of shock to the user of the set and keeps the direct current out of the windings of the loudspeaker, so avoiding partial saturation and the danger of breakdown.

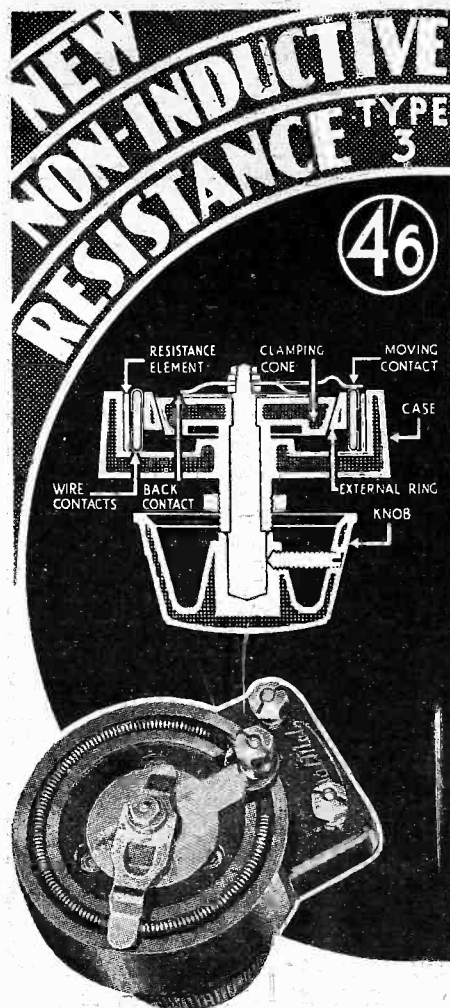
The output circuit must have a relatively low D.C. resistance so as to be able to carry the necessary anode current, whilst at the same time the primary and secondary (assuming a transformer output) must match the output stage of the set and the loudspeaker respectively.

Variable Ratio Transformers.

All this is common knowledge, but it is not everybody who has the means at his disposal to obtain these desirable conditions or even to measure up the constant in question so as to know what the requirements are.

If, however, you had a number of primaries of various inductances and all

(Continued on next page.)



This new all-British resistance embodies many new and novel features which guarantee far steadier performance than resistances constructed on old, obsolete principles.

ADVANTAGES

1. **NON-INDUCTIVE.** This is because the resistance element is not wire.
2. Furthermore, the wire contacts shown make contact with the resistance element so that the moving contact does not wear out the element. This guarantees even and true contact always.
3. The extremely firm and even contact with the element. This is obtained by a new patented clamping cone which directly it is screwed down forces the sprung external ring against the wire band. The pressure is so great that perfect all-round contact is made with the element which will not vary under any circumstances.
4. Self-cleaning wiping contacts. This ensures perfectly clean contact always.
5. Silent in operation.
6. Price 4/6.

We recommend this resistance (Type 3) only for values above 50,000 ohms where wire-wound potentiometers are not required. Patents for this new resistance have been applied for.

Write for free component catalogue and also for our free circuit diagrams.

If you have any difficulty in obtaining Watmel Components WRITE DIRECT TO US.

TRADE ENQUIRIES INVITED.



WATMEL WIRELESS CO., LTD.,

Imperial Works, High Street, Edgware.

Telephone: Edgware 0323. (M.C.6)



ELECTRADIX Sale List WILL SAVE YOU POUNDS

It is full of Bargains of Aerials, Batteries, Buzzers, Condensers, Cable, Cabinets, Chokes, Coils, Chargers, Dynamos and Motors, Ebonite and Pax., Engines, Lamps, Neons, Microphones, Mains Parts, Meters, Receivers, Spark Coils, Telephones, Valves, Wavemeters, Wire, Wheatstone and Capacity Bridges, etc., etc.

Special Bargains this week.

As we are dismantling much apparatus, 9-lb. Parcels of Radio Experimenters' Useful Sundries, Terminals, Panels and Fittings, Holders, Chokes, Magnets, Switches, Wire, etc., etc. 9-lb. parcel for 5/-; postage 1/-. Meter Movements, with magnets size of Weston Relay, with moving coil on jewelled pivot. Very sensitive. For home-made relays or meters, 5/- each to clear. 2/6 for 5 bobbins of 36g. enam. copper wire, 300 ft. each, total 1,500 ft. 250 ohms for 2/6; post 6d.

Send addressed envelope for our Sale List of Electrical bargains.

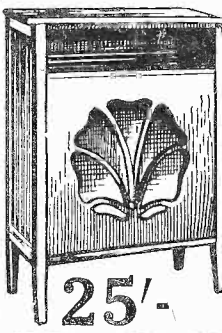
ELECTRADIX RADIOS,
218, Upper Thames Street, E.C.4
City 0191.

TUNE IN TO "R.T.I. (Gt. Br.)"

if you want to earn more money in radio. We can Train You at Home for Well Paid Jobs in Radio and Talkie Engineering. R.T.I. training is complete, up-to-date and practical—no text-books. Get Your Copy of "Progress," the R.T.I. booklet containing full particulars, fees, employment form, etc., FREE. SEND NOW.

RADIO TRAINING INSTITUTE OF GT. BRITAIN,
10, Union Buildings, St. John St., Newcastle-on-Tyne.

THIS WEEK'S BARGAIN IN OAK RADIO CABINETS



To take panel 21 ins. x 8 ins. or smaller, 14 ins. front to back, total height 36 ins. Lift-up lid. Size of fret 12 ins., baffle board 21 ins. square. Fitted with loose back and polished Medium Oak. Satisfaction or Money Back Guarantee. Send stamp for Bargain list.

Packed Free and Carriage Paid
England & Wales.

L.W.S. CO., LTD.
197, High Road, Lee,
London, S.E.13.

PATENTS, TRADE MARKS.

"Advice Handbook" and Consultations
FREE.—B. T. KING, C.I.M.E., Regd.
Patent Agent (G.B., U.S. and Canada),
146a, Queen Victoria Street, London, E.C.4.
45 years' references. Phone: Cent 1682

ADVERTISEMENTS

As far as possible all advertisements appearing in "P.W." are subjected to careful scrutiny before publication, but should any reader experience delay or difficulty in getting orders fulfilled, or should the goods supplied not be as advertised, information should be sent to the Advertisement Manager, "Popular Wireless," 4, Ludgate Circus, London, E.C.4.

TECHNICAL NOTES

(Continued from previous page.)

of low D.C. resistance and a number of secondaries of different inductances. It would be a comparatively simple matter to try different combinations so as to get the best result—by actual aural test—without necessarily knowing the values of the quantities with which you were dealing.

Several readers tell me that they have used the "Instamat" output transformer made by the Ready Radio people, and are very pleased with the results. This output transformer, as you know, is provided with a number of tapings on both the primary and secondary, and two switches so that any particular tapping can be instantly selected.

The operation of the "Instamat" is simply equivalent to trying different primaries in the output of the receiver and different secondaries in series with the loudspeaker, but by virtue of the switches these different tests can be made practically instantly.

This is very important, as in this way you can determine by ear whether the result is getting better or otherwise, which it is very difficult to do if you have to fiddle about removing one component and trying another.

By the time you have shifted the components you have forgotten what the last arrangement sounded like, and you cannot make any really reliable comparison. But with the "Instamat" arrangement it is a very simple matter indeed to tell whether you are getting "hot" or "cold."

The "Instamat."

The standard model is for all ordinary types of loudspeaker, whilst the "Major" is for low-resistance moving-coil speakers. The latter instrument gives various ratios from 10 to 1 to 25 to 1. The primary resistance is something less than 40 ohms, whilst the secondary resistance is around 2 ohms—rather less than 2 ohms in one instrument which I tested.

The primary inductance in this model has a maximum value of somewhat below 10 henries with a very small D.C. current, but at 100 milliamps, this falls to about one-third of this amount. This, however, is of no importance in practice, and I have found that the instrument gives, according to the ear, a very good and uniform response over the necessary audio-frequency range.

Trouble with H.F. Choke.

I wonder how many of my readers have experienced trouble with howling and instability in a circuit due to a high-frequency choke reacting with some neighbouring component? I have more than once had this effect occur when the choke was too near to the grid condenser, for instance. You might not think of this at first, but a moment's reflection will show you that there is quite a possibility of electrostatic effects taking place between the two components.

If you have this trouble and have any reason to suspect that it may be due to the cause mentioned above, you can easily try a temporary screen around the choke. Almost any roughly made metal cylinder will serve the purpose, and it need not necessarily be closed at the top.

By the way, the screen should not be too close to the choke, otherwise you will

get trouble from this cause as well. The screen should preferably be connected to earth. Then if you find that this temporary screen seems to improve matters appreciably, you can set to work and fit a proper screen as a permanency.

One does not always think of high-frequency chokes in the same category as H.F. coils, but there is a definite similarity, and in cases where trouble arises from this cause a similar remedy is indicated.

Adding Extra Smoothing.

With a home-constructed mains unit—or, for the matter of that, sometimes with a commercial unit—you may find that you still get an A.C. hum, as if the smoothing arrangements were not sufficiently effective. If you have trouble of this kind you can very easily tell whether it is due to the smoothing condensers being of insufficient capacity.

All you have to do is to take a separate condenser of, say, 2 microfarads capacity and connect this in turn in parallel with each of the smoothing condensers used in the unit. It should be connected by means of two short leads of insulated wire bared at the ends and just twisted around the condenser lugs, the hand being entirely removed while the tests are made.

Do not put it on and hold it in position with the fingers: for one thing you may not get the right effect in this way, and for another thing you may get an electric shock. You will soon be able to tell whether this extra condenser, shunted across any of the condensers in the unit, is making an appreciable difference.

Of course, if you find that it is, and that in some particular position it pretty well cuts out the hum, then obviously you want to fit it in and wire it up permanently as an addition to the unit.

ENGINEERS! Here is a straightforward proposition. Will you give us the chance to prove that you can earn £300, £400, £500 per year and more? It will cost you nothing to investigate, and you are bound to benefit. A postcard will bring our 200-page Hand-Book, "ENGINEERING OPPORTUNITIES," which outlines many unusual chances of well-paid, permanent and pensionable employment. Among other things, the book also contains details of A.M.I.Mech.E., I.E.E., B.Sc. Matric., G.P.O., etc. Exams, and outlines Home-Study Courses in all branches of Elec., Mech., Motor, Aero, Radio and Talkie Engineering, Building, etc. You owe it to yourself to read our enlightening hand-book—Free of obligation. Send for it to-day, stating branch of most interest.

BRITISH INSTITUTE OF ENGINEERING TECHNOLOGY,
401, Shakespeare House, 29/31, Oxford Street, London.

A Good Set or Mains Unit - needs a Good Earth

GODWINEX

NON-CORRODING EARTH TUBE

gives consistent round. Heavy lead out prevents gives perfect connection soldering sq. ins. sur.

3/6

POSTAGE 6d

J. DYSON & CO. LTD.

56, GODWIN ST. BRADFORD
2, COLEMAN ST. LONDON E.C.4

Make
The DAILY SKETCH
YOUR Picture Paper

GET YOUR
COPY OF
THE MARCH

MODERN WIRELESS

A Wonderful
Shillingsworth
NOW ON SALE

BRITAIN'S LEADING RADIO MAGAZINE—

scores another great success with the March Number, which is now on sale. It contains many enjoyable articles, on every phase of radio, by acknowledged experts. Among the features for constructors are:—

The "BI-BAND" THREE

A logical application of the band-passing method for obtaining super-selectivity, and a breakaway in 3-valve set design, for the man who wants "distance" and unusually good quality.

AN ECKERSLEY TUNER UNIT

TO MAKE YOUR SET SELECTIVE

For the many constructors who realise the advantages of using an Eckersley Tuner, but who are unable to build an entirely new set or modify the existing one. This adaptor is immediately applicable to an existing outfit.

The "M.W." "CABINET" TWO

An up-to-the-minute two-valver built in console form with loud-speaker incorporated. The only external leads are the aerial and earth wires, and the set is economical to make and maintain.

Every Set-Owner and Music Lover will find something to fascinate him in the March "M.W." Here are the titles of a few of the articles you should read:—

Sir Herbert Austin on What Radio Might Do For British Trade
Power From Low-Voltage Mains
How H.T. Batteries Are Made
Round The Turntable
Picking Your Valves
The New News Arrangements

Do Constructors Score?
A Radio Reckoner
Questions Answered
The New B.B.C. Dance Band
Trouble Tracking
On the Test Bench

Recent Record Releases
On the Short Waves
Power Valve Problems
Headphone Reception on Multi-Valvers
That Air Gap
Those Mains Sets
More Selectivity

INTERESTED IN
"LONG DISTANCE"?

Then Read
**THE WORLD'S
PROGRAMMES!**



"M.W.'s" Special Section for assisting you in the reception of foreign stations is packed with live information about conditions, dial readings, times to listen, hints on handling your set, etc.

PRACTICAL!

PRECISE!

UP TO DATE!

Here are some of the special foreign-station features in the March issue:—

What the Distant
Stations are Doing
Radio Spotlights
Getting the Americans

Station Information
YugoSlavia's Big Noise
A Visit to Ljubljana
The Empire
Short-Wave Service

Station Alterations
How, When and Where
Coasts of Canada
On the Medium
Wave-lengths

Radio Research
Heard in the Interval
German Technique
Using a Frame

SECURE
YOURS
TO-DAY

MODERN WIRELESS

ON SALE
Everywhere
1/-

High Voltage Ample current -always

S.G.:—Three alternative voltage tapings, 80-90, 70-80, 60-70. Up to 3 m.a.

Negative Plug.

50/80:—Adjustable in 3 positions, at up to 3 m.a.

120/150:—120 volts at approximately 21 m.a. up to 150 volts at approximately 11 m.a.

(The model illustrated is the A.C. 25.)

There is an EKCO Unit for every type of battery-set or portable.

INPUT.

A.C. Supplies of 200/250 volts, 40/80 cycles and 100/125 volts, 40/80 cycles. Also 25 cycle models.
D.C. Supplies of 200/250 volts.

OUTPUT.

H.T. Units (A.C.) 12, 18 or 25 milliamps with alternative

voltage tapings up to 120, 150. (D.C. Units 15, 25 M.A.)

Combined H.T. and L.T. Charger Units (A.C.).

H.T.: 12, 18 or 25 milliamps, with alternative voltage tapings up to 120/150.

L.T.: Charges 2, 4 or 6 volt accumulators at 5 amp.

Size 9x5x3 1/2 (K.25 and 25 cycle models 9 3/4 x 5 1/2 x 3 1/2).

Prices from 39/6. Also obtainable on Easy Payments from 3/8 per month.

EKCO

POWER UNITS

An EKCO Unit will give you ample, constant and silent power for your radio at a cost of only a shilling a year.

No alterations or additions to your set, valves or wiring. Just connect an EKCO Unit in place of your usual H.T. battery, plug into the electric supply and switch on—that's all. Your battery troubles will be ended for ever and you will be delighted with the improved performance of your set.

There are also EKCO Units which, in addition to supplying H.T., also keep your L.T. Accumulator constantly charged.

Post coupon now for fully descriptive literature

To: E. K. COLE, Ltd. (Dept. A.5),
Ekco Works, SOUTHBEND-ON-SEA.

Please send me details of Ekco Power Supply Unit.

Name.....

Address.....

Woburn

Printed and published every Thursday by the Proprietors, The Amalgamated Press, Ltd., The Fleetway House, Farringdon Street London, E.C.4. Advertisement Offices: Messrs. John H. Lile Ltd., Ludgate Circus, London, E.C.4 (Telephone: City 7261). Registered as a newspaper for transmission by Canadian Magazine Post and New Zealand; Messrs. Gordon & Gotch, Ltd.; and for South Africa: Central News Agency, Ltd. Saturday, March 12th, 1932. Sole Agents for Australia S.S.