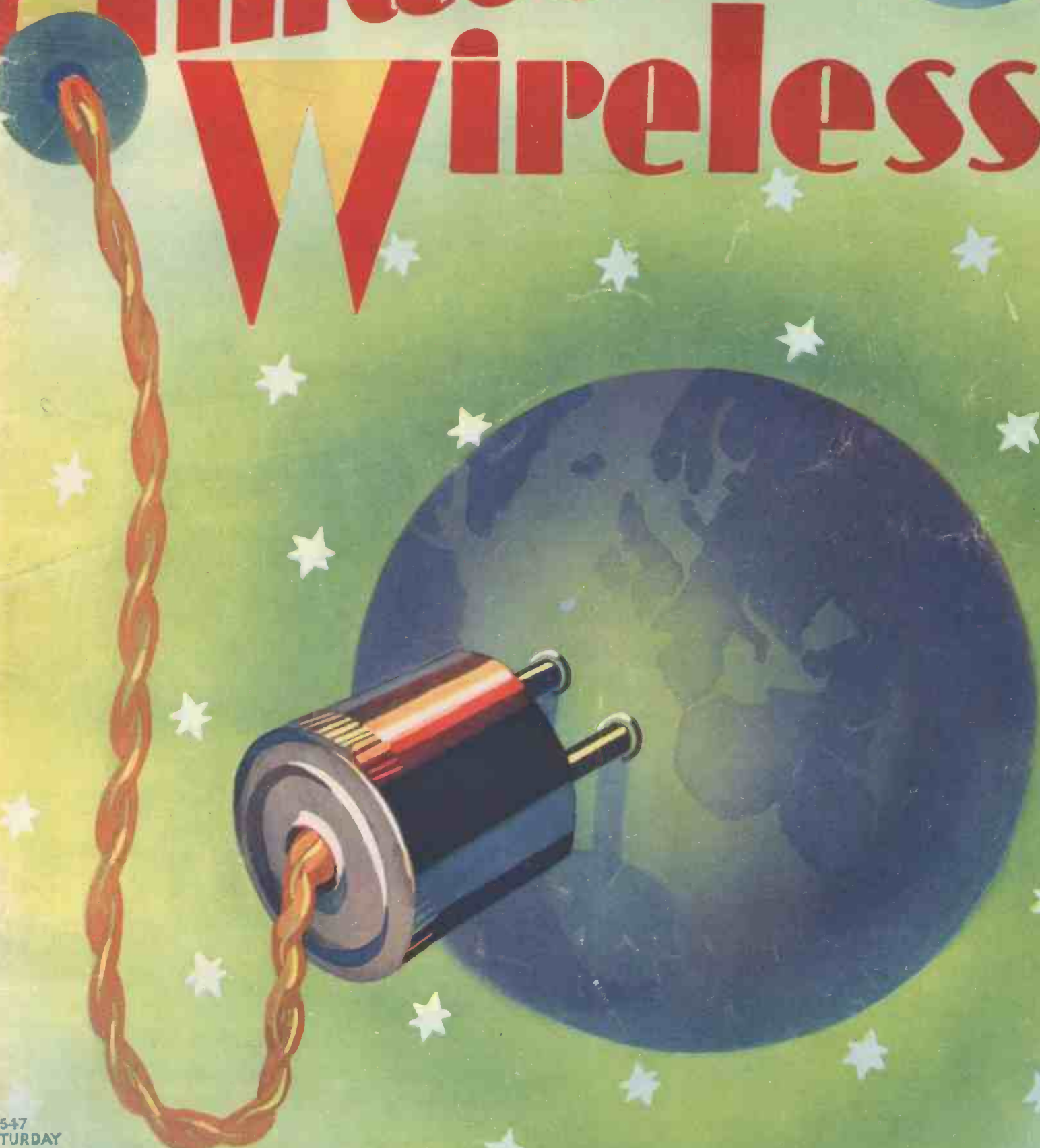


# Amateur **3<sup>d</sup>** Wireless



547  
TURDAY  
EMBER 3, 1932.  
REGISTERED AT THE G.P.O. AS A NEWSPAPER

CHRISTMAS NUMBER



# Eddy

ADVISES



H.T. Battery, 60 v. Standard Capacity  
Price 6/9



B.T.H. Senior A.C., R.K. Reproducer  
Price £7.15.0



"Extra - Life" Accumulators  
Prices from 4/3 to 15/6



MAZDA Radio Valves  
Prices from 7/- to 25/-



B.T.H. Minor Pick-up and Tone Arm. Complete  
with Volume Control - - - Price 25/-



B.T.H. Senior Pick-up and Tone Arm. Complete  
with Volume Control - - Price £2.2.0



Minor R.K. P.M. Model :- Prices: "Arundel"  
model—Fumed Oak £2.17.6; Walnut £3.3.0

... and Eddy knows! Continued success and applause from radio enthusiasts all over the country have long convinced him of the high reliability of Ediswan radio apparatus. He has, therefore, no hesitation in suggesting it to you and to your radio-minded friends as the ideal Christmas present. Your dealer will gladly help you in the task of selection.

# EDISWAN

  
THE EDISON SWAN ELECTRIC CO. LTD.  
155 CHARING CROSS RD., LONDON, W.C.2

# RADIO for Christmas

# NEW "SQUARE PEAK" SUPERHET

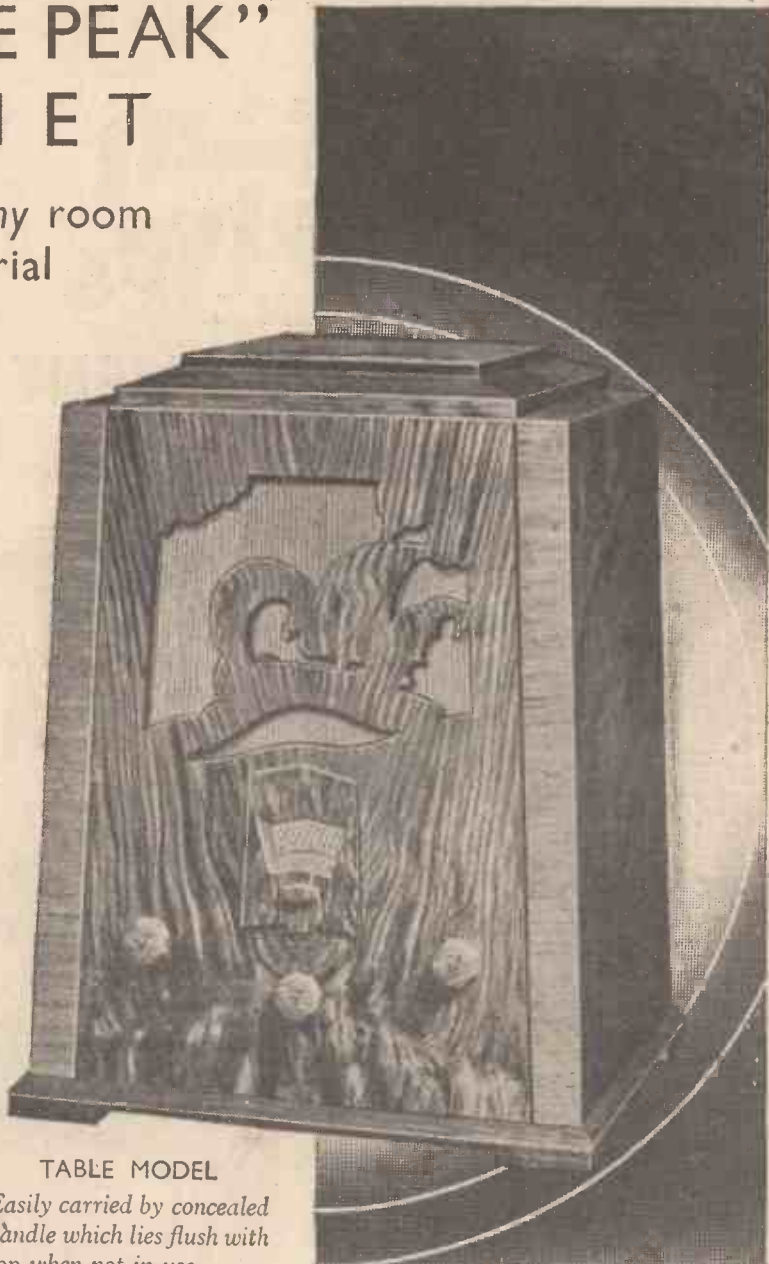
You may use it in *any* room  
without external aerial

SELECTIVITY . . . . day by day the need grows greater. Secure it in a Varley Superhet.

Knife-edge selectivity, fine quality and single knob control. Station after station clearly heard on the built-in moving-coil speakers. Radio in every room! For the local station just connect the set to any lighting socket and plug in the handy little "portable" aerial supplied.

Write for FREE art booklet and address of nearest dealer. He will gladly demonstrate Varley.

For use with external aerial or with handy portable aerial supplied. Five valves and rectifier. VARIABLE- $\mu$  H.F. AND INTERMEDIATE FREQUENCY STAGES. Six tuned circuits with SINGLE CONTROL TUNING (remaining knobs on front are Volume and Mains Switch). BAND-PASS INTERMEDIATE FREQUENCY COUPLING, giving great selectivity. ILLUMINATED SCALES marked with STATION NAMES as well as wavelengths. SEPARATE SCALES for the two wavebands. Operation of wave-change switch automatically discloses the correct scale (long or medium). TONE-BALANCED L.F. Amplifier. Energized MOVING-COIL SPEAKER. Provision for using an external speaker in place of, or in addition to, the M.C. speaker. SOCKETS FOR GRAMOPHONE PICK-UP. Beautifully finished BURR WALNUT CABINETS. For A.C. supplies only, 200/250 volts, 40/100 cycles (25-cycle models, 1 guinea extra). Available on H.P. TERMS.



### CONSOLE

Chassis as Table Model, but with moving-coil speaker of even more powerful type. No external controls on front or sides.

Undistorted Output 2,250 milliwatts. Current Consumption 60 watts. Dimensions 35 in. high by 15 in. deep by 20 in. wide. Model AP44. **35 Gns.**

### TABLE MODEL

Easily carried by concealed handle which lies flush with top when not in use.

Undistorted Output, 1,600 milliwatts. Current Consumption, 60 watts. Dimensions, 16 $\frac{1}{2}$  in. high by 12 in. deep by 13 in. wide. Model AP38. **26 Gns.**



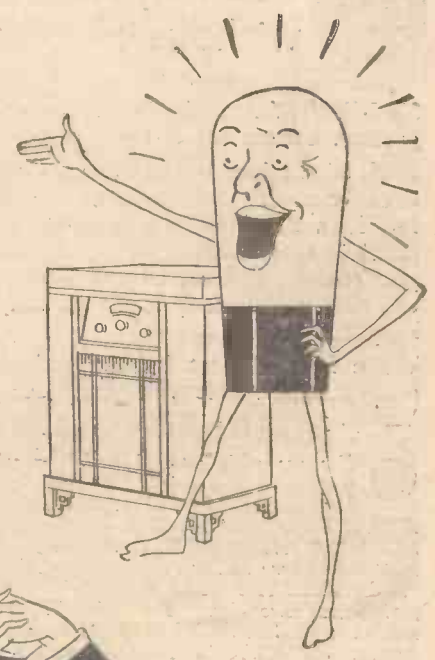
Advt. of Oliver Pell Control Ltd., Kingsway House, 103 Kingsway, W.C.2. Telephone: Holborn 5303

Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention

# Osram Valves

MADE IN ENGLAND

WITH THE WEMBLEY FILAMENT



For correct types ask your wireless dealer. Also write for the OSRAM WIRELESS Guide (1932 Edition).

WILL FARROW



## The Christmas tonic to any Set!

SOLD BY ALL WIRELESS DEALERS

PRESCRIBE OSRAMS for your own & your friends' sets this CHRISTMAS.

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

You will Help Yourself and Help Us by Mentioning "A.W." to Advertisers

"A definite advance..."



says Mr. H.J. Barton Chapple *Wh. Sch. B.Sc. (Hons)*  
*D.I.C. A.M.I.E.E.*

*This well-known radio and television authority pays striking tribute to the new W.B. "Mansfield" Speaker Magnet System.*

The Revolutionary  
"MANSFIELD"  
Moving Coil Speakers



"... The ultimate result is a really astonishingly high flux density for the size of the magnet used... fidelity of tone of outstanding merit... sensitivity very noteworthy, comparable in many respects with externally energised types without the necessity for mains or batteries. The Speaker will handle an input more than sufficient for quite a large room and yet can be worked satisfactorily from a small two-valve set.

"My conclusions... this new P.M.4 speaker is a definite advance in the permanent-magnet class."

Write for copy of Mr. Barton Chapple's full report. The "Mansfield" (patent) Magnet System is a revolutionary development. It makes possible a magnet 30 per cent. more efficient than a good cobalt steel magnet of same weight and 10 per cent. more efficient than a chrome steel magnet of three times the weight. It enables a steel chassis to be used without magnetic loss. It eliminates the bugbear of loss of magnetism. Ask your dealer for a demonstration—you will be AMAZED.

"Mansfield" Senior (Improved P.M.4), complete with 3-ratio transformer, 42/-.

"Mansfield" Junior (P.M.5), complete with 3-ratio transformer, 27/6.

"Mansfield" Cabinet in well finished oak (for P.M.4 or 5), 25/- extra.

Whiteley Electrical Radio Co., Ltd., Dept. A, Radio Works, Mansfield, Notts.  
London Office: 109 Kingsway, London, W.C.2. Phone: Holborn 6714. Irish Free State Distributors: Kelly & Shiel, Ltd., 47 Fleet Street, Dublin.

To Ensure Speedy Delivery, Mention "A.W." to Advertisers

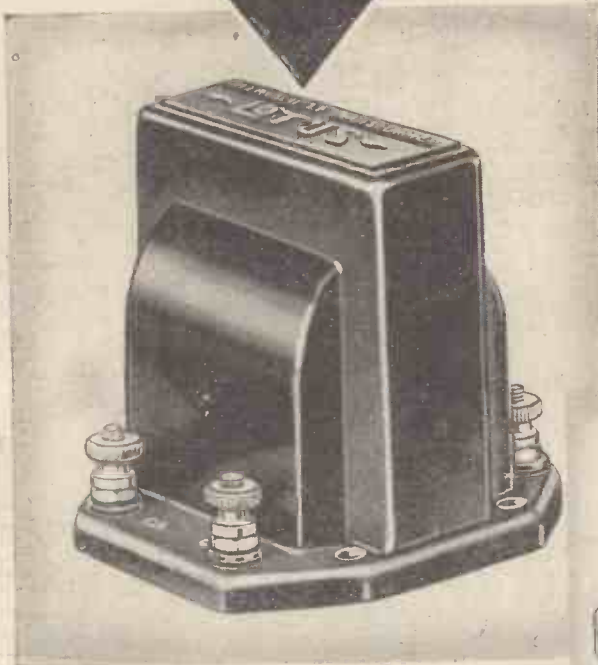
# Three of the 45

# Specified in the 'ETHER MUSIC TWO' and the 'CENTURY SUPER'

Apart from the LOTUS R.F. Choke, the L.F. Transformer, and the 4-pin Valve Holders specified in the "Ether Music Two," and the "Century Super," the balance of the range of 45 GUARANTEED Components will appeal to all amateur constructors as much as they do to Technical Designers.

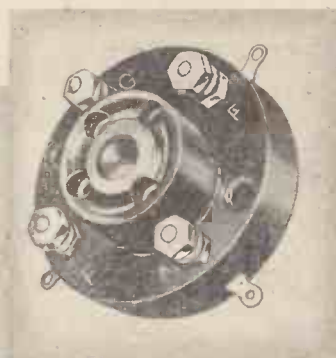
Their design, efficiency, finish and price have gained for them a reputation second to none in the Radio World, and when you use them exclusively in a Set, you virtually guarantee the efficiency of the finished job.

Specify LOTUS GUARANTEED COMPONENTS! All the leading Designers do!



L.F. TRANSFORMER No. 1. Specially designed for the home constructor. Types: A.T.13, ratio 3-1; A.T.15, ratio 5-1. Price 5/6 each.

R.F. CHOKE. Specially designed to work on the 150-2,000 metres wave-band. Type R.F.Cr. Price 2/6.



VALVE HOLDERS. All Types, from 6d.

NO DOUBT ABOUT

# See the other 42

# LOTUS GUARANTEED COMPONENTS

## Send COUPON Now

To LOTUS RADIO LTD., LIVERPOOL

Please send fully illustrated List of Lotus Components to—

NAME.....

ADDRESS.....

(1/2d. stamp only required if envelope is unsealed.) A.W. 3.12.32

To Ensure Speedy Delivery, Mention "A.W." to Advertisers



# The Famous WEARITE OT2 INTERMEDIATES specified as essential for NEW CENTURY SUPER

FOR those all-important components in a super-het—the intermediates—there is no “just-as-good,” they must be Wearite—the designers of the “NEW CENTURY SUPER” insist on that. The original “Century Super” used Wearite—the most successful of all the “Supers” use Wearite. In each case the designers knew of the exclusive tests which every Wearite coil undergoes before passed “O.K.”—and they pinned their faith in the set’s performance to Wearite. Before you build any set get this Wearite booklet—the No. A.I.—your first step to an efficient receiver.

## HERE'S THE IDEAL CHRISTMAS GIFT . . . .

Help your radio friend to reception, free from heterodyne whistle—that bugbear with all distant stations. This Wearite Heterodyne Filter permits “clean cut” programmes on a silent background. Ask your dealer or write to us direct.



PRICE 10/6

Made in two models, “A” with 3,500-cycle cut-off, and “B” with 5,000-cycle cut-off.

## OTHER WEARITE PARTS FOR THE “NEW CENTURY SUPER”

- One 50,000-ohm Potentiometer (Q.V.C.), combined with switch (G.40). Price complete. . . 6/6
- Eight four-pin and one five-pin Valve holders (S.1). Price 1/3 each
- One super-het Choke (H.F.S.). Price . . . . . 4/6
- One 20,000-ohm Resistance (2 watt) (R.D.). Price . . 2/-
- One 50,000-ohm Resistance (4 watt) (R.D.). Price . . 2/9

**A GOOD EARTH TUBE**  
Use the Wearite “No Tool” Earth Tube. Price . . 3/6

## THE WEARITE INTERMEDIATE COILS

PRICE 10/6 each

# WEARITE

# COMPONENTS

WRIGHT AND WEARE LTD.  
740 HIGH ROAD, TOTTENHAM, N.17.

Telephone: Tottenham 3847, 8, 9.

©1963

Don't Forget to Say That You Saw it in “A.W.”

# BALANCED CAPACITY



GIVES LONGER LIFE



AND HIGHER AMPERE HOUR



EFFICIENCY



- Type E.L.9. 80 a/h capacity 12/3  
Price - - - - -
- Type E.L.M.4. 45 a/h capacity 8/-  
Price - - - - -
- Type E.L.S.7. 60 a/h capacity 12/6  
Price - - - - -

● That's the secret, "balanced capacity," the newest principle in modern accumulator making.

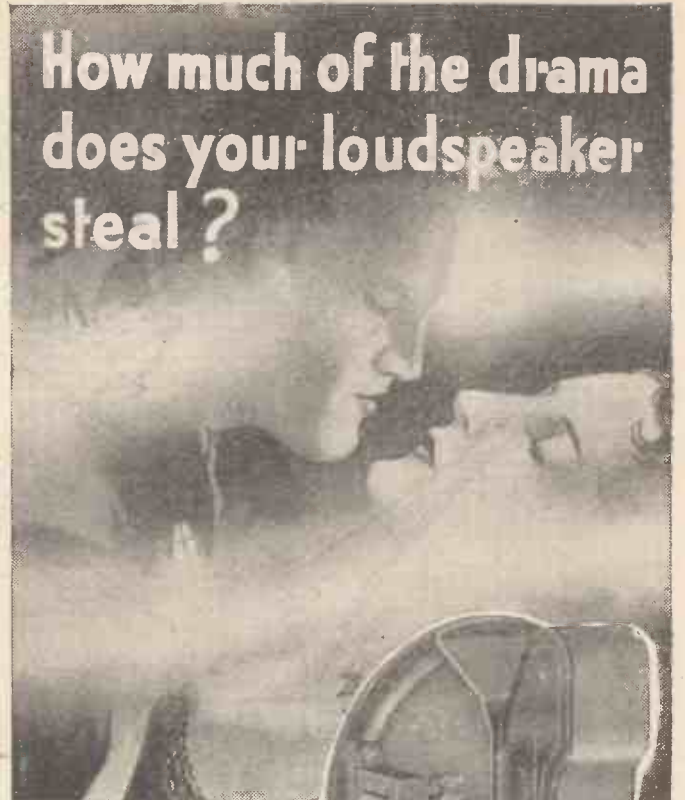
The scientific design of the positive and negative plates which preserves exact electrical "balance" allows this accumulator to be charged more quickly, and to give a longer life per charge. Twenty-five years experience in battery building has gone to produce the Ediswan "Extra Life" cell. Here are some of the additional refinements incorporated: screwed vents, non-interchangeable and non-corrodible connectors, British made containers of clear glass and metal carriers which fit neatly round the containers.

## EDISWAN *EXTRA LIFE* ACCUMULATORS



THE EDISON SWAN ELECTRIC CO. LTD.  
155 CHARING CROSS ROAD, LONDON, W.C.2

B.204



### How much of the drama does your loudspeaker steal?



■ The majority of Loud Speakers rob you of half the pleasure of radio. They reproduce the broadcast unevenly . . . sometimes even actually missing the vital parts which give sparkle and life.

With its monster magnet of special steel the Lamplugh Silver Ghost P.M. Moving Coil Loud Speaker reproduces every sound in your home exactly as it is in the Studio. Every inflection, every little trick of modulation, every little mannerism of the artiste is faithfully brought out. Speech acquires a new depth, music a deeper sweetness, song a greater richness.

Ask your dealer to let you hear the Lamplugh Silver Ghost up against an ordinary loud speaker. Then you will hear for yourself how only Silver Ghost puts the breath of life into radio.

"Wireless World" say of the Senior P.M.: "Sensitivity was found to be above the average. Reproduction is bright. Just the required amount of bass to give good balance. Speech is crisp. The highest intelligibility may be expected under adverse receiving conditions."

**PRICE 42/-**  
including Baffle and Transformer



**JUNIOR**  
The new Lamplugh Junior "Silver Ghost" P.M. Moving Coil Dynamic Loud Speaker including transformer costs only **29/6**

**INDUCTOR DYNAMIC**  
This is the most natural reproducer on the market—the Lamplugh "Silver Ghost." Made under Farrand Patents. Refuse imitation types. Price **50/-**

GET IT ALL ON THE

## silver ghost P.M. MOVING COIL LOUD SPEAKER

S. A. LAMPLUGH LTD., 89 LITTLE PARK STREET, COVENTRY  
London Office: Mr. F. G. Billett, 19/20 Holborn Viaduct, London, E.C. 1

Buckingham

Don't Forget to Say That You Saw it in "A.W."

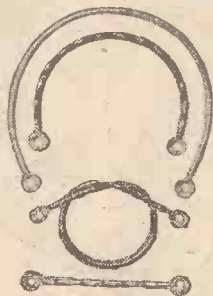


**TELSEN**

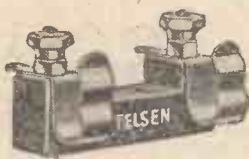
# COMPONENTS



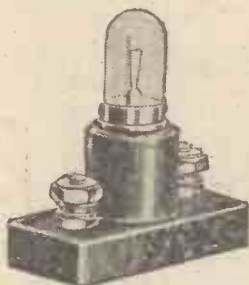
**TELSEN SCREENS.**  
Provided with series of fixing holes and movable terminals . . . **2/-**  
Also with hole for mounting S.G. valve horizontally . **2/6**



**TELSEN SPAGHETTI FLEXIBLE RESISTANCES.**  
Made from finest nickel-chrome wire, wound on a cotton core, and stoved and impregnated. Moisture and corrosion proof. In resistance values of from 300 to 100,000 ohms, at prices from **6d.**



**TELSEN GRID LEAK HOLDER.**  
Holds any standard size or type of Grid Leak. With spring contacts and soldering tags in one piece, and easily accessible terminals and fixing holes . . . **6d.**



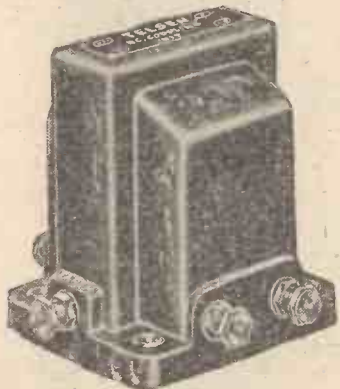
**TELSEN FUSE HOLDER.** A most inexpensive precaution against burnt-out valves. The firmly held fuse bulb ensures a perfect contact which cannot become loose **6d.**



**TELSEN POWER FUSE HOLDER.**  
For mounting the Telsen Power Fuse. Soldering tag connections provided, but wire connections may also be made under the clip screws . . . . . **6d.**



**TELSEN TERMINAL BLOCK.**  
Provides two insulated terminals, mounted on a bakelite moulding. Very convenient for aerial and earth, speaker, pick-up, extra battery connections, etc. **6d.**



### TELSEN R.C. COUPLING UNIT.

A complete assembly in a compact and convenient form for effecting Resistance Capacity Coupling in the L.F. stages of a receiver, conforming in design to the Telsen L.F. Transformers and Chokes. The Unit incorporates a 50,000 ohms wire wound anode feed resistance and a .01 mfd. coupling condenser. For best results it should be preceded by an H.L. type of valve having an impedance of approximately between 10,000 and 30,000 ohms, and be connected to an H.T. supply of not less than 80 volts . . . . . **4/-**



### "DRUM DRIVE" AND "TELORNOR" CONSTRUCTORS' OUTFITS

These invaluable outfits contain all the necessary requirements (including baseboard, terminals, battery cords and all accessories) for the construction of any of the Telsen Receivers employing either the Telornor or Drum Drive and Condenser Assembly respectively—e.g. the Telsen Ajax 3, Triple 3 and Nimrod 2 (Telornor) and the Jupiter S.G. 3 (Drum Drive and Condenser Assembly). The various Components differ only very slightly in each outfit . . . . . **3/6**

# TELSEN

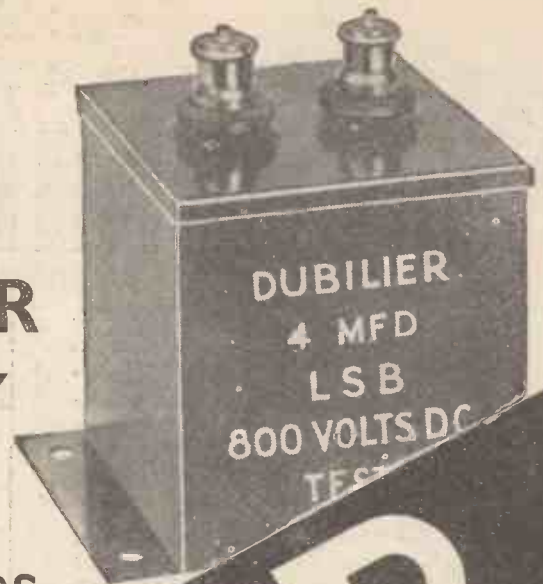
**RADIO COMPONENTS**

**TELSEN RADIO COMPONENTS ARE 100% BRITISH**

ANNOUNCEMENT OF THE TELSEN ELECTRIC CO., LTD., ASTON, BIRMINGHAM

To Ensure Speedy Delivery, Mention "A.W." to Advertisers

● **CHOSEN EXCLUSIVELY FOR THE A.C. CENTURY SUPER** because they are three times treble tested



# DUBILIER CONDENSERS

for

## RELIABILITY

The Condensers exclusively specified in the New A.C. Century Super are:—

- One .02 mfd. Type 9200 ... .. Price 2/-
- Eight 1 mfd. Type 9200 ... .. Price 2/9 each
- Two 2 mfd. Type 9200 ... .. Price 3/9 each
- Two 4 mfd. Type LSB. ... .. Price 8/-
- One .1 + .1 Type BE31L... .. Price 3/-



P.5.(FIVE)

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

Distributing Agents for Irish Free State:—  
 Kelly & Shiel Ltd., 46 & 47 Fleet Street, Dublin, C.4.



*This is the Dubilier Type 9200 non-inductive Condenser which has been specially designed for by-pass purposes in H.F. circuits. It has a working voltage of 250 D.C. peak.*

Don't Forget to Say That You Saw it in "A.W."

# RELIABILITY



The Insulated Base of a 500ft. North Regional transmitter mast, with an aerial feeder but in the background.

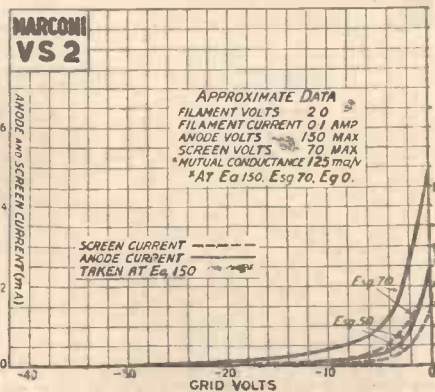
The  
B. B. C.  
trusts to  
**MARCONI**  
VALVES

police work; as for lightships and lighthouses—when ever everything depends on the valves—they choose Marconi.

### VS.2: A NEW 2-VOLT VARIABLE-MU

FROM mast top to insulated base; from Moorside Edge to the last studio detail at Portland Place, the B.B.C. leaves nothing to chance. Day in and day out their service must continue uninterruptedly. For the most important units of all—for the valves upon which everything depends the B.B.C. have always trusted to Marconi. As at sea or in the air; as for international communications or for

VS.2 is the latest Marconi development, providing the user of a battery-operated receiver with the enhanced selectivity, purer tone and perfect control of volume which only a Variable-Mu Valve can give. It is comparable in range and sensitivity to its famous A.C. counterpart, the VMS.4, and offers definitely improved performance to almost every user of a 2-volt S.G. Receiver. The price is only 16/-



The Marconiphone Co., 210/  
212, Tottenham Court Road,  
London, W.1.

Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention

# Economical Xmas Gifts of the Highest Quality

## THE FAMOUS BLUE SPOT "K" GROUP

In these times £ s. d. MUST play an important part in the choice of gifts—in spite of a very natural desire to give only the best to your friends.

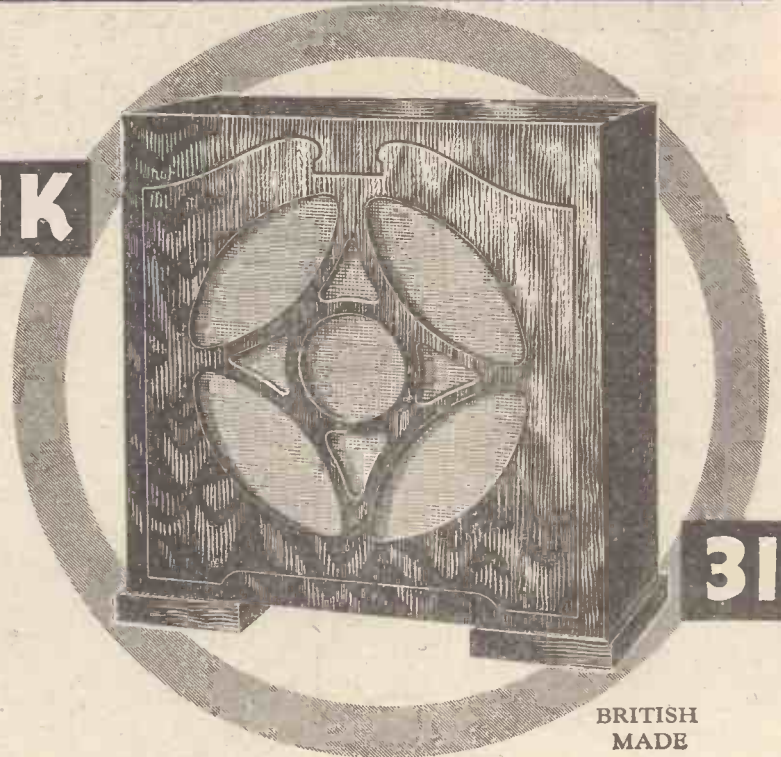
The Blue Spot "K" Group attains both objectives. There can be no higher quality than Blue Spot products—and yet they are light on hard-pressed pockets.

**31K** This beautifully made cabinet speaker of the finest quality oak, is built specially for the Blue Spot 66K unit. Particular care has been taken in fixing its dimensions so as to ensure perfect performance. In consequence this speaker has a pure, rich undistorted tone of exceptional clarity and beauty free from any suggestion of rattle. It gives you your programmes exactly like the original. Price **31/6**

**66K UNIT** —world famous and with reason. This unit guarantees pure and distortionless reception of every kind of speech, singing and music. It handles all reasonable outputs without rattle or blasting, and gives exceptionally fine reproduction for the whole musical scale. Undoubtedly the best value obtainable to-day. Price **15/-**

**66KC** —comprising the famous 66K unit mounted on a suitable chassis ready for screwing on to the baffle board or into a cabinet. The chassis is exclusively designed for this unit and ensures completely satisfactory performance. It has the additional advantage of being light in weight and strong in construction. Price **19/9**

There are many other Blue Spot products which make ideal gifts. Full details of the "K" group and other loudspeakers, Battery and All-mains Receivers free on request. Ask for Xmas list, No. A.W. 59.U.



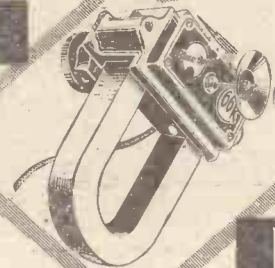
**31K**

**31/6**

BRITISH MADE

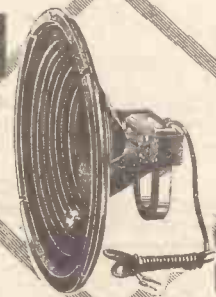
ALL BLUE SPOT PRODUCTS MAY BE PURCHASED BY INSTALMENTS.

**66K**



**15/-**

**66KC**



**19/9**

ALL BLUE SPOT PRODUCTS ARE GUARANTEED FOR 12 MONTHS.



### THE BRITISH BLUE SPOT COMPANY LTD

BLUE SPOT HOUSE · 94/96 ROSOMAN STREET · ROSEBURY AVENUE · LONDON · E C 1

Telephone: Clerkenwell 3570.

Telegrams: "Bhuospot, Isling, London."

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

Advertisers Appreciate Mention of "A.W." with Your Order



**THIS  
PICK-UP  
MINDS  
ITS OWN  
BUSINESS**

**B.T.H. MINOR PICK-UP** has been re-designed and improved and now includes a special volume control fitted in the base of the tone-arm pillar. This model is constructed in a one-piece moulding of B.T.H. "Fabriolite" and is recommended to those requiring a highly efficient but inexpensive pick-up. Price 25/6.

**B.T.H. SENIOR PICK-UP (1933 model)**. This has been completely re-designed and gives an even better response curve than hitherto. Free coupling of the head to the tone-arm reduces pressure on records and facilitates needle changing, and a ball-bearing universal joint on the tone-arm support ensures easy tracking. And independent and specially designed volume control of correct value is supplied with this connoisseurs' model. Price £2.2.0 complete with volume control.

**B.T.H. SENIOR PICK-UP** complete with four adaptors to fit standard tone-arms. Price 27/6



**PICK-UP  
and Tone Arm**

**EDISWAN RADIO.**  
100% BRITISH

It's a pick-up that doesn't take liberties with the record—it plays all there is on the record—no less, no more. That is why leading radiogram manufacturers use it; why radio engineers choose and recommend it—for its even, accurate and sensitive response over a wide range of frequencies.

**All good radio dealers stock B.T.H. pick-ups and will be pleased to demonstrate them.**

THE EDISON SWAN ELECTRIC CO. LTD.



155 CHARING CROSS RD., LONDON, W.C.2  
W194

*You will Help Yourself and Help Us by Mentioning "A.W." to Advertisers*

**TWO VALVE  
ALL-MAINS  
ECONOMY**

*with*  
**THREE-VALVE  
PERFORMANCE**



**MOVING COIL SPEAKERS  
AND EVERYTHING YOU  
WANT IN RADIO**

**for 10 GNS WHY PAY MORE?**

The Manchester Evening Chronicle reports —  
**RADIO PARIS, BERLIN, MOSCOW,  
 VIENNA, PRAGUE, LANGENBERG,  
 BEROMUENSTER, STUTTGART,  
 BRUSSELS, Breslau, POSTE-PARISIEN,  
 HILVERSUM, ETC.,** at full loud-speaker strength.

**N**EVER before has there been anything like the "ATLAS TWO." Never before have you heard such astounding truth of tone on any set, no matter what the price. For the first time the very personality of the artist actually lives again in your own home.

Performance, too, is just as spectacular. Programmes pour in from all over Europe, clear-cut, tone-true, and full strength.

Everything you want in radio—tone, range, selectivity, moving-coil speakers, all-mains operation, A.C. or D.C. for £10 10s. or 50s. down and nine monthly payments of 21s. each. Running costs are negligible.

Why not test the "ATLAS TWO" for yourself? Ask your dealer for a demonstration to-day and insist on the "ATLAS TWO."

For the listener without electricity there is the "ATLAS TWO" Battery Model with P.M. moving-coil speaker, for £6 10s. (without batteries or accumulator), or 40s. down and eight monthly payments of 13s. 6d. each.

**POST COUPON NOW!**

Messrs. H. Clarke & Co. (M/cr.), Ltd.  
 George Street, Patricroft, Manchester.

Please send details of the "ATLAS TWO."

Name.....

Address.....

29/3/12.....

**CLARKE'S "ATLAS TWO"**

H. CLARKE & CO. (M/CR.), LTD., PATRICROFT, MANCHESTER.  
 London: Bush House, W.C.2. Glasgow: The G.E.S. Co., Ltd., 38, Oswald Street.

Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention

# TELSEN

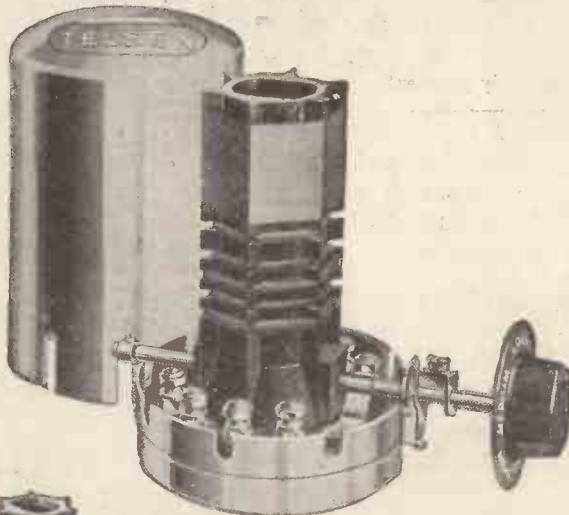
# DUAL-RANGE COILS



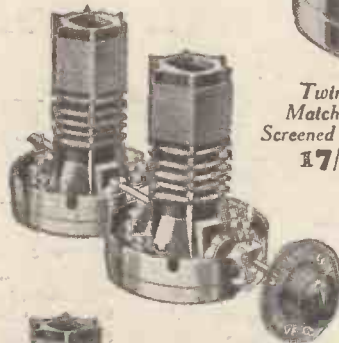
**TELSEN DUAL-RANGE AERIAL COIL** incorporates a variable selectivity device, making the coil suitable for widely varying reception conditions. This adjustment also acts as an excellent volume control, and is equally effective on long and short waves. The wave-band change is effected by means of a three-point switch and a reaction winding is included ... **7/6**



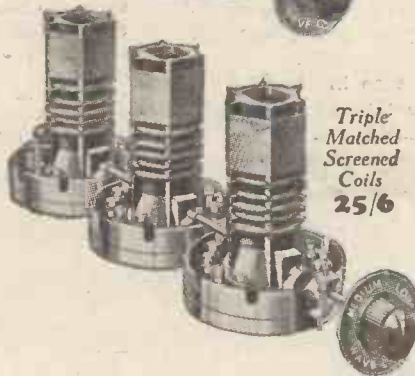
**TELSEN H.F. COIL** may be used for H.F. amplification with Screened-Grid Valve, either as an H.F. Transformer or, alternatively, as a tuned grid or tuned anode coil. It also makes a highly efficient Aerial Coil where the adjustable selectivity feature is not required **5/6**



*Twin Matched Screened Coils*  
**17/-**



*Triple Matched Screened Coils*  
**25/6**



## TELSEN SCREENED COILS

The result of much research and experiment, these coils embody the ultimate efficiency attainable in a perfectly shielded inductance of moderate dimensions. Provided with separate coupling coils for medium and long waves, they are suitable for use as aerial coils or as anode coils following a screened-grid valve, giving selectivity comparable only with a well-designed band-pass filter. The coils are fitted with cam-operated rotary switches with definite contacts and click mechanism, and are supplied complete with aluminium screening cans, bakelite knob, and handsome "Wave Change" escutcheon plate, finished in oxidised silver **8/6**

*Full instructions are supplied with every Telsen Screened Tuning Coil, showing you the alternative methods of mounting the coils, either singly, or in twin-matched or triple-matched form as required.*

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**BLUE SPOT SPEAKER UNIT AND CHASSIS, TYPE 100U.** Cash Price £1/12/6. Carriage Paid. Balance in 6 monthly payments of 5/2.

Send **5/2** only

**BLUE SPOT UNIT AND CHASSIS, Type 99 P.M.** Including matched transformer. Cash Price £2/19/6. Balance in 11 monthly payments of 5/6.

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**ROLA PERMANENT MAGNET MOVING-COIL SPEAKER F.6.** With universal tapped input transformer. Cash Price £2/9/6. Carriage Paid. Balance in 11 monthly payments of 4/6.

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

Send **6/5** only

**R & A "CHALLENGER" PERMANENT MAGNET MOVING COIL SPEAKER.** With special Ferranti multi-ratio input transformer. Cash Price, Carriage Paid, £1/15/0. Balance in 5 monthly payments of 6/6.

Send **6/6** only

**W.B. PERMANENT-MAGNET MOVING-COIL SPEAKER P.M.2.** With 3-ratio input transformer. Cash Price £4/5/0. Carriage Paid. Balance in 11 monthly payments of 7/10.

Send **7/10** only

**CELESTION P.P.M. PERMANENT MAGNET MOVING-COIL SPEAKER** with impregnated diaphragm and dual-impedance input transformer. Cash Price, Carriage Paid, £2/7/6. Balance in 11 monthly payments of 4/6.

Send **4/6** only

**SONOCHORDE PERMANENT-MAGNET MOVING-COIL SPEAKER,** with universal input transformer. Cash Price £1/12/6. Balance in 5 monthly payments of 6/-.

Send **6/-** only

**BLUE SPOT 66R UNIT AND MAJOR CHASSIS.** Cash or C.O.D. £2/10/0. Carriage paid. Balance in 11 monthly payments of 4/7.

Send **4/7** only

**COSSOR MELODY MAKER MODEL 335.** Complete with valves, speaker and cabinet. Employs Cossor Variable-mu S.G., H.F. stage, Detector and Power valves. Cash Price £7/17/6. Carriage Paid. Balance in 11 monthly payments of 14/10.

Send **10/-** only

**RADIO FOR THE MILLION "STATION MASTER 3."** Model "B." Battery type. As Model "A" but with speaker in attractive cabinet. Cash or C.O.D. Cash Price £7/10/0. Carriage Paid. Balance in 11 monthly payments of 14/-.

Send **10/-** only

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

Send **6/6** only

**READY RADIO "METEOR" S.G.3.** Three-valve screened-grid receiver, with valves, cabinet and permanent-magnet moving-coil speaker. Covers short, medium and long waves without coil changing. Cash Price, £8/17/6. Carriage Paid. Balance in 11 monthly payments of 16/3.

Send **16/3** only

**READY RADIO "METEOR" S.G.3.** Three-valve screened-grid receiver. Covers short, medium and long waves without coil changing. Cash Price (less valves and cabinet), £3/15/3. Carriage Paid. Balance in 11 monthly payments of 7/-.

Send **7/-** only

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

Send **5/9** only

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

Send **5/6** only

**HEAYBERD H.T. UNIT D.150.** Tapped variable 60/120 v., variable 0/150 fixed. Max., 25 m/a. at 150 v., 20 m/a. at 120 v. Cash Price, Carriage Paid, £4/6/0. Balance in 11 monthly payments of 8/10.

Send **8/10** only

**EKCO A.C.18 H.T. ELIMINATOR** for A.C. mains. Tapped S.G. 80 v. 120/150 v. at 12 m/a. Cash Price, Carriage Paid, £3/7/6. Balance in 11 monthly payments of 6/3.

Send **6/3** only

**GARRARD INDUCTION GRAMOPHONE MOTOR.** For A.C. mains. Model 202. Mounted on 12-inch nickel motor plate with fully automatic electric starting and stopping switch. Cash Price £2/10/0. Carriage Paid. Balance in 11 monthly payments of 4/7.

Send **4/7** only

**GARRARD JUNIOR "B" SPRING MOTOR.** Complete with turntable. Cash Price £1/13/0. Carriage Paid. Balance in 5 monthly payments of 6/1.

Send **6/1** only

**EKCO H.T. ELIMINATOR A.C.25** for A.C. mains. Tapped S.G. variable, 50/80 volts and 120/150 volts max. at 25 m/a. Cash or C.O.D., Carriage Paid, £3/17/6. Balance in 11 monthly payments of 7/-.

Send **7/-** only

**REGENTONE W.I.F. H.T. ELIMINATOR** for A.C. mains. Tapped for S.G., Detector and Power, 120/150 volts max. at 12 m/a. Cash or C.O.D., Carriage Paid, £2/15/0. Balance in 11 monthly payments of 5/1.

Send **5/1** only

**GARRARD AUTOMATIC RECORD CHANGER** for A.C. mains. Mounted on unit plate complete ready for fitting in position, including Garrard pick-up and tone-arm. Cash Price £10/0/0. Carriage Paid. Balance in 11 monthly payments of 13/6.

Send **18/6** only

**THIS YEAR'S WINNER**

### LISSEN "SKYSCRAPER"

**COMPLETE WITH VALVES S.G.3**

Chassis kit with (Lissen) S.G., Detector and Pentode Valves. Cash Price, Carriage Paid, £4/9/6. Delivered, carriage paid, on first payment of ... Balance in 11 monthly payments of 8/3.

Cabinet Kit with (Lissen) Valves, Walnut Cabinet and special Balanced Armature Loudspeaker. Cash Price, Carriage Paid, £6/5/0. Delivered, carriage paid, on first payment of ... Balance in 11 monthly payments of 11/6.

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**BLUE SPOT PICK-UP.** With arm, rotating head and volume control. Cash Price £3/3/0. Carriage Paid. Balance in 11 monthly payments of 5/9.

Send **5/9** only

**MARCONIPHONE PICK-UP K.17.** Send With counter balanced arm and rotating head. Cash Price £2/2/0. Carriage Paid. Balance in 7 monthly payments of 5/9.

Send **5/9** only

**ULTRA 1933 BLUE FOX**

A.C. or D.C. mains. Detector and Pentode valves. Moving coil speaker. Complete with valves and cabinet. Ready for use. Cash Price, Carriage Paid, £10/10/0.

Delivered Carriage Paid on first payment of **15/9** Balance in 14 monthly payments of 15/9 only.

**AERODYNE SCREENED GRID 3.** With Variable-Mu. Complete and ready to play with valves, batteries and accumulator with moving-coil speaker. Cash Price, £9/9/0. Carriage Paid. Balance in 14 monthly payments of 14/3.

Send **14/3** only

**AERODYNE ALL-MAINS VARIABLE-MU S.G.3.** Complete and ready to play, with moving-coil speaker. Cash Price, £15/15/0. Carriage Paid. Balance in 17 monthly payments of 20/-.

Send **20/-** only

**PHILIPS TYPE 830A 4-VALVE RECEIVER.**

For A.C. mains. Two Screened-grid, Power-grid Detector and Pentode. With moving-coil speaker. Provision for pick-up and external speaker. Cash Price, Carriage Paid, £16/16/0.

Delivered Carriage Paid on first payment of **21/6** Balance in 17 monthly payments of 21/6.

**ULTRA 1933 TIGER**

A.C. or D.C. mains. S.G., S.G. Detector and Pentode. Moving-coil speaker. Complete with Mazda valves. Ready for use. Cash Price, Carriage Paid, £15/15/0.

Delivered Carriage Paid on first payment of **20/-** Balance in 17 monthly payments of 20/-

**LISSEN S.G.3 PENTODE BATTERY SET.** In walnut cabinet complete with speaker, valves and all necessary batteries. Wave-length calibrated. Cash Price, £8/17/6. Carriage Paid. Balance in 14 monthly payments of 13/4.

Send **13/4** only

**TELSEN MACNAMARA**

S.G., Detector and Pentode. Complete ready to play, with moving-coil speaker. In walnut cabinet. Cash Price, Carriage Paid, £15/15/0.

Delivered Carriage Paid on first payment of **20/-** Balance in 17 monthly payments of 20/-.

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IMMEDIATE DELIVERY CASH, C.O.D. or H.P.

## 2 GUINEA THREE

As described in last week's Issue

**KIT 'A'** Author's Kit of specified parts, less panel, baseboard, valves and cabinet. Cash or C.O.D., Carriage paid **42/-**

Or 8 monthly payments of 5/9

**KIT 'B'** As Kit "A" but with panel baseboard, and valves, less cabinet. Cash or C.O.D., Carriage Paid, £3/13/0. Or 12 monthly payments of 6/9

**KIT 'C'** Author's Kit, complete with panel, baseboard, valves and cabinet. Cash or C.O.D., Carriage Paid 24/4/8. Or 12 monthly payments of 7/9

**PILOT STRUCTAKIT**, comprising ready-drilled oak-faced ply panel, 10 in. by 7 in., baseboard, 10 in. by 10 in., necessary fixing screws, insulated connecting wire and flux for **TWO GUINEA THREE**. **5/-**

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Obtainable from all Branches and Bookstalls, Messrs. W. H. Smith & Sons, or direct from Peto-Scott.

## A.C. CENTURY SUPER

Described this week

HERE ARE THE PARTS THE AUTHOR USED:

	£	s.	d.
1 J.B. Unitune 2 twin-gang .0005-mfd. variable condenser, type D	18	6	
1 J.B. Nugang .0005-mfd. variable condenser, type A1	9	6	
3 WEARITE super-het intermediate coils, type OT2	11	6	
1 LISSEN ganged oscillator and band-pass coils	1	10	0
1 VARLEY Nicore II L.F. transformer	11	6	
1 SLEKTUN super-het H.F. choke	5	0	
1 SOVEREIGN .0003-mfd. max. pre-set condenser	1	3	
8 DUBILIER 1-mfd. fixed condensers, type 9200	1	2	0
2 DUBILIER 2-mfd. fixed condensers, type 9200	7	6	
1 DUBILIER .02-mfd. fixed condenser, type 9200	2	0	
3 LISSEN fixed condensers: (1) .0001-mfd., (1) .0005-mfd., (1) .002-mfd.	1	6	
1 TELSEN pentode tone corrector	3	6	
2 ERIE 1-megohm grid leaks	2	0	
1 TELSEN 10,000-ohm potentiometer and combined switch, type Y832	5	3	
4 TELSEN 4-pin and 6 5-pin valveholders	9	0	
6 BELLING-LEE marked terminals	1	3	
1 PETO-SCOTT terminal strip, 8 in. by 2 in., ready-drilled	9		
13 GRAHAM FARISH Ohmite fixed resistances, values as specified	19	6	
5 GRAHAM FARISH vertical resistance holders	2	6	
1 READY RADIO grammo-radio changeover switch	2	9	
1 PETO-SCOTT aluminium bracket	6		
Connecting wire and sleeving, six yards thin flex	2	6	
1 HEAVYBRED mains transformer, type 717	1	14	0
1 TUNEWELL smoothing choke, type S30/50	15	6	
2 DUBILIER 4-mfd. 800 volts test fixed condensers, type LSB	16	0	
1 DUBILIER .2 centre-tapped fixed condenser, type BE31	3	0	
1 BULGIN twin fuseholder and fuses, type F9	2	3	
2 PETO-SCOTT baseboards, foil-covered, for set, 18 in. by 12 in.; for mains unit, 14 in. by 8 in.	4	6	
<b>KIT "A" CASH OR C.O.D.</b>	<b>£13</b>	<b>5</b>	<b>0</b>
Out-faced plywood panel, ready drilled (if desired)	2	0	
PETO-SCOTT oak console cabinet	1	5	0

### KIT "A"

Author's list of components, including eliminator parts and 2 baseboards but excluding panel, valves, speaker and cabinet.

Set of specified Valves

Cash or C.O.D., Carriage Paid

**£13-5-0**

Or 12 monthly payments of 24/3

£5 16 6

### KIT "B"

As Kit "A" but with complete set of valves. Cash or C.O.D., Carriage Paid.

**£19-1-6**

Or deposit £2/19/0. Balance in 11 monthly payments of 32/3.

### KIT "C"

As Kit "A" but including set of valves, Peto-Scott Console and W.B. moving-coil speaker. Cash or C.O.D., Carr. Pd.

**£22-8-6**

Or deposit £4/8/6. Balance in 11 monthly payments of 36/-.

## PILOT STRUCTAKIT

Contains 2 laminated non-warping baseboards for A.C. Century Super, (one foil covered, 18 in. by 12 in., and one 14 in. by 8 in.) Red Triangle first quality ebonite terminal strip, 8 in. by 2 in., ready drilled, 1 Peto Scott aluminium bracket, wire, screws, flex, and sleeving, 6 terminals and oak-faced plywood panel ready drilled for this set. **10/6**

## PILOT AUTHOR KITS - Exact to Specification

### NEW CENTURY SUPER

Battery Model, as described October 29.

#### KIT "A"

Cash or C.O.D. Carriage Paid.

**£7.0.0**

or 12 monthly payments of 12/9.

Complete kit of Author's first specified components as listed, excluding panel and foil-covered baseboard.

**KIT "B"**—As Kit "A" WITH oak-faced ready-drilled panel, foil-covered baseboard, and valves. Cash or C.O.D. (Carriage Paid), £11/5/6, or 12 monthly payments of 20/3.

**KIT "C"**—As Kit "A" WITH oak-faced ready-drilled panel, foil-covered baseboard, valves, and cabinet. Cash or C.O.D. (Carriage Paid), £12/9/8, or 12 monthly payments of 22/3.

### ETHER MUSIC 2

Described this week.

#### KIT "A"

#### KIT "B"

Author's Kit of specified parts, with ready-drilled panel, and baseboard, but less valves and cabinet.

Cash or C.O.D., Carriage Paid.

**£3.15.6**

Or 12 monthly payments of 7/-.

As Kit "A" but with valves less cabinet.

Cash or C.O.D. Carriage Paid.

**£4.11.3**

Or 12 monthly payments of 8/5. Set of Specified Valves, 15/9

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A.W. 3/12/32.

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"This must be that attractive little set you remarked about when we fetched the accumulator last night. We'll go round to-night and hear it fully demonstrated."

Reader, have you heard it? It's the most amazing little set you can possibly make up. Only two valves, it's most economical of H.T. (average 10-12 mA.), but because its quality components are carefully matched it easily gives the results of a three-valve set. Primarily a local station set, it will also receive, *on its own speaker*, Radio Paris and many foreign stations, with splendid fidelity of tone.

Hear it to-night at your dealers, or write for descriptive folder "A"



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- 1 BULGIN FUSE HOLDER & FUSE
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- Bulgin Terminals, Battery Clip, Battery Cord, Grid Leak and Holder, Fixed Condenser, Brackets and Coils of "Quickwyre." ALSO Slow Drive Variable Condenser with Escutcheon Plate, Screws, Bolts, etc.

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**BRITAIN'S LEADING RADIO WEEKLY  
FOR CONSTRUCTOR, LISTENER & EXPERIMENTER**

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**H. CORBISHLEY.**

**NEWS & GOSSIP OF THE WEEK**

**CHRISTMAS!**

HERE is our Christmas Bumper Number, full of good things to remind you that the festive season is at hand! From the special four-colour cover, printed in photogravure, to the helpful, practical and constructional articles it is a genuine bumper number. And, we think you will agree, excellent value for 3d.!

**"MENACE" OF THE WIRELESS EXCHANGES**

THERE is no doubt about it—the B.B.C. does not take kindly to the wireless-exchange idea of distributing programmes to listeners by land-lines. Probably it fears that too much foreign station matter will be relayed at the expense of the home product! In Germany, it is interesting to note, wireless exchanges are compelled by law to relay only German programme material. In this country it is stipulated that no political talk in English from a foreign station may be sent out but there is no other restriction.

**DAVENTRY SHORT-WAVE TESTS**

REPORTS are beginning to flow in from parts of the Empire with reference to reception of the test signals now being sent out from the new Daventry short-wave stations. Although too early yet to decide how the new service will be received, the engineers are already convinced that the Daventry signals will be very much more reliable than those from Chelmsford. By the way, did you hear of the accident to the Chelmsford aerial? It fell down about lunch time one day last week, but was put up again in time for the 6.15 p.m. news bulletin.

**AN EDITOR RUNS RADIO**

THE Editor of a big newspaper and a well-known journalist are two leading members of the commission appointed by the Government of Canada to run broadcasting. Another member of the Canadian Radio Broadcasting Commission has just come back from Madrid, where he held a "watching brief" at the International Radio Conference. The commission is having a busy time finding out how best to run Canada's broadcasting. There are about 700,000 sets and the tax is roughly 8s.

**BRIGHTER BERLIN PROGRAMMES**

THERE is a new programme director at the Berlin Broadcasting House, Dr. F. C. Duske. As so many of the German station chain programmes originate in the Charlottenburg building, any new talent in the programme direction is welcome. Dr. Duske is an enthusiastic director, full of bright ideas.

**A NEW RADIO STAR?**

SUZANNE will be heard more of, you mark the word of an enthusiastic B.B.C. programme official! Suzanne Botterell, to give the lady her full name, is a young artiste of great promise. She has nearly completed her musical education as a coloratura soprano but,

**RADIO "BELLS"**



Christmas bells by gramo-radio! As there is no room for bells in the steeple of his Birmingham church, the Vicar of Yardley Wood has fitted three loud-speakers in the tower and "broadcasts" gramophone records of the bells of Bow Church and St. Margaret's Westminster

Also in this Issue—

**FEATURES YOU SHOULD NOT**

**MISS**

The "Ether Music Two"

"A.C. New Century Super"

**SPECIAL SUPPLEMENT FOR BEGINNERS**

**Bright Suggestions for Radio Christmas Gifts on pages 1234—1236, and pages 1254 and 1256.**

owing to the unique possession of a "double" voice Suzanne can sing vaudeville songs, or any other songs, for that matter, in a very deep voice. Did you happen to hear her the other night in the "Songs You Cannot Buy" programme?

**LEEDS IS LOOKING UP!**

THANKS to the good work of Mr. John Proctor, a local architect, the new Leeds broadcasting headquarters has taken on a splendour worthy of the great county of Yorkshire they are destined to represent. Ready by the new year, these palatial headquarters will be notable for the very large studio measuring 50 ft. by 38 ft. by 27 ft. high. Like the large studio at Manchester, it will be larger than anything the B.B.C. had at the old Savoy Hill buildings. Evidently the B.B.C. intends to make good use of the talent of Yorkshire!

**FUTURISTIC EFFORTS AT BIRMINGHAM**

TALKING of provincial studios reminds us that Chermayeff, the designer of some of the studios at "B.H.," has done something very futuristic for the new studio nearing completion at Birmingham. Glasgow's new talks studio is now in operation and the other two will soon be ready. Some indication that the B.B.C. has got "studio conscious" is the work going on all round the country in bringing up to date studios that have never been treated with the new acoustic materials as used at Broadcasting House.

To Every Reader **HEARTY CHRISTMAS GREETINGS**

NEWS & GOSSIP OF THE WEEK —Continued—

WEST REGIONAL NEWS

IT has been estimated that three-quarters of the listeners of Wales will be inside the service area of the new West Regional station when it starts up in the early spring. Pending this happy event work on the Cardiff studios is progressing rapidly and the new double-decker will soon be ready for service.

DEATH OF MR. PERCY PITT

WE deeply regret to hear that Percy Pitt has died suddenly at his home. Always a genial figure at the B.B.C., Percy Pitt has had a very distinguished career as a musician and particularly as conductor of B.B.C. orchestral concerts. He was, in fact, Musical Director of the B.B.C. from 1924 to 1929—difficult years in which the B.B.C. had to contend with great opposition from the concert world. Since 1929 Percy Pitt has been conducting regularly for the B.B.C. and has done on an average three concerts a month from Broadcasting House. He was last heard during Birthday Week.

NOTTINGHAM TO RE-OPEN?

YOU will remember that since the Nottingham relay station was closed down upon the opening of North Regional the studio in that city has fallen into disuse. Now, in view of the B.B.C.'s re-awakening to the resources of the provinces, there is a good chance that the Nottingham studio will be re-opened and brought up to date so that local talent may be tapped for the North and other regions.

TO HELP HOME INDUSTRY

TALKS in the North Regional programme clearly show that the B.B.C. is doing all it can to foster industry in this country by telling listeners of our manufacturers' resources. On December 5, for example, a calico designer speaks on "We Northerners," while on December 7, also from North Regional, Professor J. H. Jones, head of the Commerce Department of Leeds University, will give a talk on the future of Northern industry.

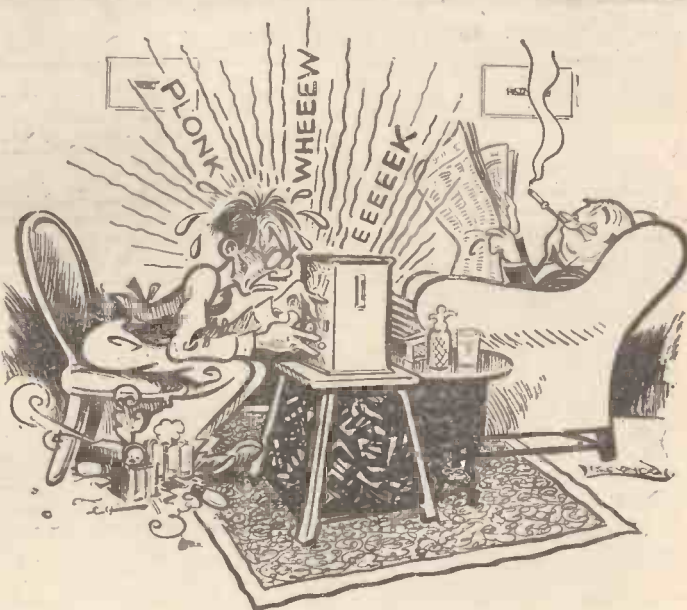
HARD WORDS FROM THEIR LORDSHIPS!

WHEN Lord Ponsonby, in the un-named listener series, addressed "an old public-school friend," he apparently raised something of a storm. Lord Peel was therefore deputed to reply and did so by assuming that what Lord Ponsonby had said was an attack on our social system. The ensuing acrimony, while diverting to a degree, must have caused a certain amount of anxiety among B.B.C. officials!

IT HAPPENED YESTERDAY!

LISTEN to the story of the dear old lady peering into the portals of Broadcasting House, what time the B.B.C.'s official fireman happened to be standing inside, resplendent in his uniform of blue, red and gold. She screwed up sufficient courage to nip inside the doors under the arm of the vigilant commissioner, rushed up to said fireman, seized him by the hand and exclaimed: "Good morning, Mr. Walton O'Donnell, I've always wanted to meet you!"

they came to play back the record they found at one spot there was a mysterious noise, just the sort of noise one hears in the loud-speaker when listening-in during a storm. And that is what



"What is the whirring noise that comes on before the announcer speaks?"  
"I expect it's the announcer changing his mind!"

FOR THE "GRAND GOOD NIGHT"

EVERYONE at Broadcasting House is wishing Mr. J. C. Stobart a quick recovery from his illness. Without him there might be absent from the New Year's Eve programme one of the most time-honoured of B.B.C. attractions—the Grand Good-night, which Mr. Stobart personally organises each year as a sort of retrospective greeting to everyone in the universe!

the noise on the record turned out to be—some-where on the line lightning had found its way and been faithfully recorded. Of course the whole record had to be done again.

JEANNE IN A NEW ROLE

JEANNE DE CASALIS, who was heard by the Prince of Wales in the Birthday Week variety programme which H.R.H. attended at Broadcasting House, is to play lead in *The Immortal Lady*, by Clifford Bax, the dates of broadcasting being December 8 (Regional) and 9 (National).

CHIPPING PROSPERO AND ARIEL

WHEN our correspondent passed into Broadcasting House yesterday he asked the commissioner what the scaffolding over the entrance was for. "We're putting up our ariel!" was the smart rejoinder. Apparently Eric Gill is now putting the finishing touches on his large sculpture of Prospero and Ariel.

A CURIOUS FAULT

LIGHTNING has played some queer tricks at various times, but seldom have we heard of anything so queer as the incident of the "crash" on an Empire record. Let us explain. They were making one of the Empire records at No. 10 studio, the microphones being connected to the recording studio by the usual landline. When

ANOTHER NATIVITY PLAY

FATHER BERNARD WALKER'S Nativity Play will be relayed from Cornwall, in accordance with the yearly custom, on December 21. The characters are played by the parishioners of St. Hilary, Mr. Walker's church at Marazion, and the play takes place in the church itself.

SIR JOHN SIMON TO BROADCAST

UNDER the presidency of the Earl of Derby, the annual banquet of the United Associations of Great Britain and France will take place at Claridge's on December 1. An announcement by Lord Derby, and speeches by Sir John Simon and M. Doumergue, former President of the French Republic, will be relayed in the National programme.

Regional listeners will hear on Christmas Day the Grenadier Guards Band, and a recital of Grieg's music by Arthur de Greef.



Wind and windows in the Effects Studio! Ray Kelly, the "noise" man at the N.B.C. studios in New York, creates a studio storm with the wind machine, and slams the window to add to a radio play's realism



Something new in the way of the two-valvers—a fine set for Christmastide listening—easy to build,

**A** NEW set for Christmas? If it's to be a set which is easy to build, simple to work, economical and capable of radio or gramophone reproduction, then here's the outfit for it.

It's genuinely a Christmasy set! It can be built in an easy evening's work and it is sufficiently out of the ordinary to be the object of admiration of all your neighbouring enthusiasts during the festive season.

It is ideal for reception during Christmas parties. It is a "quality" set which justifies a good speaker. It is not only an excellent radio set, it is also a first-class gramophone outfit and can be used as a first-rate amplifier for use with a pick-up to reproduce gramophone records electrically.

Don't disdain this new set because it is a two-valver. It is a truly up-to-date outfit and can put up a far better performance than many old-fashioned sets having more valves. As there are only two valves in the "Ether Music Two," it is cheaper to build and more economical in running costs than multi-valve sets; a big point in these hard times!

**What Kind of Set is It?**

A straight two-valver, without any "frills," but adequately decoupled, very selective and provided with detail refinements, such as an output unit, which you do not get in a very cheap set, the specification of which is scamped.



The "Ether Music Two" is very selective. It uses a special screened coil, tapped so that the degree of sharpness in tuning can be controlled. It covers a wide wave range. On a set like this you don't lose



The Ether Music Two

stations because the medium and long wavebands are not adequately covered. The "Ether Music Two" gets you all the stations you want!

Apart from the coil tapping, there is a series aerial condenser to control the sharpness of tuning, and as the set has a very nice reaction control, it is easy to make the most of the set's range and station-getting powers.

There are separate terminals for a gramophone pick-up and a gramo-radio switch is fitted at the back of the set, so that you don't have to change any of the wiring when switching from radio to gramophone and back again.

An efficient detector ensures plenty of stations, and good quality, owing to the adequate decoupling. An anode by-pass is

economical to work and capable of excellent output. It is suitable for radio or gramophone

fitted, of course. There is transformer coupling to the power valve and in the anode circuit of this valve is a choke-condenser output circuit.

In every set some kind of output circuit is an advantage. It is practically a necessity if you work from the mains. It prevents the speaker being damaged owing to the steady anode current. It ensures first-rate quality. For all these reasons, an output circuit is included in the "Ether Music Two."

A choke-condenser output circuit is used, which is both cheap and efficient.

**Unusual in Appearance**

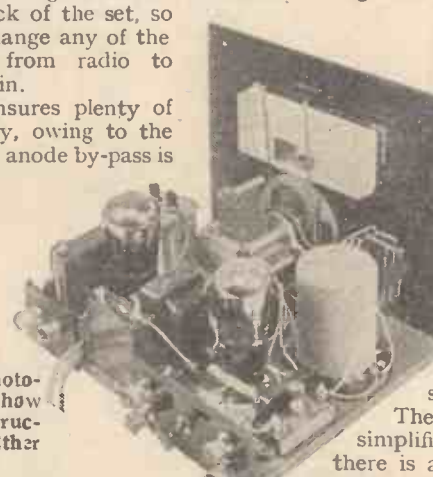
You have only to look at the photographs of the new set to see that it strikes a new note.

It looks totally different from any receiver previously described for home construction.

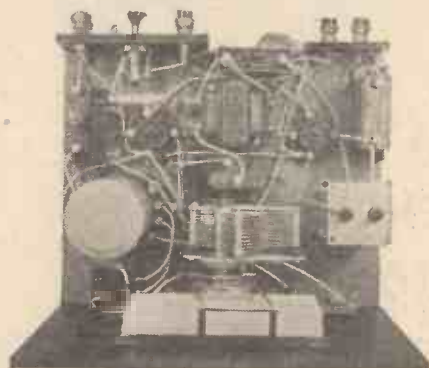
Partly the unusual appearance is due to the straight-line type of dial employed. A very good slow-motion device for the tuning condenser is combined with a visible full-scale tuning indication, and gives the

set an unusual appearance, makes it easy for non-technical users to spot the proper dial readings for stations and which, in addition, can be illuminated if you want to make use of the pilot bulb which is an integral part of the scale.

The panel control is simplified by the fact that there is a combined medium- and long-wave and on-off switch, with only the main tuning con-



These three photographs show how simple is the construction of the "Ether Music Two"



denser knob and the reaction condenser knob on the panel.

This means that the "Ether Music Two" is exceptionally easy to control.

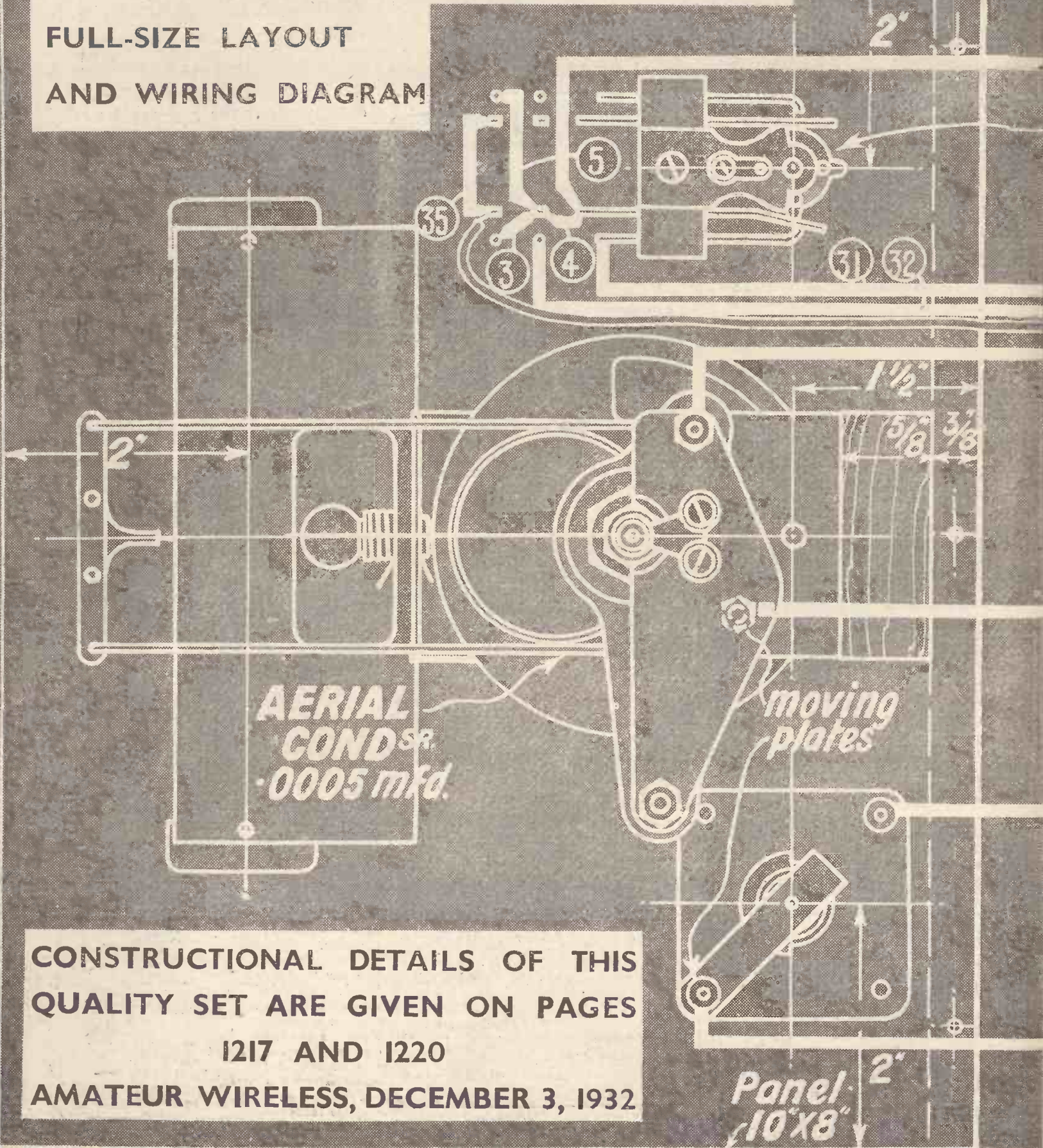
The special double-purpose wave-change and on-off switch has (Continued on page 1220)



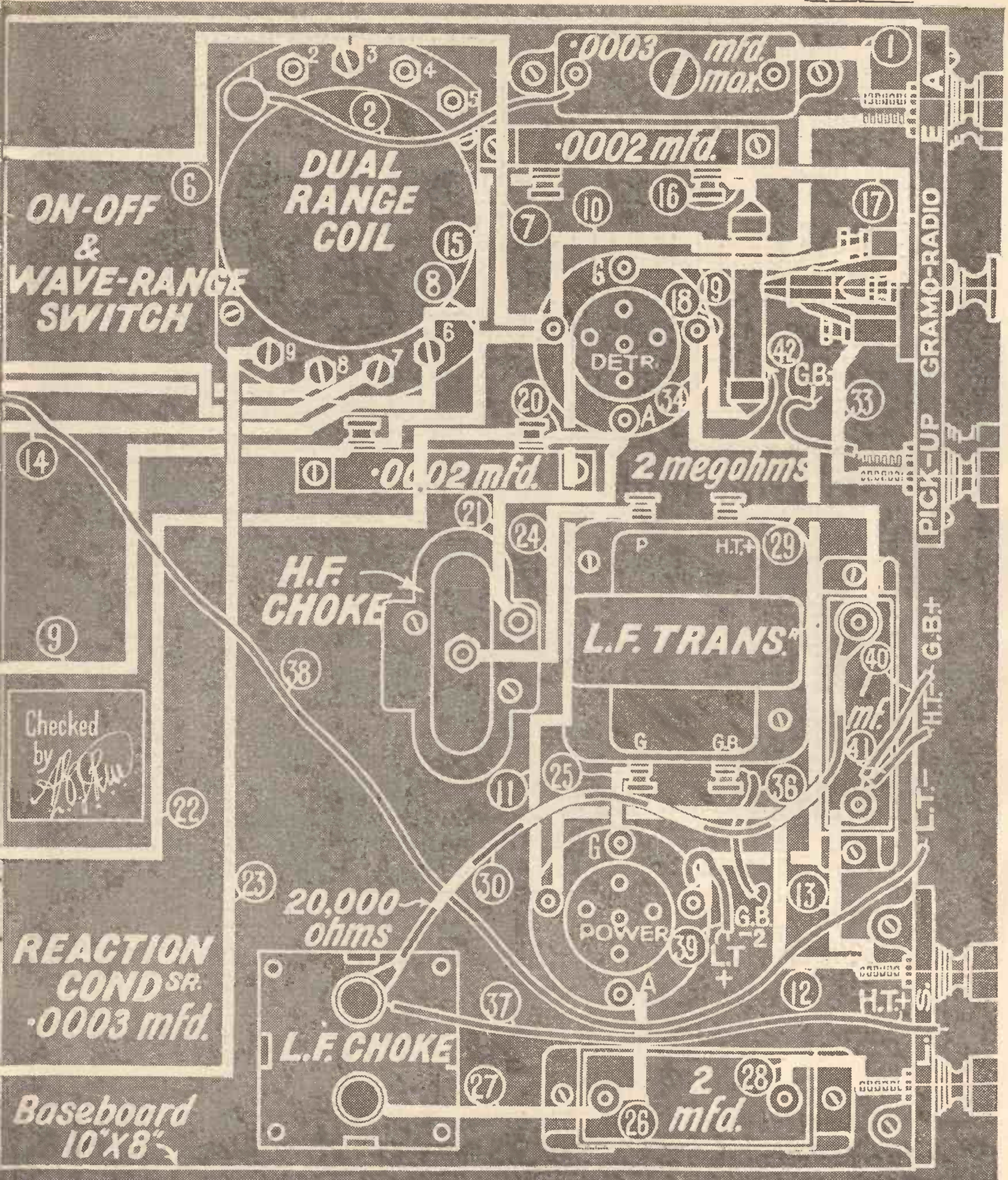
**A FULL-SIZE WIRING DIAGRAM OF THIS FINE SET APPEARS OVERLEAF**

# THE "ETHER MUSIC TWO"

FULL-SIZE LAYOUT  
AND WIRING DIAGRAM



CONSTRUCTIONAL DETAILS OF THIS  
QUALITY SET ARE GIVEN ON PAGES  
1217 AND 1220  
AMATEUR WIRELESS, DECEMBER 3, 1932



**ON-OFF  
&  
WAVE-RANGE  
SWITCH**

**DUAL  
RANGE  
COIL**

**.0003 mfd.  
max.**

**.0002 mfd.**

**DET. R.**

**2 megohms**

**H.F.  
CHOKE**

**L.F. TRANS.**

Checked  
by  
*A.B. Ru.*

**20,000  
ohms**

**POWER**

**L.F. CHOKE**

**2 mfd.**

**Baseboard  
10" X 8"**

PICK-UP GRAMO-RADIO

HT. G.B.

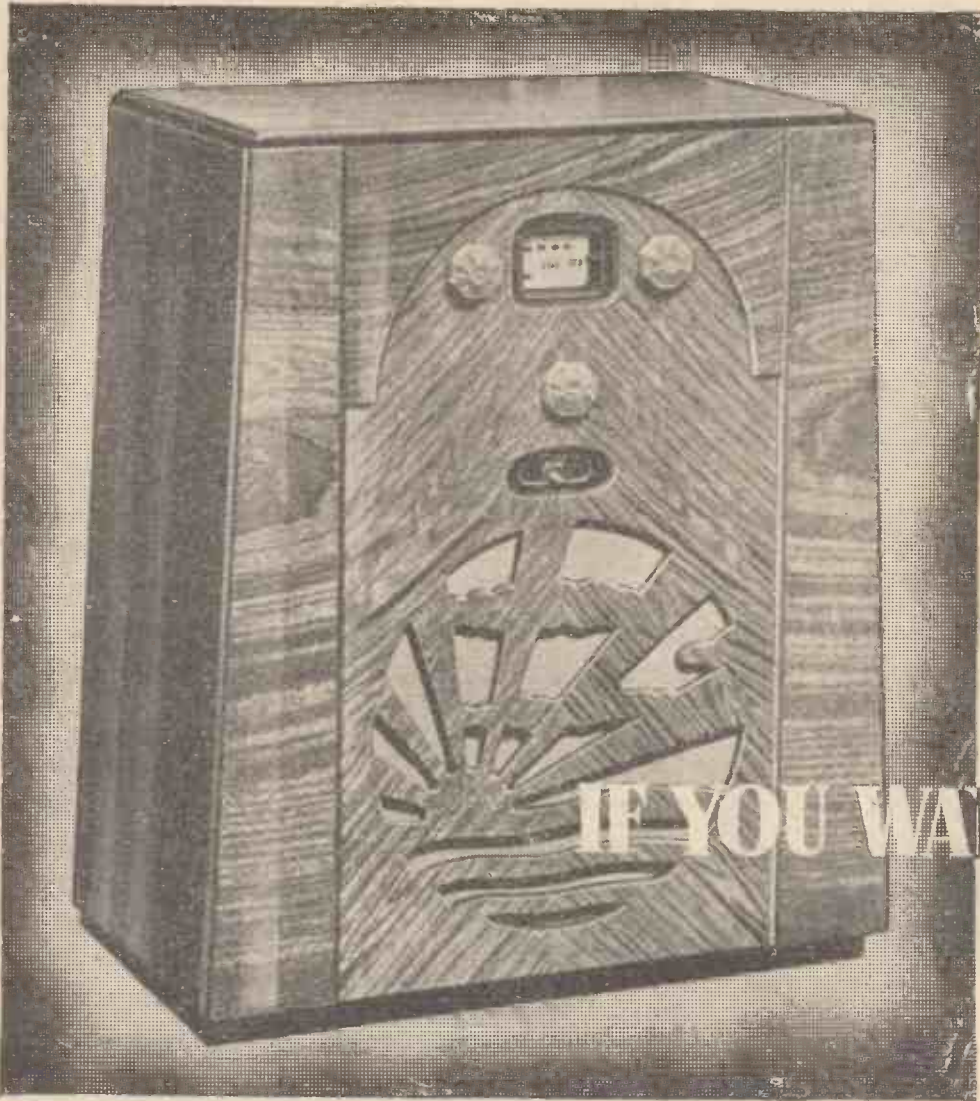
L.T.

HT. +

L.T. -







**IF YOU WANT A SET.**

that is the most modern in radio, if you want a set to give you a wide choice of programmes free from interference and reproduced with glorious tone quality, if you want a set in a

PYE MODEL "G"; 18 GNS. OR 34/- DOWN.

handsome walnut cabinet that is a joy to behold, if you want a set that is tuned by a single knob, with the principal stations marked by name on the dial, with a built-in moving-coil speaker, and a volume control that operates on both "radio" or "gramophone". Above all, if you want a set with Pye quality, presentation and performance, choose the Pye "G" Receiver. Ask your nearest Pye Service Agent (there's one in every town) to demonstrate it to you.

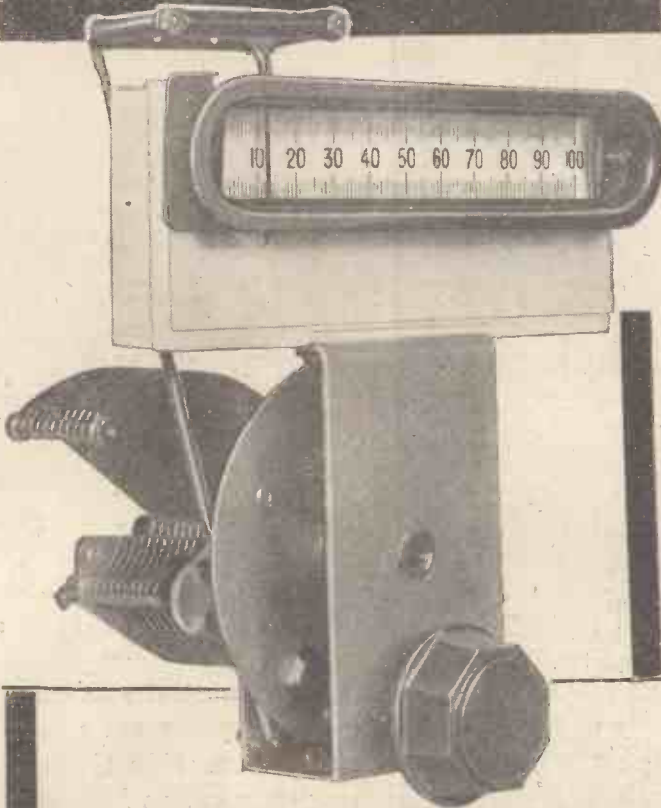
**PUT QUALITY FIRST—  
CHOOSE**



Full details of Pye Receivers, with the name of your nearest Pye Service Agent, will gladly be sent on request. Pye Radio Ltd., Sales Organization, Africa House, Kingsway, W.C.2

*You will Help Yourself and Help Us by Mentioning "A.W." to Advertisers*

# THE PERFECT PAIR



Now, at a price no higher than you would pay for an ordinary condenser you can buy a Utility .0005 condenser complete with the Utility Straight Line Dial.

The Utility condenser is the standby of every discerning expert and amateur and needs no explanation. The Straight Line Dial makes every other type of tuning obsolete. A moving pointer traversing a stationery scale which is always in full view is surely the best method of tuning; but you can only get it with the Utility Dial.

From your dealer or post free from the Makers.

And look at the **PRICE**  
**9/6**  
complete as illustrated.

**WILKINS & WRIGHT LTD.**  
UTILITY WORKS, HOLYHEAD RD., BIRMINGHAM

London Agents:  
E. R. Morton, Ltd., 22, Bartlett's Buildings, Holborn Circus, E.C.4.



# LOOK... What's the Idea?

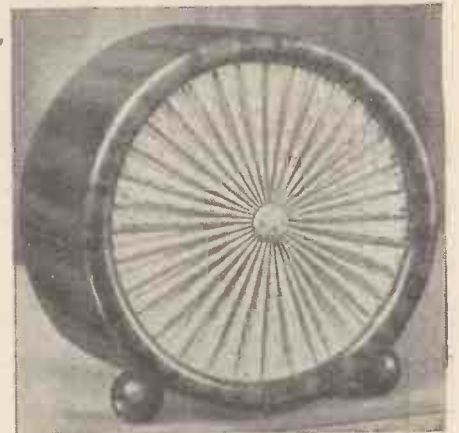
Another GREAT BARGAIN OFFER™ for readers of "A.W."

Tariff restrictions make it impossible for us to obtain any further supplies of these magnificent Loudspeakers. Being unable to continue it as one of our regular lines, we are therefore clearing the whole of our remaining stock at a Christmas Gift price. This offer is exclusive to readers of "Amateur Wireless."

Actually worth more than double, but offered to clear, and for cash with order, at

**10/-**

Packing and carriage free.



## What an opportunity!

Whether you want a spare speaker for yourself or a useful Christmas gift for a friend, this is a wonderful opportunity that positively will not come your way again. These very beautiful speakers are of a unique and handsome design with a rich silk front. They are equally handsome in performance, giving a fine, clear tone, very sensitive, and capable of handling great volume. We expect a "rush" for this amazing Christmas offer, and we have therefore arranged to execute orders promptly and in strict rotation. You can send your money with confidence, for we guarantee your satisfaction with this magnificent bargain.

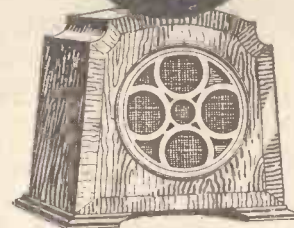
This Special Offer cannot be repeated. After the present stock is cleared, no further supplies will be available, so secure yours at once, before it is too late.

P.O.s and Money Orders should be crossed and Treasury Notes sent by registered post.

Obtainable only from:  
**FRANKLIN ELECTRIC CO., LTD., 150 Charing Cross Road, London, W.C.2.**  
Telephone: Temple Bar 3682, 5833

**USED IN THE B.B.C. STUDIOS**

## Your Set is as good as its Loudspeaker



What is spoiling your reception? If it's resonance, unpleasant tone or boominess it must be the loudspeaker. The Howe Box Baffle is the scientific remedy for resonance—it can be fitted by anyone to any non-portable set without technical knowledge or alteration to the set. The Howe Box Baffle Kit, ready for fitting into your existing cabinet, costs 20/-, including Royalty; or with a Knockdown Cabinet, 30/-.

The Baffle can also be had assembled complete in Cabinet, ready for use, from 30/-.

**F. McNEILL & CO., LTD. (Radio Dept. 10), Lamb's Passage, Bunhill Row, E.C.1**  
**HOWE BOX BAFFLE**

## BETTER VALUE IS IMPOSSIBLE CABINETS for WIRELESS or RADIO-GRAM

This handsome cabinet is fit to grace any room. It is constructed from first quality oak for front and top, with best quality birch for the sides. Standing on shaped legs and fitted with hinged lid supported by strong stay-joint, it has ample accommodation for batteries and accumulators.



No. 506 for WIRELESS only, 39 in. high by 21 in. wide by 12 in. deep. Takes a panel 20 in. by 8 in. Loud-speaker compartment, 20 in. by 18 in.

R.T.A., 19/6. Completely finished and polished ... 29/6  
No. 506 for RADIO-GRAM, 39 in. high by 21 in. wide by 15 in. deep. Takes a panel 20 in. by 8 in. Loud-speaker compartment, 20 in. by 18 in.

R.T.A., 25/-. Completely finished and polished ... 35/-  
Fitted mask—cut to your special sizes, 1/6 extra.

Either of the above may be fitted fret front as illustrated or two doors. State which you require when ordering.

Cash with order. Carriage paid anywhere in England and Wales, add 1/- extra for Scotland and Ireland.

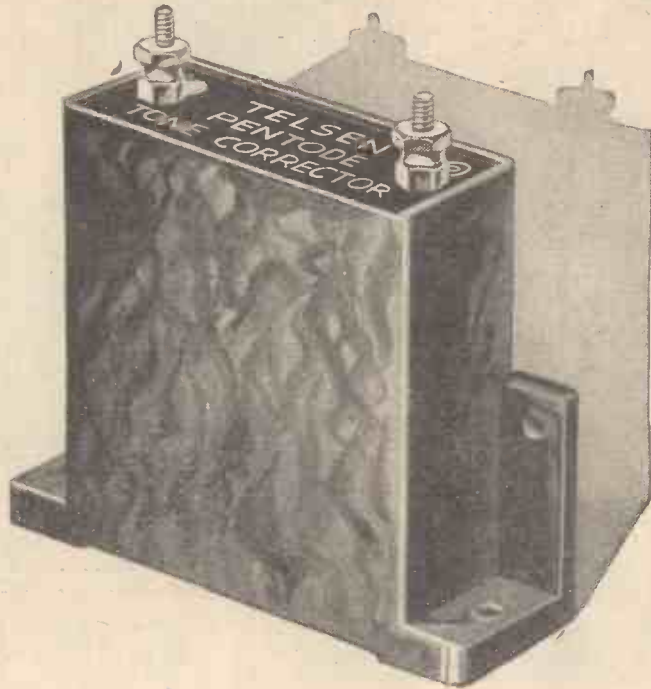
(Dept. A16), **A. H. FOSTER & CO., 11, HIGH STREET, ERDINGTON, BIRMINGHAM.**

# Introducing TELSEN PENTODE TONE CORRECTOR

*an entirely new component  
specially designed for you  
by TELSEN TECHNICIANS!*

**T**HE question of tone correction in super-selective receivers is one of to-day's most pressing radio problems. And now Telsen technicians have solved it for you! After intensive research followed by exhaustive experiments they have developed an entirely new component whose introduction provides a complete solution to the problem of tone correction—a component which every owner of a super-selective set will welcome—the TELSEN Pentode TONE CORRECTOR.

Here are a few of its many advantages. It enables the matching between valve and speaker circuit to be maintained at all frequencies, even though the speaker impedance rises with the frequency. As a result it enables the maximum power output to be obtained from the pentode valve *without high notes distortion*. And although the accentuation of high notes (which it is generally agreed results from the use of a pentode output valve) is in some cases a desirable feature, it enables considerably more pleasing results to be obtained. It improves the tone and general quality of reproduction to a very marked extent. And, in addition, it helps to prevent damage to the pentode valve. Ask your dealer for it to-day.



Ask your dealer for the  
TELSEN Pentode TONE  
CORRECTOR, price

**TELSEN**  
RADIO COMPONENTS

**3/6**

**TELSEN RADIO COMPONENTS ARE 100% BRITISH**

ANNOUNCEMENT OF THE TELSEN ELECTRIC CO., LTD., ASTON, BIRMINGHAM

*Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention*



"His Master's Voice" Transportable Radiogram Model 501.

**GO ONE BETTER!**

Make it a Radio-Gramophone—In this small, easily-movable cabinet is a wireless set of extreme efficiency, requiring no batteries—a moving-coil loudspeaker—and a gramophone that needs no winding up. It will bring in the chief European stations at full loudspeaker strength—without an aerial (A.C. model). With an aerial its range is, of course, tremendously increased. From both broadcasting station and gramophone record, it gives you absolute realism . . . every sound reproduced with flawless accuracy and matchless tone. The output is ample for two extra loudspeakers. Price 25 Gns., or by hire purchase.

**"His Master's Voice"**  
**TRUE TO LIFE RADIO AND RECORDS**

# On Your Wavelength!

## JOB LOTS

**F**ROM time to time one sees advertisements offering brand-new wireless sets at absolutely break-up prices. Readers who are attracted by these announcements should think twice before making purchases. In some cases the sets are the productions of firms that have gone out of business. If you buy one, two things happen. In the first place, there is usually no guarantee or undertaking to give after-sales service; in the second, it may be impossible to obtain replacements if these are required. Other job lots of sets consist of goods manufactured last season or even the season before. We all know that every year brings the need for greater and greater selectivity and—well, need I say more? It may be possible now and then to pick up a bargain in wireless, but, generally speaking, one should look several times before making a leap at it.

## SOUTH AMERICA, TOO

**S**OME readers may have discovered for themselves that the reception of U.S.A. medium-wave stations is extraordinarily good just now; but how many, I wonder, have realised that a good many South American stations are also coming in with fair regularity? The Argentine possesses a number of 5-, 10-, and 15-kilowatt stations, mostly situated at Buenos Aires, which are coming through very well indeed just now on nights when conditions are favourable. There then is Mexico. So far, I haven't heard or seen any reports of the reception of Mexican stations, so I awarded myself several pats on the back the other morning when, unable to sleep, I got up and spent an hour with the super-het. One of my captures was Mexico City, which appears to be a mere 1-kilowatt station. The power may have been increased recently, but there are little stations in the U.S.A. which span the Atlantic night after night, though their power is comparatively tiny. One of these is WIOD, of Miami Beach, Florida. It is, perhaps, the easiest of all U.S.A. stations to pick up.

## INTERESTING FIGURES

**O**N previous occasions I have pointed out that some of the smaller European countries had a good many more wireless stations than could be justified by the numbers of their population. In view of the hopeless overcrowding that has occurred on the medium wave-band, some of the most recent figures of the numbers of wireless licences in various countries are distinctly interesting. And it is not only in the smaller countries that one finds in some cases large numbers of

stations serving small numbers of listeners. If you were asked, for instance, to say which country, on the whole, was best heard in our own land, the odds are that you would answer Italy at once. The Italian stations are: Milan, 60 kw.; Rome, 50 kw.; Florence, 20 kw.; Bari, 20 kw.; Trieste, 10 kw.; Turin, 7 kw.; Palermo, 3 kw.; Naples, 1.5 kw.; and Bolzano, 1 kw. Yet the number of wireless licences for the whole country is under 300,000.

## THE GRAB POLICY

**B**ESIDES the big stations of Motala, Stockholm, Gothenburg, Hoerby, and Sundsvall, Sweden has a horde of relay stations; yet her wireless licences total a little more than one-tenth of ours. Poland, with well under 300,000 licences, has the 120-kw. Warsaw, the 120-kw. Prague, the 16-kw. Lwow, the 16-kw. Katowice, the 2-kw. Lodz, the 1.5-kw. Cracow, and the 1.9-kw. Poznan—not such a bad allowance. Probably the most "over-wireless" country in Europe is France, whose stations are out of all proportion to her population. In addition to the six Paris stations which I mentioned recently, her regional scheme, which is now going forward, includes about a dozen 50- or 60-kilowatt Government stations, and beyond all these there is a mass of privately owned stations, not a few of which have installed or are installing high-power transmitting plants. We shall never clear up the chaos in the European ether until countries are content to restrict the numbers of their stations to what they need, instead of setting out to grab every possible channel.

## A NEW POSITION

**W**HEN our own regional scheme was inaugurated, I criticised it on the ground that it had been designed upon a "crystal" basis. I said then that the crystal set was, to all intents and purposes, out of the picture and that any scheme should be founded on at least a one-valve basis. That was two or three years ago, and to-day the three-valver is by far the most popular receiving set. It is really a matter of pounds, shillings, and pence, when you come to look into it. Any scheme, it seems to me, should really have what I call a £5 basis.

Here is what I am driving at. The price of a good crystal set when broadcasting began was in the neighbourhood of this figure. (Don't forget that first-rate telephones cost three guineas then!) In a short time the cost of a single-valver dropped to a like amount, and it rapidly superseded the crystal. The single-valver gave way to the two-valve set as soon as this could be bought or made for a £5 note,



and now the three-valver comes easily into the £5 class. Mains sets, of course, cost considerably more in the first instance, though they are much cheaper to run. As the all-electric set gradually replaces that operated from batteries, the basic figure for the listener's initial expenditure upon receiving equipment will probably become something like £10.

## BIGGER SERVICE AREAS

**O**WING to the increase in the average number of valves in use in receiving sets, the service area of high-power stations has become very much enlarged. There are probably few areas in this country where a three-valver cannot bring in, and bring in well, at least two Regionals and two Nationals. What it all comes to is that, if the authorities responsible for broadcasting in European countries would look a little ahead instead of keeping their eyes firmly fixed on the past, they would realise that each year makes it possible to provide a first rate service in any particular country with a smaller and smaller number of broadcasting stations. We shall certainly not reach a satisfactory position in Europe until the original 10-kilocycle separation is restored, and it would be better for everyone if we could space the channels 12 kilocycles apart. This end can be achieved only if the number of stations is drastically reduced by putting out of action those which are genuinely surplus to requirements.

## GETTING ON WELL

**T**HE new Empire short-wave station at Daventry is progressing well, I hear, and there seems to be no reason why the regular programmes should not be given on December 19, the date originally arranged. There are actually two transmitters, each with a power rating of about 20 kilowatts. Two are required on account of the big range of wavelengths that will probably have to be used in the course of each twenty-four-hour period. I must say that I am rather surprised to



## On Your Wavelength! (continued)

learn that the whole wavelength range that can be covered by the station is only from about 14 to 50 metres.

I hope that this will prove to be sufficient, but, like many other short-wave enthusiasts, I have an idea that for the next three or four years, as we approach and pass the sunspot minimum, the optimum wavelength is likely to rise rather steeply and I should not be at all surprised to see it reaching 70 or 80 metres for night-time transmissions in easterly and westerly directions. Short-wave broadcasting began to become popular in 1924-25, when the last sunspot minimum period was on the wane. Experts showed that optimum wavelengths were then dropping rapidly, and they are now showing a similar tendency to rise.

### A QUEER THOUGHT

**S**TRANGELY enough, the one country in the world in which the worst reception of the Empire station is likely to take place is our own. This is due to the queer effects of short waves, which jump quite large areas surrounding the transmitter. You probably know that short-wave reception relies almost entirely on the sky wave, for the ground wave has a very short range. The sky wave is reflected back to earth at an angle which depends upon the wavelength, and if you are too near to receive the reflected wave, you don't hear much of the station. When PCJ, of Eindhoven, was working on 31 metres, I used to receive him very well indeed, but readers living on the coast of East Anglia told me that they could hardly ever hear him at all.

### A CURE FOR SECOND CHANNELS

**S**OME old super-hets are rather a nuisance on account of what is known as second-channel interference. Everybody who has operated a super-het knows that any station can be received at two different settings of the oscillator. If, for instance, the intermediate frequency is 110 kilocycles, you can bring in the station with the oscillator working either 110 kilocycles above or 110 kilocycles below its frequency. There is no harm in this, but the trouble arises when the oscillator "pulls" the aerial and grid tuning circuits, for the station comes in on its second channel then, even when the aerial and grid circuits are adjusted for another station.

I was recently faced with this problem in an oldish super-het. I solved it by removing the original single tuning coil and condenser, and replacing these with a band-pass unit tuned by a two-gang condenser. The result has been little short of astonishing. Second channels have absolutely disappeared and the set now performs as well as the very best of modern super-hets. These band-pass units are invaluable, not only in super-hets, but in other sets whose selectivity is not too good. You can obtain them made up in carefully matched "assemblies," each consisting of two potted

coils and a ganged condenser. There are very few connections to make and the unit can be put into any set where there is room for it. The matching of an assembly that I fitted recently in this way was so good that no trimming worth talking about was required to obtain perfect working over both the medium and the long wave-bands.

### THE ANSWER'S "YES"!

**I**N a recent issue of AMATEUR WIRELESS a correspondent asked whether the variable-mu valve was really worth while. He had thought of replacing an ordinary screen-grid with one of these and wondered whether the change would make any difference to his results. Most emphatically it will, particularly if he lives fairly close to a high-powered station. One of the troubles about the ordinary screen-grid valve is that it can deal properly with only very small grid-circuit impulses, so that a powerful signal at short range is always liable to cause distortion. But its very worst property is to be found in its tendency to introduce cross-modulation when an attempt is made to separate two stations. Again, there is, so far as I know, no system of volume-controlling the ordinary screen grid, which is not liable to make it distort.

The only drawback about the variable-mu S.G. is that, even when going all out, it does not give quite the same amplification as the ordinary pattern. In actual practice, the difference between the performances of the two in this respect is small—much smaller than might be expected from the amplification-factor figures. The variable-mu definitely does reduce cross-modulation enormously; it increases the selectivity of a set and it enables the most nearly perfect form of volume control that I know to be used.

### BATTERY AND MAINS

**W**E have heard a good deal lately about the manner in which the battery set has been neglected. I wonder how many people realise the real reason for this. It is not that all the designers in the country are equipped with electric light in their own houses and have therefore completely forgotten the battery user. It is rather that mains valves are, firstly, more efficient and, secondly, more convenient in their use.

This latter point is the crux of the whole situation and arises entirely from the use of the independently heated cathode. Each valve can be treated as an absolutely isolated piece of work, provided with its own self bias, and decoupled in a most efficient manner with condensers directly down to the cathode rather than to H.T. minus. Because of this, all sorts of simple arrangements are possible which are not practicable with battery valves, where all the cathodes have to be connected together.

### A SUGGESTION

**T**HIS being so, one is tempted to wonder whether an independently heated cathode battery valve is not possible. Of course, the difference in wattage is tremendous. Even the ordinary power valve only takes something like half a watt in the 2-volt range, whereas a mains valve takes the best part of 4 watts. In point of fact, valves can be made to operate quite satisfactorily on only 2 watts—witness, for example, some of the D.C. 1-amp valves of Mazdas—but this again is four times the wattage of the ordinary battery power valve.

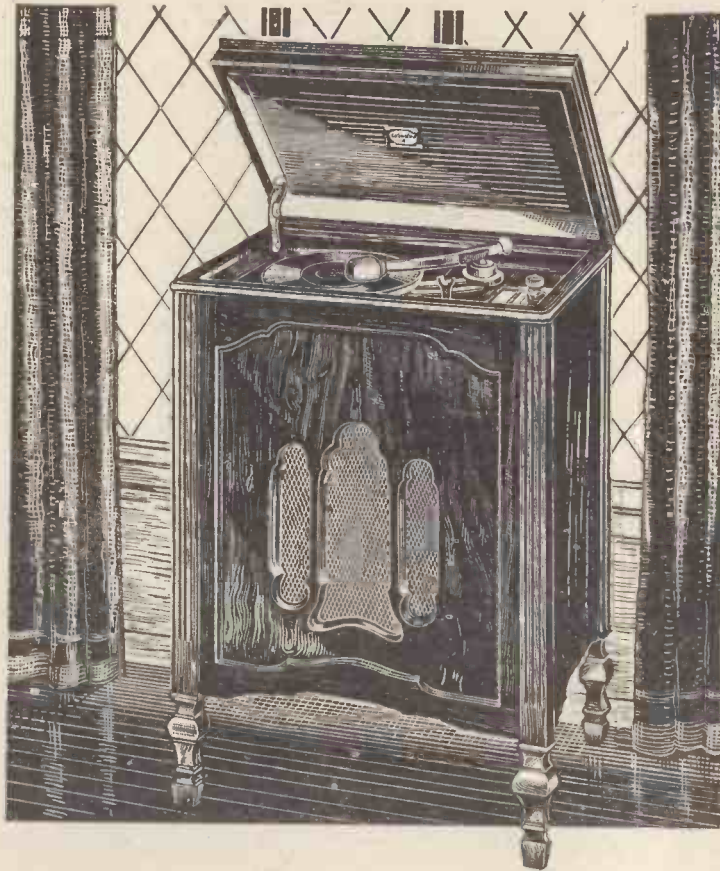
However, it should not be beyond the wit of the designers to evolve some form of independently heated cathode which is not too inefficient. The Americans have produced 12-volt tubes for car sets which are independently heated, and I should not be at all surprised to see some battery valves here before very long. Possibly they will be introduced for special purposes at first, but their general introduction would not be very long delayed once the problem had been solved. It would certainly help matters if the battery user were prepared to adopt a 4-volt battery instead of a 2-volt one. This doubles the wattage on the heater at one fell swoop without increasing the ampere-hour capacity of the battery, so that it would not require recharging any more quickly. However, all this is very speculative, and I am afraid it will be some time before any real progress is made in the matter.

### AN INTERLUDE

**I**SUPPOSE the most enthusiastic wireless fan occasionally likes to take what the musicians call "three bars rest." For instance, the other morning, after polishing off an unusually sticky batch of queries, I went out for a bite of lunch and, to give myself something fresh to think about, decided to try a chapter or two of a new detective yarn I'd got from Mudies. As a matter of fact, that kind of book has to be taken pretty seriously, because, unless you keep close on the trail right up to the last chapter—where the whole mystery is cleared up—it is likely to leave you stone cold.

Well, in due course, I found myself sitting next to a couple of stout fellows—home constructors they were, one full of knowledge and the other lapping it up, but both keen as mustard. I tried hard to mind my own business, and stick to the book, but presently it went something like this: "The door slowly opened and a hand reached in and switched off the electric light"—"through a 50,000-ohm resistance"—"A blood-curdling shriek rang out"—"try a high-frequency choke"—"Choke! Just then I could have tried two, but instead I put the book away, and in two minutes the three of us were hard at it."

THERMION.



# TONE tells!

Will you make this simple test? Ask to hear Columbia Radio alongside any other make. With 30 years' experience in sound reproduction our claim is that Columbia tone is unsurpassed. But we ask you not to take our word for it—Test it! Let your own ears prove it! Above you see the Columbia Radiograph Four (Model 620) a new inexpensive radio-gramophone of rare beauty, carrying every modern device to meet present broadcasting conditions and render gramophone music at its best. Four valves, including rectifier. One knob tuning. Illuminated station guide and flood lit horizontal scale calibrated in wave-lengths. Columbia Cradle Chassis. Electric induction motor. Field-excited moving coil speaker. Handsome walnut cabinet. Marconi valves standard. The price is 32 gns. (A.C.), 34 gns. (D.C.), and there are fourteen other Columbia models from £4.7.6 to 90 gns.

Obtainable on first payment of **£3.7s.** 

# Columbia

## TEN-POINT RADIO and RADIO - GRAPHOPHONES

### Get the Craziest Record on Record!

### CRAZY PANTOMIME

(Columbia on Parade No. 2.)

What a Cast!

CHESNEY ALLEN and BUD FLANAGAN  
 Cinderella - - - PEGGY WOOD  
 Prince Charming - - - NORMAN LONG  
 Baron Fyffe - - - STANLEY HOLLOWAY  
 Ugly Sisters - - - BINNIE and SONNY HALE  
 Buttons - - - BILLY LEONARD  
 The Fairy Queen - - - HARRY TATE  
 The Demon King (afterwards Dandin) - - - NAUNTON WAYNE

Accompanied by  
 DEBROY SOMERS and HIS FORTY THIEVES.  
 12 inch DX410 (4/-)

#### CUT OUT FOR FREE HOME TRIAL

(Write in block capitals)

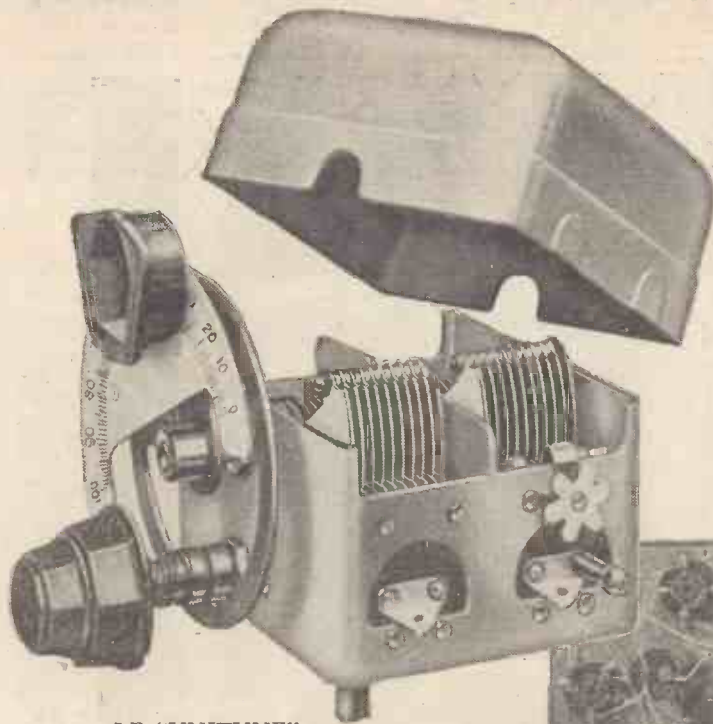
- ★ Please arrange a demonstration of Model 620, free and without obligation, in my home.
- ★ Please send me a free Magazine Catalogue of the 15 Columbia Models (£4. 7. 6 to 90 Gns.)
- ★ Please send me free a copy of Columbia Record Catalogue for December.
- ★ Cross out if not required.

NAME .....

ADDRESS .....

..... A.W. 3/12/32

Cut this out and post it in an unsealed envelope bearing id. stamp to Columbia, 98/108, Clerkenwell Rd., E.C.1.



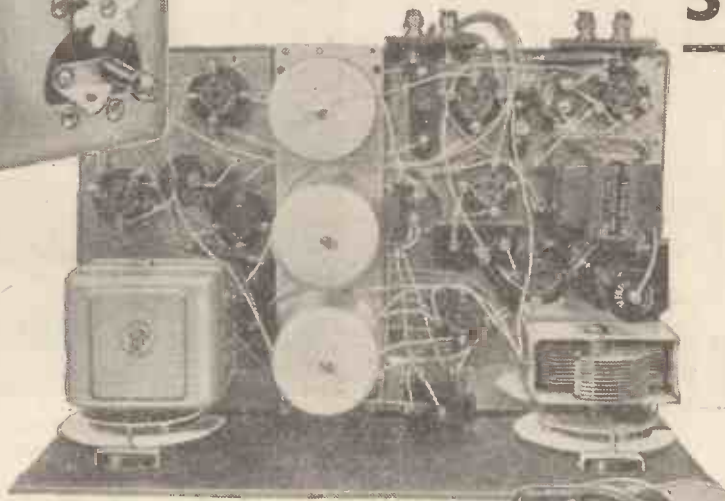
J.B. "UNITUNE"  
2-gang

**SPECIFIED**  
for the "NEW  
**A.C. CENTURY**  
**SUPER**"

The J.B. "Unitune" 2-gang and the J.B. "Nugang" Type A.1—these are the condensers that you must use to build the wonderful New Century Super (A.C. and battery models) . . . chosen for their unfailing accuracy, for their efficiency and ease of control.

The J.B. "Unitune," like all the new J.B. Gangs, is matched to within  $\frac{1}{2}$  mmfd. plus  $\frac{1}{2}$  per cent. It gives exceptionally fine tuning, the trimmer of the front section being operated independently from the receiver panel by means of a second knob concentric with the main tuning knob.

Both "Unitune" and "Nugang" Type A.1 have a rigid one-piece chassis and heavy gauge wide-spaced aluminium vanes. They are supplied complete with disc drive and bakelite escutcheon plate.



J.B. "NUGANG"  
Type A.1



**J. B. UNITUNE**

2-gang, complete [at top] 18/6

**J. B. NUGANG**

Type A.1, complete [at foot] 10/6  
(or 9/6 without screening lid)



**PRECISION INSTRUMENTS**

Advertisement of Jackson Brothers (London) Ltd., 72, St. Thomas' Street, London, S.E.1.

Telephone : 1929

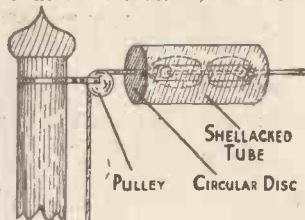
To Ensure Speedy Delivery, Mention "A.W." to Advertisers



# That Radio Dodge

## AN AERIAL HINT

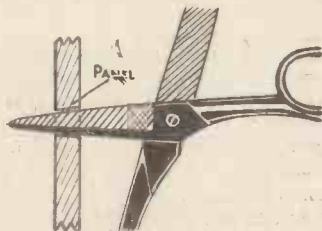
A little extra care taken when erecting the aerial will avoid troubles later on. You will find it a good plan to put a piece of well-shellaced or varnished tube over the aerial insulators, as shown.



This prevents dust collecting and so causing leakage. The tube should be slipped over the insulators, and a circle of cardboard inserted at one end to keep the tube in position.

## IMPROVISED REAMER

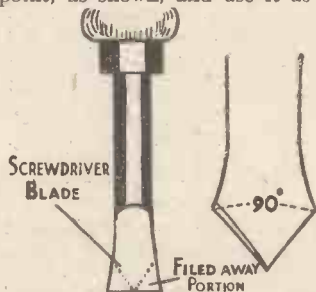
There are many occasions when you need a hole in an ebonite



panel a trifle larger than the biggest bit to hand. If the hole cannot be drilled with a bit in the ordinary way, it must be enlarged, and the easiest way to do this is with a pair of old scissors. Push one blade through the hole already drilled in the panel and reamer out the hole, using the other blade as a handle. As the scissor blade is tapered, you must reamer out alternately on both sides of the panel, so that the enlarged hole has fairly straight sides.

## COUNTERSINKING

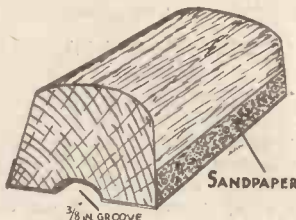
Don't throw away your broken screwdriver. File the blade to a point, as shown, and use it as a



countersinker. In this way you will find many uses for it in set construction. The most useful screwdriver is one with a  $\frac{3}{8}$ -in. blade and the angle of the point filed to approximately 90 degrees.

## TRIMMING A PANEL

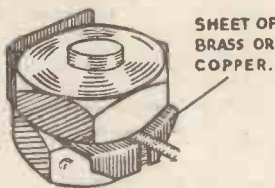
Ebonite panels, when squared up, have very sharp edges, liable to cut the hands. You can quite easily cure this by getting a block of wood 2 in. square and about 4 in. long. Run a  $\frac{3}{8}$ -in. half-round groove lengthways down the centre all the way and cover the



whole of this face of the block with fine sandpaper. This forms a handy tool to round off the sharp edges of ebonite panels.

## LOOSE NUTS

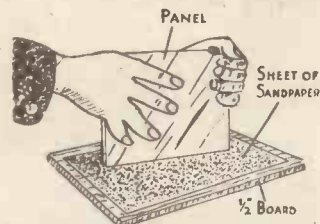
What an irritating job it is to keep on tightening those nuts that will persist in coming loose! There are many ways of locking



nuts, but most of the locking devices are suitable only for large nuts and not for the small ones generally used in wireless work. There is one simple locking method, however, which you can use. Between the two nuts insert a piece of thin copper or brass foil, about  $\frac{1}{4}$  in. or  $\frac{1}{2}$  in. wide, allowing the ends to overlap, say  $\frac{1}{8}$  in. and bend one end down and the other end up, tight against the sides of the nuts.

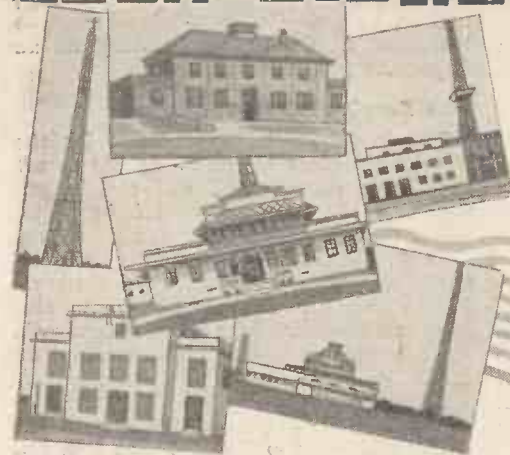
## SQUARING-UP EBONITE

If you want to make a neat job of a set you should always square up the edges of ebonite work. This is a difficult job to do with a file. The best plan is to stick a sheet of medium-coarse sand



paper—the grade known as "middle two"—on to a piece of flat, hard wood. The squaring can now be done by holding the ebonite strip or panel firmly at each end and moving it backwards  
(Continued on next page)

# Each Station Clear of Jamming!



of a set to-day. The pressing need in a modern receiver is selectivity, and the average straight circuit fails to give the requisite degree of selectivity without spoiling the quality or being far too tricky to adjust.

There is one good solution: the super-het.

The "Century Super" which AMATEUR WIRELESS introduced last year created a furore among knowing listeners.

The national "dailies" heralded it. Within a

"A.C. New Century Super," a mains-driven super-het, which gives an amazing performance. It can be used on an outdoor aerial, and so none of its punch is lost owing to the need for a frame aerial. It has bandpass tuning and the intermediate frequency stages are also bandpass tuned, so that the selectivity is of an extremely high order.

## Quickly Made Up

The "A.C. New Century Super" needs no batteries. It can be made up in a few hours and plugged straight into the mains.

This is the set for you!

CAN you get foreign stations free from jamming?

Does your set give you the local stations without any background of Continental broadcasters?

If your set is selective, is it easy to tune?

There are not many owners of ordinary sets who can truthfully answer "Yes" to these vital questions.

The reason?

Simply that most "ordinary" sets—sets designed two or three years ago—are incapable of standing up to the performance expected

few weeks it began to be realised that a really modern super-het, shorn of all difficulties in operating, would give a performance previously thought to be impossible with an amateur-built receiver.

A few weeks ago the "New Century Super" was introduced. It is designed by three leading experts, W. James, Percy Harris, and Rutherford Wilkins. It has features which make it definitely better than even last year's "Century Super." And now here is the A.C. mains version of this famous set.

On pages 1244 to 1248 this week is a description of the

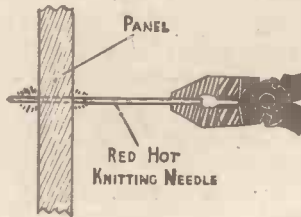


**MORE RADIO DODGES** (Continued from preceding page)

or forwards on its edge over the sandpaper surface. You must, of course, make sure that the ebonite work is held at right angles to the board.

**A NEW WAY OF DRILLING!**

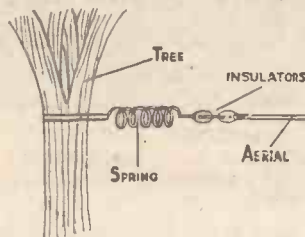
Here is a good tip if by chance your only 4 B.A. or 6 B.A. drill bits get lost or broken and you want to make some holes in a panel. Put a steel knitting needle in a gas flame and leave it until red hot. Then, holding it with a pair of pliers, push it through the panel at the point where the hole is to be made. The ebonite will melt directly the hot steel touches



it. The hole can later be reamed out with a pair of old scissors as previously described.

**AN AERIAL PRECAUTION**

At this time of year it is a good idea to fit a safety device to the aerial, so that if the wind shakes the pole or tree to which the wire is fixed, it will not cause a break. The best plan is to insert a fairly



flexible spring between the insulators and the support at the far end. A long coil spring should be used and it should be well enamelled to prevent rusting.

**"STARTING" NUTS EASILY**

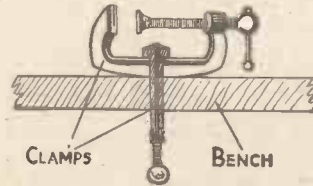
A LOT of time can be wasted in trying to "start" nuts or terminal-heads in awkward or inaccessible parts of the set. Often the nut wobbles about in an exasperating fashion on the tip of the terminal-stem, and perhaps falls down several times into even more inaccessible crannies between components, before one finally succeeds in getting the screw-threads into register so that the nut can be run on to the terminal stem.

A useful time and temper-saving dodge in this connection is putting a little soap on to the spanner (or, in the case of a slotted nut, the screwdriver) that is being used to tighten up the nut. The soap, if applied

in the right place, will cause the nut to adhere to the tool so that it can be guided into position and started easily on the threaded stem of the terminal. Any traces of soap left on the terminal-head or nut should, of course, be wiped away afterwards.

**A HANDY VICE**

An easily made small vice can be erected on the edge of the



bench by using two clamps. The type shown in the sketch can be obtained at most hardware stores and they are suitable for holding most light work needed in set construction. A clamp of this kind is very useful, for instance, for holding a screwdriver blade upwards on which is placed a reel of wire, so that it will "pay out" the wire easily when coil-winding.

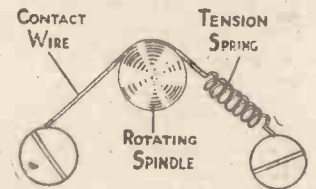
**SLOTING TERMINAL HEADS**

THE type of terminal-nut that is provided with a slot, enabling it to be tightened up with a screwdriver is rather convenient. Any plain ter-

minial-head or nut can easily be slotted at home before using it in a set. All that is necessary is to clamp the nut in a small vice (or even grip it in a pair of pliers, if a vice is not available), while a small cut is made across the top of the nut with a thick-bladed fretsaw, a hacksaw, or other suitable tool. The slot need not be more than about 1/32 in. in depth, and only takes a few seconds to cut.

**CURING A NOISY CONDENSER**

Troublesome noises are often traced to rotating spindles fitting badly in their bearings, but they can be overcome in an easy way. The sketch shows a simple



tensioning idea which can be applied to most condenser bearings. You will see that a wire is secured at one end by a screw or bolt and the other is joined through a tensioning spring to a second fixing point. The tension on the bearing can be increased by shortening the wire or spring.

*Some Notes on Present-*

*day Short-wave Conditions*

**Around the Short-wave Dial**



BY the time these notes are in print the main topic of conversation in many quarters will undoubtedly be the Test Match. This year, for the first time, I believe, a running commentary will be broadcast through VK2ME Sydney on 31.28, and, perhaps, via Melbourne on 31.55 metres.

These stations are quite easy to receive, particularly Sydney, if you go about it in the right way. The transmissions will take place between 6 and 8 a.m., which is equivalent to 3 and 5 p.m. Sydney time, so you will be able to obtain the tea-time scores before breakfast!

**How to get Australia**

A simple two-valver should pick up these stations quite easily, but to save expense, a simple plug-in adaptor or super-het converter would do equally well. If you are not familiar with your short-waver, Sydney may be rather hard to find, as the wavelength used is not the most suitable for reception in this country—in such instances I should advise you to tune your receiver in the following manner.

The night before, tune in Zeesen on 31.38 metres, which continues until 11 or 11.30 p.m. Then leave the receiver tuned

to this station, and in the morning Sydney will be found a fraction of a degree lower on the dial—with my own receiver, there is a difference only of .75 of a degree between the two stations. You may have to increase your reaction and adjust your aerial series condenser, but if these adjustments are made in conjunction with the main condenser, you will not alter your wavelength to any appreciable extent. These broadcasts will continue for the duration of the matches.

**13,000 Miles!**

A remarkable transmission took place on November 23—Mr. W. M. Hughes, who during the War was the Prime Minister of Australia, spoke at the unveiling of a memorial to the "Anzacs" which has been erected at the mouth of the Suez Canal. The address was relayed by land-line to Cairo, from there to England via the Anglo-Egyptian Telephone Service, and re-transmitted to Australia for general distribution over the whole of Australia and New Zealand, a total distance of at least 13,000 miles.

For the last few days the only stations that could really be called reliable have been AQ and W3XAL, the 16.87 relay of

Boundbrook. EAQ has been R8 every evening for the whole of the transmission, and as the programmes are now being made a lot more interesting, this station should be entered into the log-book. WX3AL has been receivable during the afternoon at varying strengths, but is usually about R4 until 3 o'clock, gradually increasing to R8 between 4.30 and 5 p.m. The programmes are very light, but quite amusing, and on Saturday afternoon it is usual to broadcast a running commentary on an important football match.

**The Empire Station**

The B.B.C. tests in readiness for the Empire Broadcasting on December 19 are now being carried out, and satisfactory reception has been reported from India, where the volume is sufficient for dancing. This service should certainly give a boost to the sale of short-medium wave receivers in the colonies. Arrangements have also been made to relay these Empire broadcasts in Shanghai by the local transmitter XCBL on 230.5 metres.

I am rather disappointed with the reception from Prangins; this may be due to the skip distance or to the fact that it is not primarily intended for reception in this country, but so far, with the exception of the first evening, signal strength has been very poor, and subject to a considerable amount of fading.

There is some very good dance music broadcast by the Canadian station Bourmanville, VE9GW. The wavelength is 49.22 metres and usually it commences at 9 p.m., and carries on until 3 a.m.

# "CENTURY SUPERS" FOR EVERYBODY

## A.C. MODEL

## TABLE MODEL

## RADIO GRAM

## SHORT-WAVE ADAPTOR (BATTERY)

Complete Catalogue of all Sets, Accessories and Gadgets. Price 1/-. Post Free.

	£ s. d.
1 J.B. Unitune 2 type D twin-gang .0005-mfd. variable condenser	18 6
1 J.B. Nugank type A1 single .0005-mfd. variable condenser	10 6
3 Wearite super-het intermediate coils, type OT2	1 11 6
1 Lissen ganged oscillator and bandpass coils	1 10 0
1 R.L. Hypermite low-frequency transformer	12 6
1 Ready Radio H.F. choke	5 6
1 Sovereign .0003-mfd. max. pre-set condenser	1 3
8 Dubilier 1-mfd. fixed condenser, type 9200	1 2 0
2 Dubilier 2-mfd. fixed condensers, type 9200	7 6
1 Dubilier .02-mfd. fixed condenser, type 9200	2 0
2 T.C.C. .0001-mfd. fixed condensers, type "g"	2 6
1 T.C.C. .0005-mfd. fixed condenser, type "g"	1 3
1 T.T.C. .002-mfd. fixed condenser, type "B"	1 6
2 Erie 1-megohm grid leaks	2 0
1 Bulgin 10,000-ohm potentiometer and combined switch, type V832	5 6
1 Telcon Pentode Tone Corrector	3 6
4 4-pin valve holders	2 0
6 6-pin valve holders	4 0
6 Belling-Lee terminals, marked: Aerial, Earth, L.S., L.S.—2 pick-up	1 3
2 Erie 50,000-ohm fixed resistances	2 0
1 Erie 40,000-ohm fixed resistance	1 0
4 Erie 20,000-ohm fixed resistances	4 0
2 Erie 5,000-ohm fixed resistances	2 0
1 Erie 600-ohm fixed resistance	1 0
1 Erie 400-ohm fixed resistance	2 0
1 Erie 200-ohm fixed resistance	1 0
1 Ready-Radio gram-radio change-over switch	2 9
1 Aluminium bracket	3
Lewcos connecting wire, screws, steering, etc.	1 6
1 Piece aluminum foil, 18 in. by 12 in.	2 0
1 Heayberd mains transformer, type 717	1 14 0
1 Heayberd smoothing choke, type 757	1 0 0
2 T.C.C. 4-mfd. fixed condensers, 800-volt test type 80	17 0
1 Dubilier 2-ohm centre-tapped fixed condenser, type BE31, or Peak	3 0
1 Belling-Lee twin fuse holder and fuses	2 6
1 Easyfix baseboard for set, 18 in. by 12 in., baseboard for mains unit, 14 in. by 8 in.	2 0
7 Valves—Mazda, A.C.S.G., 2 Mullard 2VM4V, 2 Mullard 904V, 1 Mullard Pen4V, 1 Mullard DW2	5 16 6
1 Direct Radio 159 walnut consolette cabinet	2 2 0
	<b>£21 1 3</b>

	£ s. d.
1 J.B. Unitune twin-gang .0005 variable condenser, fully screened	18 6
1 J.B. Unitune single .0005 variable condenser	9 0
1 Bulgin 50,000-ohm potentiometer and combined switch, type V836	5 6
3 Wearite super-het intermediates with pipittals	1 11 6
1 Set Lissen ganged oscillator and bandpass coils and combined on-off switch	1 10 0
8 Four-pin and 1 five-pin valve holders	4 6
2 Dubilier 1-mfd. condensers, type 9200	5 8
1 Dubilier .02-mfd. fixed condenser, type 9200	2 0
1 T.C.C. .0001-mfd. fixed condenser	1 3
1 T.C.C. .0002-mfd. fixed condenser	1 3
1 T.C.C. .001-mfd. fixed condenser	1 3
1 Erie 1-megohm grid leak	1 0
1 Erie 2-megohm grid leak	1 0
1 R.L. Parafeced low-frequency coupling unit	11 9
1 Sovereign .0003-mfd. pre-set condenser	1 3
1 Ready Radio high-frequency choke	5 6
2 Sovereign terminal blocks	1 0
4 Belling Lee terminals, marked: Aerial, Earth, L.S.—, L.S.—	10
6 Belling Lee wander plugs, marked: G.B.—, G.B.—1, G.B.—2, H.T.—, H.T.—1, H.T.—2, H.T.—3, H.T.—4, H.T.—	1 2
6 Belling Lee spade terminals, marked: L.T.—, L.T.—	3
1 Sheet aluminum foil, 16 in. by 10 in.	1 6
1 Ready Radio fuse and holder	1 0
1 Erie 20,000-ohm fixed resistance	1 0
1 Erie 50,000-ohm fixed resistance	1 0
1 Aluminium bracket	3
6 Yards flex	4
1 Special Direct Radio "159" cabinet with Easyfix baseboard and panel drilled to specification	1 1 0
6 Mullard valves—PM12 Met. 2, PM12V Met. 2, PM1HL Met., 1 PM12A	4 0 0
1 Calibrator Easy Station Finder (no charge)	
	<b>£12 2 0</b>

**"Century Super" Short-Wave Adaptor**  
 Complete kit as specified, Price £3, can be purchased on easy terms if included with any "Century Super" Table Model or Radiogram Kit.  
 Terms: 5/6 per month extra on 12 monthly payments.

**KIT RG1** Full kit with all radiogram accessories, as below but excluding valves and phone cabinet. Price **£12 : 3 : 6**  
 Or 12 monthly payments of £1 4 0.

**KIT RG2** As RG1, but including valves. Price **£16 : 4 : 6**  
 Or 12 monthly payments of £1/10/0.

**KIT RG3** As RG1, including valves and radio-gramophone. Price **£19 : 14 : 6**  
 Or 12 monthly payments of £1/17/6.

**RADIOGRAM ACCESSORIES**

	£ s. d.
1 Colliaro B.30 clockwork gramophone motor with turntable and automatic stop	1 13 0
1 Bowyer-Lowe A.E.D. Mark III gramophone pick-up	1 10 0
1 Bulgin radio-gramophone switch	1 9
1 Lewcos 50,000-ohm volume control potentiometer	3 0
1 Special "159" radio-gramophone cabinet	3 10 0
1 Belling-Lee wander plug, marked G.B.—3, 1 length of screened connecting wire and 1 yard thin flex (Lewcoflex)	9
1 Epoch Twentieth Century permanent magnet moving-coil loud-speaker	1 15 0
Bulgin dust needle cup	2 6

	£ s. d.
1 Direct Radio cabinet with baseboard, 10 in. by 9 in.	15 0
1 Drilled panel, 10 in. by 8 in.	2 0
1 Colvern dual-range screened short-wave coil, type K8W	9 6
1 J.B. .00025-mfd. short-wave variable condenser, type 2045, with slow-motion disc drive No. 1085	10 9
1 Ready Radio .0005-mfd. reaction type bakelite dielectric	2 6
1 J.B. neutralising condenser	3 6
1 Ready Radio on-off switch	10
1 4-pin valve holder	6
1 T.C.C. 1-mfd. condenser	2 10
1 T.C.C. .0001-mfd. and one .0005-mfd. fixed condensers	2 6
1 Ready Radio 400-ohm baseboard mounting potentiometer	2 9
1 Erie 1-megohm grid leak	1 0
1 Slektun short-wave H.F. choke	2 9
1 Sovereign terminal block and 2 Belling Lee terminals marked Aerial and Earth	11
2 Yards thin flex, connecting wire, screws, etc.	4
1 Bulgin 4-pin adaptor plug, P.D.	2 0
1 Belling Lee S.G. anode connector, type 1030	4
	<b>£3 0 0</b>

**KIT MODEL 1** (Less Valves and Cabinet) **£7 : 0 : 0**  
 Or twelve monthly payments of 13/-.  
**KIT MODEL 2** (With Valves and Cabinet) **£11 : 1 : 0**  
 Or twelve monthly payments of £1/0/6.

**KIT MODEL 3** (With Valves and Cabinet) **£12 : 2 : 0**  
 Or twelve monthly payments of £1/2/6

**KIT MODEL 4** (Complete kit as specified with "159" Consolette Cabinet, Valves, and Epoch Twentieth Century Moving Coil Speaker) **£15 : 0 : 0**  
 Or twelve monthly payments of £1/7/6

**OFFICIAL DEMONSTRATION**  
 159 BOROUGH HIGH STREET, LONDON BRIDGE, S.E.1.

"Amateur Wireless" in co-operation with Direct Radio invite you to a demonstration of the "Century Super" constructed from Direct Radio guaranteed kits. Everyone who hears it is astounded. Before you definitely decide on any new receiver come to 159 Borough High Street and test the remarkable "Century Super" yourself.

**TEST IT FOR YOURSELF**

<b>KIT No. 1</b> (less valves and cabinet) <b>£13 : 2 : 9</b> Or 12 monthly payments of £1 4 0
<b>KIT No. 2</b> (with valves, less cabinet) <b>£18 : 19 : 3</b> Or 12 monthly payments of £1 15 0
<b>KIT No. 3</b> (with valves and cabinet) <b>£21 : 1 : 3</b> Or 12 monthly payments of £2 0 0
<b>KIT No. 4</b> (Complete kit with valves, special Consolette cabinet and Epoch A2 permanent-magnet moving-coil speaker with multi-ratio input transformer) <b>£24 : 5 : 0</b> Or 12 monthly payments of £2 5 0

## THE ETHER MUSIC TWO

1 Ebonite panel, 10 in. by 8 in.	3 6	1 Erie 2-megohm grid leak with wire ends	1 0	<b>KIT No. 1</b> (less valves and cabinet) <b>£3 : 6 : 6</b>
1 Baseboard, 10 in. by 8 in.	1 0	1 Lewcos 20,000-ohm apagebetti resistance	1 6	Or 10 monthly payments of 7/8.
1 Utility type W327 straight-line dual and .0005-mfd. variable condenser	9 6	1 Sovereign terminal block	6	<b>KIT No. 2</b> (with valves, less cabinet) <b>£4 : 2 : 3</b>
1 Wearite 3-pole change-over switch, type V22	4 0	1 Terminal strip, 4 in. by 2 in.	6	Or 12 monthly payments of 7/8.
1 Colvern dual-range screened aerial coil type TD	8 6	6 Belling Lee terminals, marked: 2 L.S., Aerial, Earth, 2 pick-up.	1 5	<b>KIT No. 3</b> (with valves and cabinet) <b>£4 : 17 : 3</b>
1 Sovereign .0003-mfd. max. pre-set condenser	1 3	1 Bulgin push-pull single-pole change-over switch, type 834	1 9	Or 12 monthly payments of 9/-. <b>KIT No. 4</b>
2 T.C.C. .0002-mfd. fixed condensers	2 6	Connecting wire, four yards thin flex, screws, etc.	1 6	(Complete kit with valves, "159" walnut consolette cabinet and R. & A. type 50 loud speaker chassis) <b>£7 : 14 : 6</b>
1 Ready Radio high-frequency choke	1 6	5 Belling Lee wander plugs, marked: H.T.—, H.T.—, G.B.—, G.B.—1, G.B.—2	10	Or 12 monthly payments of 14/6.
1 R.I. "Dux" low-frequency transformer	0 9	2 Spade terminals, marked: L.T.—, L.T.— (Belling Lee)	4	
1 Ready Radio .0003-mfd. reaction condenser	2 3	2 Mullard valves—PM1HL, PM2A	15 9	
1 T.C.C. 1-mfd. fixed condenser	2 10	1 Direct radio "159" cabinet	15 0	
1 T.C.C. 2-mfd. fixed condenser	3 10			
2 4-pin valve holders	1 0			
1 R.I. "Dox Aud Rad" low-frequency output choke	8 9			

**£4 17 3**

**ANY COMPONENT CAN BE SUPPLIED SEPARATELY**

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

To DIRECT RADIO, LTD., 159 Borough High Street, London Bridge, S.E.1.

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) (c) I enclose first deposit of £.....

NAME.....

ADDRESS.....

Amateur Wireless, 3/12/32

**DIRECT RADIO LTD., 159 BORO HIGH ST., LONDON BRIDGE, S.E.1**  
 Don't Forget to Say That You Saw it in "A.W."

IT was many years since I had been in England or indeed anywhere within reach of civilisation. My job had buried me in the wilds, out of touch with modern development. One of the first things I did on reaching home was to visit my old friend, Phelts. My air taxi deposited me quietly on the roof of his house, and after a short controversy with the driver, who informed me in a patronising manner that tipping had been abolished for many years, I walked inside.

I may say that this is literally true. Just as I was about to knock at the door, it opened, and a voice said "Go straight in; you will find me in the first door to your right."

"A merry Christmas, old boy," said he, rising and shaking me warmly by the hand. "It is many years since we met; come and tell me all your news."

"My news can wait," I replied. "I am a little bewildered with the various happenings which are apparently accepted as commonplace by you people. If I remember you used to be a bit of a radio fan, but it seems that our most advanced ideas have been left far behind."

"Oh," he laughed, "you are thinking of my little welcoming speech: That of course is not universal, but quite a lot of people have it fitted. You see, a small bell rings and a picture is flashed on to this screen showing whoever is coming up to the door. All I have to say is 'Come in,' followed by any remarks I like, and the door opens."

"What happens if you don't say 'Come



while my host amused himself by dialing another station. Here we had a radio play, and as before a scene suddenly appeared at the end of the room. I was particularly intrigued by the fact that the voices seemed to come from the actual speaker, that in fact there was a true audioscopic effect. When one speaker walked from one side of the room to the other his footsteps walked with him.

"Well," I remarked, "it is certainly most

effective, but the thing I have not got yet is how these figures and scenes appear in such a lifelike manner at the end of the room."

My host walked to the end of the room, but before he had reached it, he suddenly stopped, held out his knuckle and touched what appeared to be the air. I suddenly realised that there was a sheet of glass across the room. "Television," he went on, "was of course very much in its infancy when you left England. Since then we have made several marked alterations. In the first place we no longer attempt to illuminate the screen direct from the signals received. The signals picked up work through an amplifier and build up the picture on a small cathode ray tube. Here we take quite a different step.

"You will probably remember the epidiascopes, forms of magic lantern in which instead of using a slide you placed a fixture on a platform, illuminated with a bright light and the fixture was projected on to the screen. We found we could use this principle here. Therefore we use an

(Continued on page 1258b)

By J. H. REYNER

in?" I asked.

"The door remains closed. It only responds to those two words."

"I suppose your radio now is positively marvellous?"

"You shall hear it, if you like. Let's see what is on." And he quickly turned up the items for that particular evening.

He walked over to a little dial resting on a table by the fireside. I had at first mistaken this for an ordinary automatic telephone dial, and I noticed that he dialed three numbers. After a short pause there was a faint click and two men suddenly appeared at the other end of the room and proceeded to put over the customary humorous turn. I listened spellbound until the end of the turn, when my host pressed a button and the figures faded out. Only then did I realise how extraordinary the whole process had been, and I pressed for an explanation.

"What was that dial, anyhow?" I asked.

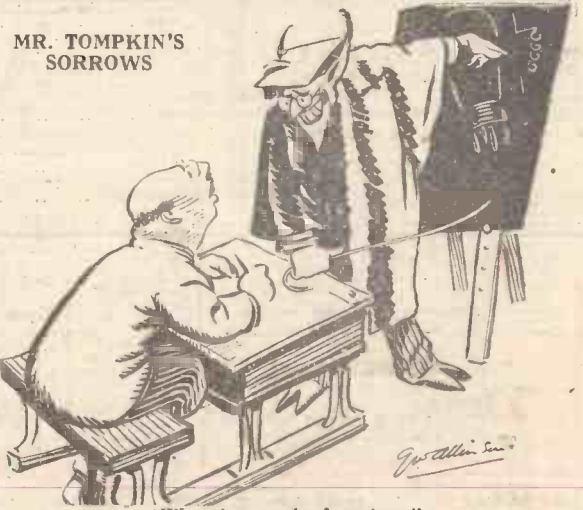
"Oh, that?" he replied. "We gave up the old-fashioned tuning dial long ago. All you do now is to dial the frequency in kilocycles of the station you want. The receiver does the rest."

"But where is the receiver?" I asked.

"At the far end of the room. We don't trouble about making it a fancy piece of furniture nowadays; in fact I never look at it from one year's end to another. The broadcasting service attends to that for me on their periodical visits of inspection." I scratched my head in amazement,

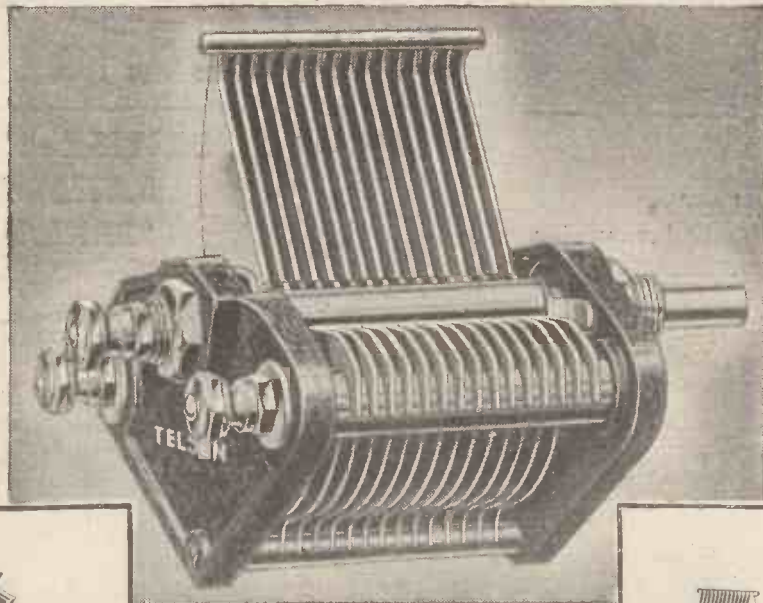


Giving lessons to the uninitiated



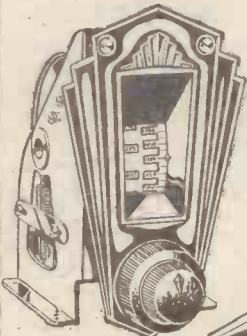
"When does a valve function?"  
"When you 'socket'"

# PRECISION



**TELSEN TELORNOR**

An illuminated Disc Drive embodied into an unusually handsome silver oxidised escutcheon plate, complete with artistically grouped Volume, Tuning, On-Off, and Push-Pull controls . . . 7/6

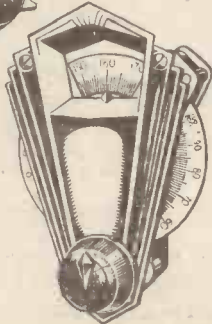


**TELSEN DRUM DRIVE**

Embodies numerous refinements, including cord drive and rocking stator trimmer. An extra scale, graduated for wavelength tuning, is supplied free of charge . . . 8/6

**TELSEN ILLUMINATED DISC DRIVE.**

Fitted with handsome silver oxidised escutcheon plate and incorporating an improved movement, making for delightfully easy tuning . . . 3/6



**TELSEN SLOW MOTION DIAL.**

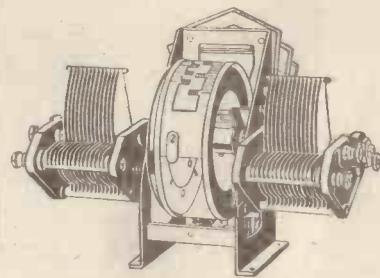
(Black or Brown Bakelite)

Made with a gear ratio of 8-1, the disc being graduated from 0-100 in both directions. Supplied complete with instructions for mounting on all panels up to 3/16" thick . . . 2/-

## TELSEN LOGARITHMIC VARIABLE CONDENSER

The Telsen Logarithmic Variable Condenser is a component whose precision, allied to its sturdy construction, ensures years of faithful service. The sturdy frame is braced by three solid pillars, and the vanes clamped at three points, making distortion impossible. The rotor is also built into a rigid unit and the vanes held at both ends, generous bearings preventing backlash or endplay.

Cap. .00025 . . . . .	4/6
Cap. .00035 . . . . .	4/6
Cap. .0005 . . . . .	4/6
Cap. .0005 (left-hand movement with trimmer) . . . . .	5/-
Cap. .0005 (right-hand movement with trimmer) . . . . .	5/-

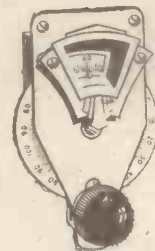


**TELSEN DRUM DRIVE AND CONDENSER ASSEMBLY.**

A complete drum drive and ganged condensers tuning unit, with a handsome escutcheon finished in oxidised silver. An extra scale (marked in wavelengths) is supplied free . . . . . 17/6

**TELSEN SMALL FRICTION DISC DRIVE.**

A low priced disc drive for auxiliary controls. It is extremely robust and may be used for main tuning condensers where considerations of space make it desirable . . . 2/6



# TELSEN

**RADIO COMPONENTS**

**TELSEN RADIO COMPONENTS ARE 100% BRITISH**

ANNOUNCEMENT OF THE TELSEN ELECTRIC CO., LTD., ASTON, BIRMINGHAM

Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention

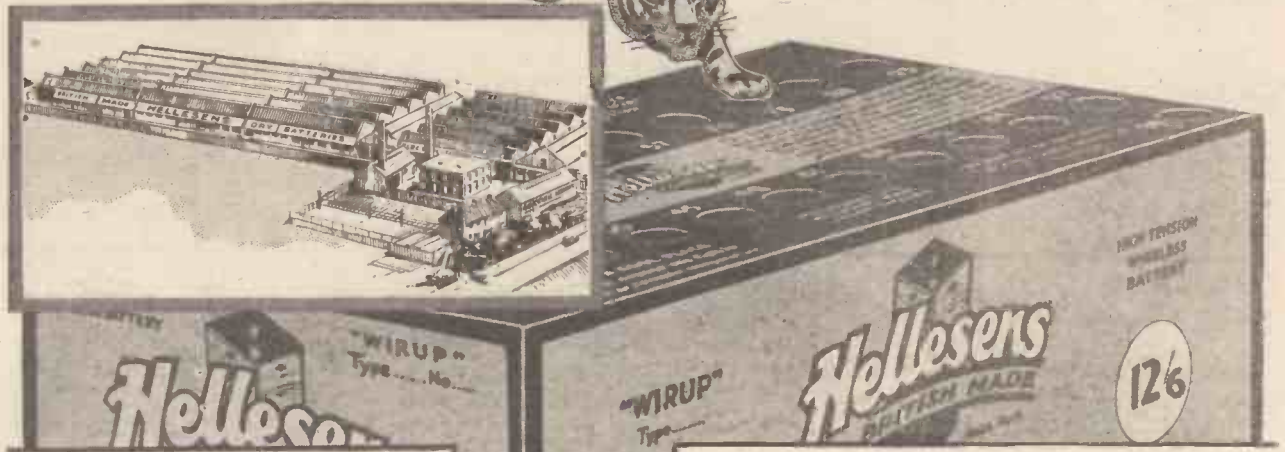


The Hellesen Tiger

# RELEASED!

Hellesen Works, London  
A model factory set in ideal surroundings.

**BRITISH - MADE HELLESEN BATTERIES AT THE NEW "BRITISH - MADE" PRICES**



**A few typical examples of the new British-made prices**

*High Tension Batteries: "Hellesen Standard" Capacity*

Type	Volts	Price
WIRIN - - - - -	60	7/6
WIRUP - - - - -	99	12/6
WISOL - - - - -	108	13/6
WISYP - - - - -	120	16/-

*Special Batteries for Portable Sets.*

McMICHAEL - - - - -	120	16/-
PYE Q - - - - -	126 + 3G.B.	17/6
BURNDIPT - - - - -	118 + 18G.B.	18/6

*Standard Grid Bias Batteries.*

WIROF - - - - -	4½	9d.
WISIX - - - - -	6	1/-
WIRAY - - - - -	9	1/3
WIRIS - - - - -	15	2/-

*Pocket Lamp Batteries.*

POLAMP - - - - -	4½	6d.
RECORD - - - - -	4½	9d.

*Cycle Lamp Battery.*

POKEL - - - - -	3	9d.
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*General Purpose Cell, round type.*

TIGER - - - - -	1½	1/9
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Made at the new British factory and encased in a new style container . . . but the same superlative Hellesen product that has stood for so long as the world's standard of dry battery quality.



**DRY CELLS & BATTERIES**

**SINCE 1887  
THE BEST IN THE WORLD**

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Sheer Dependability

Consistent Performance

Longer and Better Life

Service

## Since 1887 the Best in the World

Don't Forget to Say That You Saw it in "A.W."

# PARALLEL-FEED PITFALLS

By M. G. SCROGGIE,  
B.Sc., A.M.I.E.E.

TO POWER

THE parallel-feed transformer coupling has a considerable vogue at the present time because the advantages of high amplification, good quality, and low cost are associated with it.

And quite rightly so if it is properly

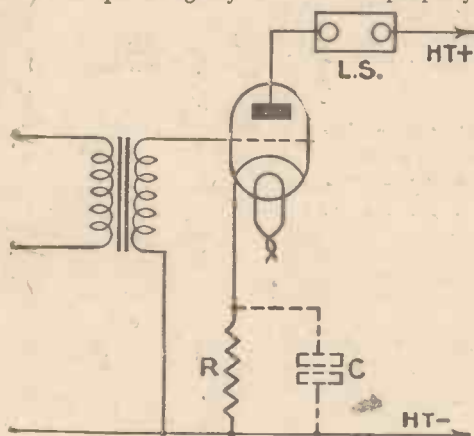


Fig. 1. Simplest method of obtaining automatic bias for A. C. valves

applied, but is it generally realised that in an extreme case 96 per cent. of the loud-speaker power may be lost?

Unless the reader is rather credulous he may well call for some explanation of such a statement. Admittedly the figure quoted above is about the worst possible, and in most cases the loss is less disastrous.

The battery user, for example, may breathe again more freely and turn over to read something else; this is not for him. But those who make use of "automatic" grid bias are advised to continue here awhile, as they may learn something to their advantage.

### Getting Bias

Let us look for a moment at the methods of applying grid bias to valves requiring it in a mains-driven set. Getting the bias voltage itself is simple; a suitable resistor is connected between the cathode of the valve and H.T.—, and the drop in volts due to the valve current is applied to bias the grid (Fig. 1). The slips of paper that fall out of the valve cartons when they are opened tell us all about this, and give useful information as to how much resistance to use. It is usually from a few hundreds up to 1,000 ohms. Multiply this by the anode current in milliamps and

divide by 1,000, and the answer is the grid bias volts.

What we want is a steady, continuous, unvarying grid bias. But the anode current is continually varying in order to make sounds come out of the loud-speaker. So if we use this current to produce grid bias, these same variations are applied to the grid. One may say *re-applied*, for the grid is already in receipt of them from the preceding valve. So the grid is supplied not only with the negative bias voltage, and the continually varying "signal" voltage from the preceding valve, but also with a replica of the signal voltage fed back to it from its own anode. These two oppose one another and partly cancel out, so the net result is weak reproduction. The more efficient the valve—the greater its "slope"—the larger is the proportion lost in this way.

### Upsetting Bias Action

Clearly it is necessary to provide an easy path for the signal currents without upsetting the biasing action. Alas! how often does one see circuit diagrams in which this path has been provided by a condenser of 2 microfarads or even less. It is seen in specifications that lay claim to good quality reproduction. And why not, you say? Take an example. Bias resistor, 500 ohms; condenser across it,

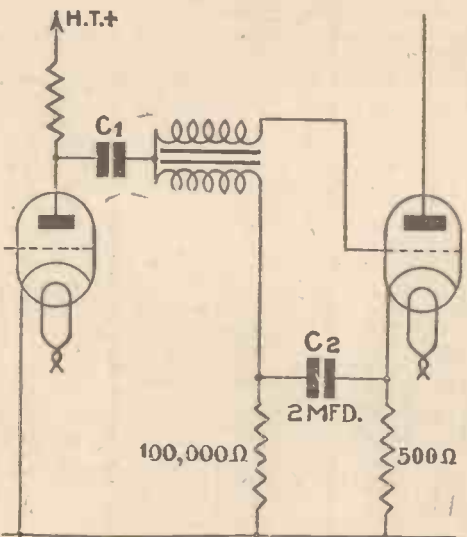


Fig. 2. Illustrating method of decoupling an automatic bias system

2 microtarads. Anode current 30 milliamps. The steady current takes no notice of the condenser, so the resulting bias voltage is calculated as explained—15 volts. A signal current corresponding to a very high note—5,000 cycles per second—finds an easy route via the condenser, which is

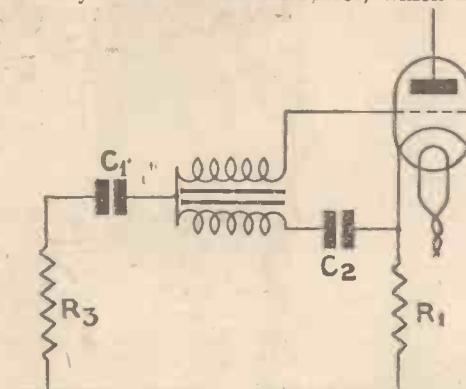


Fig. 3. Showing the path of the re-applied and the initial fluctuating currents

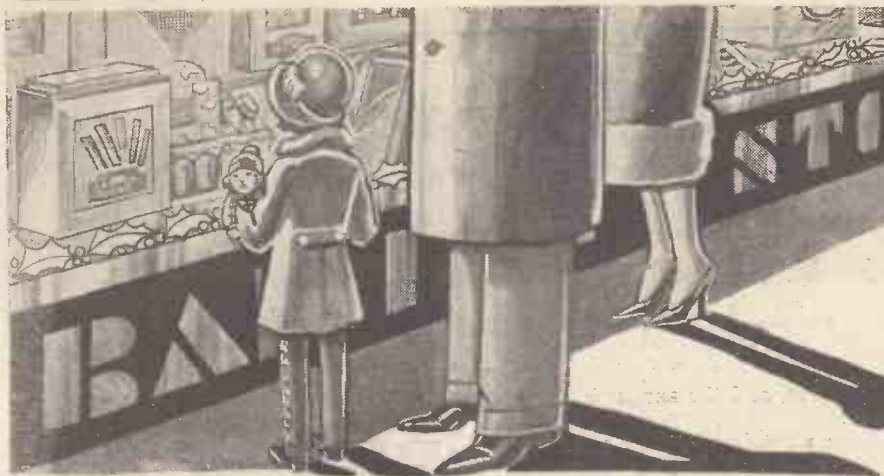
only 16 ohms at that frequency. The signal current must be less than 30 milliamps, say 10. Ten times 16 divided by 1,000 = 0.16 volts; not enough to matter.

At 500 cycles—a middle note—the condenser is 160 ohms. The feed-back is quite appreciable now. And to a 50-cycle note the condenser is 1,600 ohms; so that it hardly eases the situation at all, and there is a very large loss. Result: high notes full strength, middle notes slightly weakened (not enough to be noticed), low notes cut right down.

### Decoupling

So the valve people and many other helpful people show us the circuit of Fig. 2 in which an extra resistor appears—usually about 100,000 ohms. As it has not to carry current its high value does not matter; but it does form a very effective little filter, for while the condenser impedance which is 1,600 ohms to low notes is not small compared with the 500-ohm bias resistor, it is quite small compared with 100,000 ohms.

If the ordinary directly-connected transformer coupling is used this bias circuit is perfectly good. But if the parallel-feed transformer circuit is examined it will be  
(Continued on page 1266)



# XMAS RADIO GIFTS

## Practical Suggestions for Your Christmas Radio Shopping List.

**R**ADIO ideas for Christmas presents?

Well, there's a big store from which to choose!

No hobby offers anything like the wide range of suitable presents as does radio, and if you can't find anything suitable in the ordinary range of sociable gifts for Christmas, then you will be quite safe this year in picking a radio present for friends or relatives.

Nearly everybody has a set these days and so you are safe in choosing something of a radio nature. But as there is nothing more heartrending to give (or, for that matter, receive) a present which just "won't fit" you must make sure that your radio gift will be acceptable. Some Christmas givers fight shy of radio parts as presents because they think it is very difficult to choose just the right things. As a matter of fact, it is a whole lot easier to choose an acceptable radio gift than it is to delve into the suitability of more personal gifts, socks and ties, for example! It is much easier to find out the technicalities of a man's set than it is to discover his taste in ties or his size in gloves! In many cases it isn't even necessary to worry about the suitability of radio parts as gifts. There are some "safe" parts which, practically without exception, make acceptable presents. A seasonable word is never out of place. Find out as much regarding the recipient's set as you can before buying something to add to it. You won't get a hearty "Thank you" if you buy a brand new accumulator for a man who is changing over to all-mains operation. A D.C. high-tension unit won't please a man who is blessed with an A.C. mains supply.

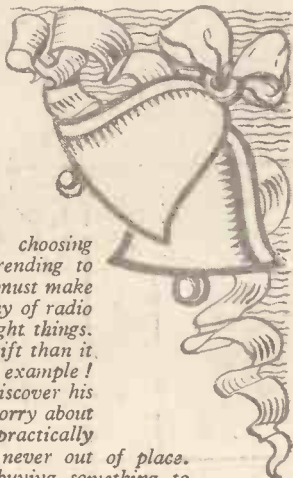
When you go to the other side of radio, however, you find many components which are acceptable in a wide range of circumstances; loud-speakers, for instance, and certain small parts, such as volume controls. Even if a man has a set fitted with an integral speaker he will generally be able to make excellent use of an additional speaker connected through extension leads to another room of the house.

Volume controls, fuses, fixed condensers, resistances and so on always find their place in the outfit of a keen experimenter, even if they are not put into immediate use in the set. I once knew a man who rebuilt his whole set because a friend had given him a new type of bandpass coil, and he wanted to try it out. The only thing that can be said against this is that it may tempt your friend to pull his set to pieces just before the festive season and the rush to stir puddings and hang up Christmas decorations may prevent him getting it back in time. There is nothing worse than a radio-less Christmas!

Loud-speakers, volume controls, fixed condensers and resistances; they are all fairly inexpensive components.

Is your pocket deeper? If your bank book is swelling with Yuletide generosity (or if you have won something in a raffle!) then share your generosity in the form of something bigger, a mains unit, radiogram equipment or even a complete new set. There are a number of firms this year who make radiogram outfits, consisting of turntable equipment, pick-up and volume control, which can be added to practically any set to make it a radiogram.

No matter whether it is to be small or big, super-luxury or an ultra-economical Christmas gift, you will find in the accompanying illustrated pages some very valuable help in choosing suitable radio parts for Christmas presents.



(Above) W.B. moving coil speaker and Lissen tuning-control unit. (Right) Tune well choke



SOME USEFUL GIFTS. (Left to right) R. & A. speaker, Ready-Radio Instamat, Goltone switch and Blue Spot 44R speaker





Litsen  
Skyscraper kit set



Climax A.C. 3  
radio-gram



Atlas  
moving-coil speaker



Tunewell  
mains unit



Igranic speaker



Kolster Brandes  
pick-up



Wearite  
volume-control



Lotus corsole set



Pye radio-gram

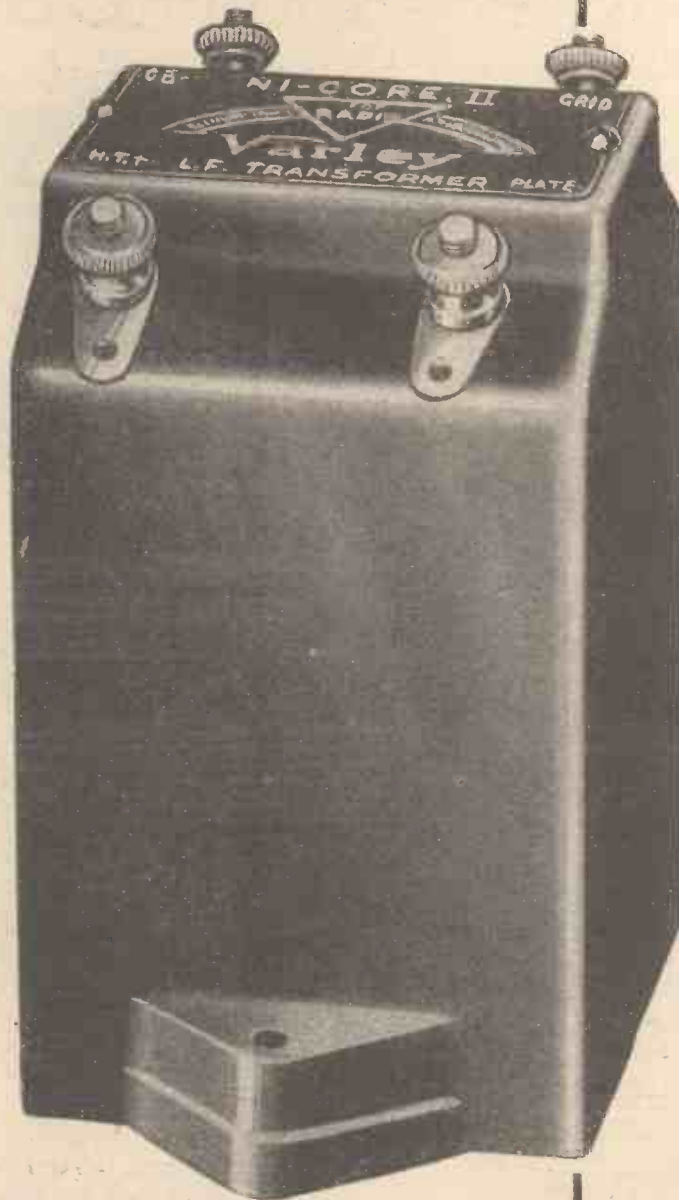


Marconiphone  
model 255



1. Telsen coil. 2. Ultra receiver. 3. Graham-Ferish condenser. 4. R.I. transformer. 5. T.C.C. condenser. 6. Ready-Radio set chassis. 7. Exide H.T. accumulator. 8. Davenset transformer. 9. Lissen receiver. 10. Graham-Farish Filt earth. 11. Lissen coil set. 12. Lissen H.T. battery. 13. Marconi-phone speaker. 14. Graham-Farish Gard. 15. Belling Lee fuse. 16. Celestion speaker. 17. Mullard valve. 18. Formo-densor.

# SPECIFIED IN THE NEW A.C. CENTURY SUPER



The perfect tone of the New A.C. Century Super owes much to this Varley L.F. Transformer—the famous Nicore II. A component of utmost reliability, that will give you really good reproduction. Designed in the light of Varley's experience, cumulative over 35 years, in the winding of transformer coils of many makes and every type . . . NICORE II—see that you get it! Ratio 1:4. Price 11/6 from any radio dealer.

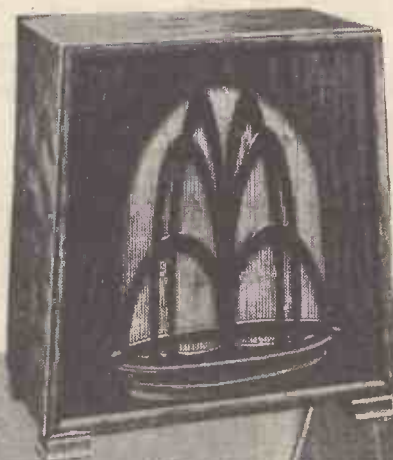
# Varley

*Proprs: Oliver Pell Control Ltd.*

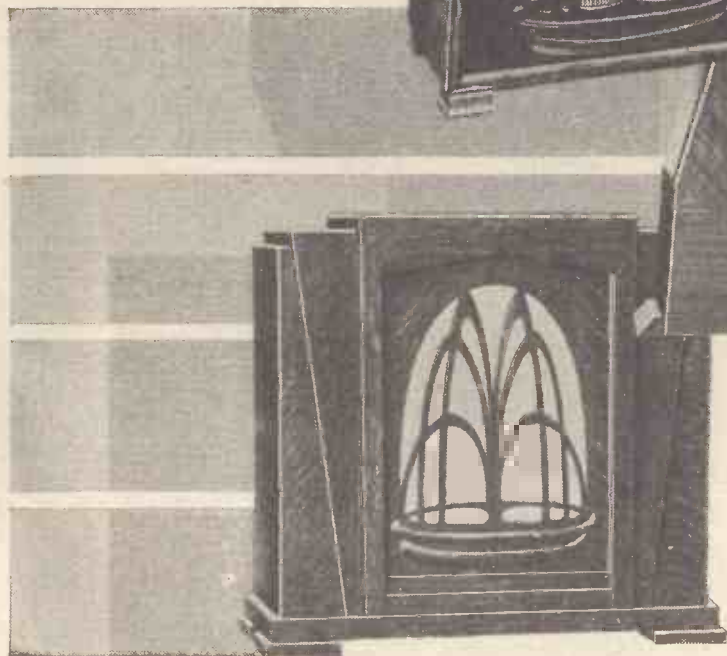
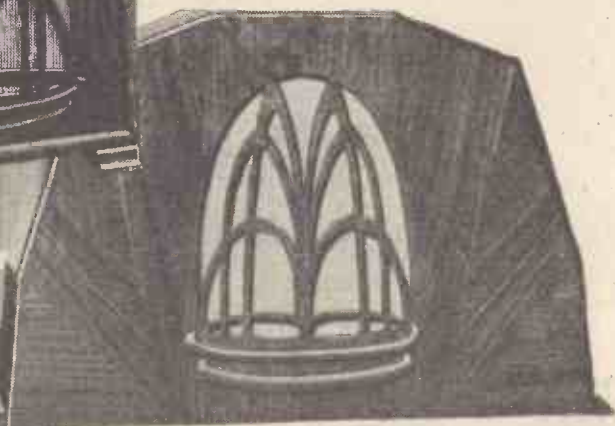
## NICORE II . . . . 11/6

# THERE'S THE SPEAKER YOU WANT IN THE B.T.H. RANGE of MOVING COIL REPRODUCERS 1933 MODELS

The Minor R.K. Reproducer, Permanent Magnet Model, is supplied complete with multi-ratio transformer. The unit housed in the cabinet has a 7-inch corrugated cone with moving coil having a nominal impedance of 7.5 ohms.  
Prices:—  
Fumed Oak "ARUNDEL" model £2.17.6  
Walnut "ARUNDEL" model £3.3.0



The Senior R.K. Reproducer, Permanent Magnet Model, is available complete with multi-ratio transformer.  
Prices:—  
"WARWICK" model in Oak - £8.10.0  
"WARWICK" model in Walnut £8.17.6



The Senior R.K. Reproducer, Permanent Magnet Model, is available complete with multi-ratio transformer.  
Price:—  
"WINDSOR" model in Oak - £8.10.0

There's a speaker to suit you and a price to suit your pocket in the R.K. range. Years of experience—the first moving coil speaker was an R.K.—have contributed to R.K. supremacy. Comparative tests have established the R.K. as the finest moving coil speaker made—regardless of price. You pay no more but you get a better speaker.

All good radio dealers will be pleased to demonstrate R.K.'s to you. A range of output transformers specially designed for use with R.K.'s is available.

## EDISWAN RADIO 100 PER CENT BRITISH

The Edison Swan Electric Co. Ltd.



155 Charing Cross Rd. London. W.C.2

W.192

You will Help Yourself and Help Us by Mentioning "A.W." to Advertisers

# Telsen

## MICA CONDENSERS AND GRID LEAKS

### MAKE ALL THE DIFFERENCE TO YOUR SET!



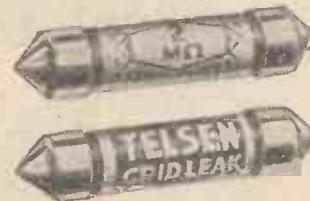
**TELSEN MICA CONDENSERS**  
 Represent an important advance in technique resulting in the virtual elimination of H.F. losses, even in the larger sizes. In attractive moulded cases, adaptable to flat and vertical mounting. Grid leak clips (for mounting in series or in shunt) are supplied free with the smaller capacities. Made in capacities of from .0001 to .002 mfd. **1/-**  
 Also .006 mfd. **1/3**



**TELSEN PRE-SET CONDENSERS**  
 The only pre-set condensers to give so wide a variation between maximum and minimum capacities, providing a correspondingly wide range of selectivity adjustment when used in the aerial circuit. Superbly constructed throughout, for high insulation with low loss. Easily adjusted and provided with locking ring. Made in capacities of from .002 (max) and .00025 (min) to .0001 (max) and .000005 (min) **1/6**

# TELSEN

**RADIO COMPONENTS**



**TELSEN GRID LEAKS**

This new type of improved efficiency, is absolutely silent and practically unbreakable, the resistance being unaffected by the application of different voltages. They are guaranteed to be completely non-inductive and to produce no capacity effects. Made in capacities of from 5 to 1 megs. **1/-**



**TELSEN TAG CONDENSERS**

Of extremely compact and sturdy construction. May be mounted on either insulated or metal panels by utilizing the two base-board screw holes in the neatly designed moulded casing. The tags enable the condensers to be connected to any other components, either directly or by soldering. H.F. losses are negligible. In capacities of .0001 mfd. to .002 mfd. **6d**

**IT'S THE 'LASTING EFFICIENCY' THAT COUNTS**

ANNOUNCEMENT OF THE TELSEN ELECTRIC CO. LTD., ASTON BIRMINGHAM

Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention



● Is your set a ruler of the radio waves with every port in reach; or just a worn out coaster tied down to one or two stations? Your valves fix the limits of your voyaging. Fading valves can't give you to-day's programmes at their best. Change to Tungram now! Tungram valves are specified by many more than 61 British Setmakers. Money cannot buy a better valve, and yet they are priced as low as 5/6. Change to Tungram now. Give your set the power it needs, and go full steam ahead to better radio!

# TUNGSRAM

## RADIO VALVES

Write for FREE literature to Tungram Electric Lamp Works (Gt. Britain) Ltd., 72, Oxford Street, London, W.1.



Here is some first-hand information by HENRY HALL himself, on dancing to radio this Christmas

I ENVY dance-music enthusiasts this Christmas, because, being on the other side of the microphone, I shall not see the dance music programme in as cheerful a fashion as they will!

While they—and you—will be hearing broadcast dance music in the cheery Christmas-time surroundings of the home, I, in company with the B.B.C. Dance Orchestra, will be in a robot-like and a not too cheerful studio in Broadcasting House; playing gay music to millions, without actually seeing a soul.

The studio in which most of our broadcasting is done and which will most probably be used during Christmas week is 3a—the studio originally intended for the Children's Hour, and in which the B.B.C. engineers carried out their tests with a glass reflecting wall. The tests are not complete yet, so 3a is not properly decorated

Owing to the Christmas rush of programmes, moreover, I don't suppose there will be much time to bother about which studio we are using. I have just been glancing through the advance programmes of the dance music during Christmas week and from the facts shown in an accompanying table you will realise that it is going to be a busy time both for the "O.B." bands and for the B.B.C. Dance Orchestra.

In spite of the fact that the B.B.C. Dance Orchestra is kept busy rehearsing in Broadcasting House from 10 in the morning until the teatime broadcasts (in addition to regular gramophone recording), we have managed to get down to the Christmas tunes well ahead of schedule.

Early last month we gave an evening tryout from 8 to 8.30 p.m. of the tunes which I had selected as the most popular numbers for Christmas. My post bag is a fairly reliable guide as to what listeners think of new tunes and I wanted to make sure of getting popular numbers.

The normal library of the B.B.C. Dance Orchestra is 450 numbers. As each of these takes about a day to arrange, you can see that we have not wasted time. Further numbers are still being taken on for possible broadcasting at Christmas.

I am sure that we have more good tunes than at this time last year. Jack Hylton's "Song of the Bells" is heard everywhere, and I feel confident that it is this type of dance music which will be popular at Christmas. Among the other good tunes are "Tell Me To-night," the six-eight "Marching Along Together," the comedy number "The Old Kitchen Kettle" and a very attractive American tune "Here's Hoping."

Dance Music is to a large extent international and it is therefore perhaps a little unfair to stress the relative importance of British, Continental and American tunes. There are not so many Continental tunes at the moment, as the interest in numbers of the "Vienna" type

is waning. At the moment I am broadcasting approximately a percentage of 48 per cent. British tunes, 6 to 7 per cent. Continental and the rest American.

New tunes keep coming in. My post



Henry Hall—the Director of the B.B.C. Dance Orchestra, and the author of this interesting article on your Christmas dance music

bag is full of the enthusiastic efforts of amateurs. Only about one in every five hundred of these is good enough to be handled by the arrangers.

I employ some of the best dance music arrangers in the country, among them being, Brownsmith & Lowry, Phil Cardew, Benny Frankel, Peter Yorke, Ronnie Munro and Van Phillips. These men arrange music for other famous dance band combinations, Jack Hylton and Ambrose, for instance. Acting under my direction, they arrange the dance music specially to suit the style in which I think each number should be played by the B.B.C. Dance Orchestra.

The arrangement of every piece takes about a day and costs approximately ten guineas. You will see therefore that the

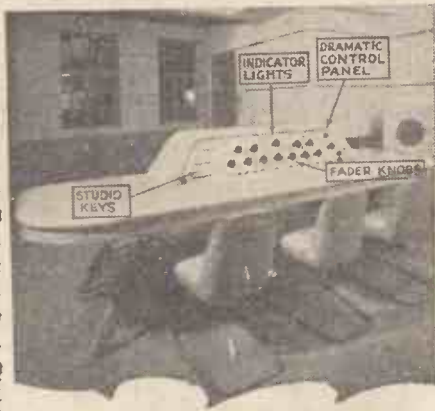
(Continued at foot of next page)



A peep into studio 3A in which Henry Hall will broadcast during Christmas week

AT THE B.B.C.

THE CONTROLS OF THE "D.C.P."



The main dramatic control panel at London. The chief controls are indicated by the arrows

NO B.B.C. play is now ever given with the actors all in one studio. Val Gielgud, the Productions Director, pioneered the idea of having anything up to ten studios working at a time, part of the caste in one room, part in another; the orchestra in a large studio and the narrators in a small one. Synchronised sound effects are always produced in a separate studio.

This scheme means that the play producer does not see any of his actors, and it also necessitates him sitting at a panel where he can control each of the studios switched into use for the radio play. He must be able to warn the

people in each of the studios when their cue comes. He must be able to hear what is happening in each of the studios, and also the total programme.

The B.B.C. engineers have worked out circuits for all these jobs. The distant switching and volume control has meant several miles of shielded wire and some hundreds of relay contacts. It also means that there are twenty-two separate big L.F. amplifiers in the control room racks.

The key of all the studios is the gadget known to the play producers as the "D.C.P."—Dramatic Control Panel.

Not content with devising a modernist, robot-like play producing circuit, the engineers have fitted the D.C.P. switches, keys and meters into a gleaming grey control desk which hides beneath its smooth and futurist exterior, a mass of potentiometer wiring and switch contacts.

Everyone of the studios to be used for radio plays is fitted with a green "flick" light which the producer at the control panel brings into circuit at the touch of a key. Directly this key is touched, the actors in the studio get their cue.

The play producer then slowly turns

the volume control, so that the new studio is silently brought into circuit. When the section from this particular studio is finished, the potentiometer knob is turned back to zero and immediately a pilot speaker in that studio is switched in so that the actors can hear what is happening in the other studios, and they do not lose the continuity of the play.

The main "D.C.P." room is on the eighth floor, just at the side of the control room and at the back of studio 8A. Shielded wires from this room in one extreme corner of Broadcasting House, run, through the control room amplifiers, to all the sixth and seventh floor production studios.

Up in the "D.C.P." room the producer has a pilot loud-speaker in a baffle box, coupled to a mains-driven amplifier. This is his guide to the continuity of the whole play. At will he can have this pilot speaker and amplifier connected to the microphone amplifiers or to a receiver actually tuned to the National or Regional programme.



"YOUR CHRISTMAS DANCE MUSIC"

(Continued from preceding page)

arrangement of an amateur-produced tune cannot be entered upon lightly and it is for that reason that we welcome new tunes if they are good.

Every piece has to be specially arranged for the B.B.C. Dance Orchestra. Quite a number of people have the mistaken

case special arrangements have to be scored.

Women are taking a big interest in broadcast dance music. More women are writing good dance tunes. Perhaps you do not know that that well-known tune "Lullaby of the Leaves" was written by a woman. I am not inviting the criticism of the fair sex by making an analysis of the Christmas dance tunes provided by women composers!

Technically, the Christmas Dance Music broadcasts will be the best ever given from the B.B.C. studios. No. 3A, in spite of my sly digs at its lack of cheer, is a fine background for the new microphones which have been tried out in time for Christmas.

I started broadcasting at the B.B.C. with a directional condenser microphone, which gave very crisp reproduction. Then we tried the Edison Bell microphone, which is

non-directional and which was stood in the centre of the B.B.C. Dance Orchestra near the vocalist. Now we have gone back again to a directional microphone; but it is a new one, the R.C.A. I have discovered an unusual arrangement of the orchestra, with respect to the baffle of this mike.

I am sure that you will have no reason to complain at the programmes or the technical presentation of the B.B.C. Dance Orchestra's music during Christmas week.

BOXING-DAY DANCE MUSIC

9.35-10.35. The B.B.C. Dance Orchestra directed by Henry Hall (Daventry National and London National).

10.35-midnight. Dorchester House broadcast. (London Regional and Daventry National).

Midnight-1 a.m. B.B.C. Dance Orchestra directed by Henry Hall (London Regional and Daventry National).



In the television studio. Bill and Elsa Newell appearing before the microphone (the curious bomb-like instrument on the small stand) and the photocell groups of the basement studio of Broadcasting House which is being used for television broadcasts.

impression that, owing to a number of changes which have been made in the orchestra, special scoring is not now necessary. This is a big mistake, for every piece which the B.B.C. Dance Orchestra plays is specially scored to conform to my idea of dance music as it should be played by the B.B.C. combination.

The style of the B.B.C. Dance Orchestra is distinctive and is just as individual as that of Jack Hylton, Ambrose, or any of the other well-known orchestras. In every

*Henry Hall*



# OUR BROADCAST CRITIC

## BIRTHDAY WEEK



HETTY KING  
the well-known male impersonator

THE best thing the B.B.C. can do is to have a birthday every week. It has a good effect on the programmes. They have been really good this week.

The only exception was the vaudeville which the Prince was supposed to hear, but apparently did not. He, by the way, made some pleasant observations. His Highness is never found wanting on such occasions as this.

Sir Gerald du Maurier appealed for a very deserving cause in a manner that must surely have brought a great response from listeners. If everyone who heard that appeal sent a shilling much distress would be alleviated.

Now for the vaudeville itself. Has everybody "dried up" that they must give us stale turns? Cicely Courtneidge, for instance. Is not that Laughing Gas episode exploded yet? Very generous of her to respond to encores in that way, but I think we cannot laugh at it any more however heavily gassed we may be!

Then Jeanne de Casalis. I thought she had sent that telegram to her uncle in Africa. I have heard her sending it more than once, but for all that she despatched it again on Tuesday evening.

Clapham and Dwyer were a trifle off colour. Clapham's stuttering valve must have burnt itself out, for he did not get "tied up" in his customary fashion. If those two get serious it will be sad for vaudeville.

Gillie Potter was quite fresh. I admire the fertility of his imagination. He always leaves me wondering how he thinks of some of his ideas. He is one of the most original of our vaudeville broadcasters.

The Wednesday night vaudeville cheered me up. It was so good that it kept me off of the symphony concert for some considerable time. That is intended to be a high compliment, I may add.

Horace Kenney, in his "Trial Turn" sketch was funnier than I have ever heard him. As the broken-down actor who is seeking a job in an up-to-date show he is really not exaggerated, if one believes what managers say on the subject. His type of broadcast is one that might fall flat on repetition unless he changes every line in it. I hope he will do so and let us have something entirely fresh in composition but on the same lines.

I never heard Jetsam in better voice,

I could listen to him for a whole evening, so beautifully produced is his voice. It interested and amused me to note that he sang a low B flat and Gretl Vernon (who was, by the way, very good) reached the F in *all*. Between those two notes lie five and a half octaves, which goes to prove that the human voice covers most of the range of orchestral instruments.

Hetty King is always welcome. I imagine. She is just as virile as ever.

Rupert Hazell and Elsie Day gave a very good turn. The former is a comedian of the first rank. I hope the B.B.C. will ask him to prepare an entirely new turn. He is too good to have so infrequently.

Billy Bennet is another comedian whose powers lie far above the average. I point these matters out because there has been so much mediocrity recently. Now then, I want to ask a plain question. Is a vaudeville of this standard a special treat for Birthday Week or is it a specimen of what listeners are to expect regularly. Echo answers—nothing at the moment!

Towards the end of this vaudeville I

### PROGRAMME POINTERS

The Foundations of music this week were really worthy of the name. I have often thought some of the music rendered in this admirable series does not deserve the title, Beatrice Beaufort and Janet Christopher took the trouble to unearth seventeenth-century songs and duets of real value. Apart from their beautiful rendering of them, the songs themselves were really the foundation of modern vocal art. I do not suggest that no modern music should be included in this series, but I do suggest that these ladies' example be followed. Let us have the welcome historical touch occasionally. I further suggest that Miss Beaufort and Miss Christopher be included in the Saturday evening chamber concerts. Their general style of singing would be very fitting for one of those concerts.

mentally sent my respects to Jack Payne and took leave of him to switch round to where Queen's Hall lay. I was just in time—as I wanted to be—for Debussy's nocturnes. Nothing I can call to mind for sheer loveliness can equal the *Syrens*. The sopranos and contraltos of the National Chorus were really alluring—as the *Syrens* were, of course, in mythological days when they broadcast on their own wavelength—and I must own that I have rarely enjoyed anything more than the whole of that suite as interpreted by Ernest Ansermet.

Thinking that Debussy had turned me to a sufficiently "modern" frame of mind to appreciate the *Rite of Spring* (Stravinsky) in the second part of the programme, I did my best with it, but it conquered me in the end and I had to switch off. It is too futuristic for broadcasting. Had I a score I could have settled down to it, but without anything to follow it was too much for me to swallow.

A perfectly delightful recital was given on the Thursday evening. I had looked forward to it, but enjoyed it even more than I anticipated. Elena Gerhardt was wonderful in Schubert, Schumann and Strauss. I honour her; she wears amazingly well. It must be twenty-five years since I heard her in my student days at Manchester with the great Arthur Nikisch as her accompanist.

Myra Hess was as good as ever, but we have learnt to expect these things of her. I liked her Mozart-playing especially.

As for Albert Sammons, where does he get his tone from? I have rarely heard a violin sound like it—broadcast, at all events.

A. J. Alan must have mystified everyone. Even though he leaves you wondering—and wondering still more—he does satisfy you. Why is he so careful not to let us know who he is. I do know, but I dare not tell you!

The tour of Broadcasting House went off fairly well. One or two departments had nothing to give, but I think the idea was a good one. Rather reminiscent of "Goodbye to Savoy Hill," but otherwise not amiss.

WHITAKER-WILSON.

The Ridgeway Parade, with Philip Ridgeway directing, return to the microphone on December 22 in an hour's broadcast for Regional listeners. The same programme will be heard by National listeners on December 23.



The "A.C. New Century Super" in its console cabinet



# The A.C. NEW C

## THE A.C. MAINS MODEL SET

**A**N A.C. mains receiver will normally give much better results than an equally well designed battery set of the same type. This statement is based upon practical experience and is confirmed by theoretical considerations.

The battery model of the "New Century Super" is really good; this A.C. model is better. There is finer quality. The range is greater. You can turn up the volume control

and have as much volume as needed. Therefore, the A.C. model is a better set. It is just as easy to handle as the battery set, but takes a little longer to build.

There is no need to enter into the detailed advantages of an A.C. mains set in comparison with a battery-driven type.

Everybody knows, for example, that a set is likely to work best when the voltages applied to the various anode circuits have certain values plus or minus a few per cent. With a battery set the best conditions cannot hold for long as the voltage of the high-tension battery falls after it has been used for a time. Thus, if the set is adjusted to give its best when the battery is delivering its rated voltage, performance must fall off long before the battery has depreciated to the point where it is no longer of value.

### RANGE AND QUALITY

The point is that the range, volume and quality vary with the condition of the battery. In a mains set, on the other hand, the supply is relatively steady. All circuits normally have the supply for which they are designed with only very slight variations. From this it should be expected that the performance will be consistently good, until, perhaps, a valve wears out.

This new set may be divided into two or perhaps three parts. There is first the power or mains-

apparatus section. Then there is the set itself and finally the loud-speaker.

In the power section is a large transformer. This supplies the heater circuit of the rectifying valve and

the high-tension side as well. It also provides 4 volts at 6 amperes for the valves of the receiver.

It is necessary to use a well-made component here as the power is relatively large. Attached to the output of the transformer and valve combination is the smoothing circuit. This comprises the usual choke and two condensers.

The parts used in this set have the correct values for good smoothing and if you should have a choke not of the same make as that recommended, be sure its inductance when carrying the normal feed current to the set is satisfactory. The power equipment, briefly, provides heater and high-tension current.

It is essential that high tension be smoothed to avoid hum, and therefore the right parts must be used.

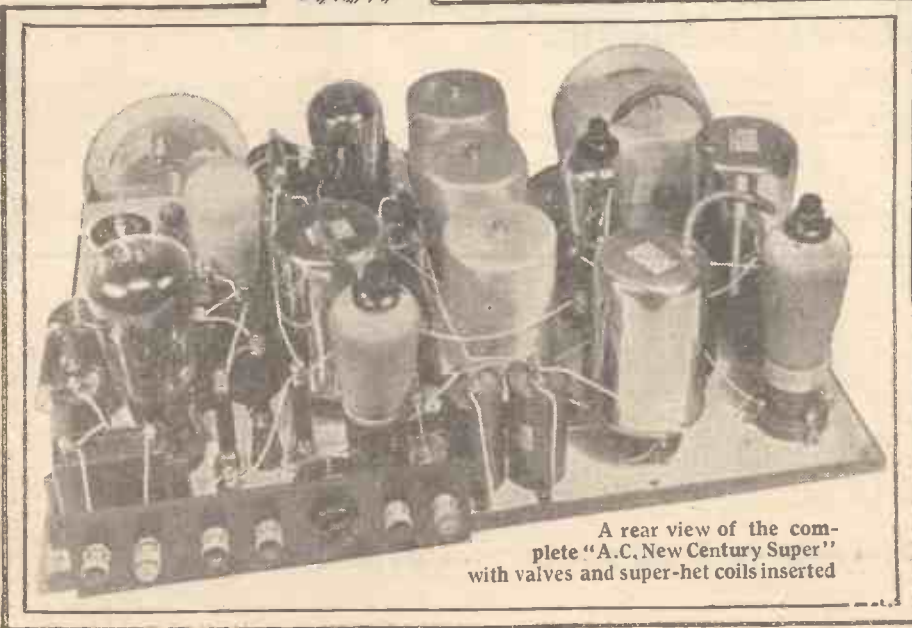
Sometimes high-frequency currents pass from the mains to the set. To avoid this a condenser filter is used, consisting of two condensers in series across the high-tension with the centre point earthed. This simple filter does remove certain hum troubles and naturally condensers of the right working voltage must be used.

The transformer may become just warm when working and the rectifying valve gets hot, a normal state of affairs. The transformer has a centre-tapped heater winding for the valves in the set. No further centre-tapping device is therefore necessary.

Now, although the high-tension supply from the power unit is smooth direct current, the voltage is not correct for each valve. Besides, decoupling is necessary. Various resistances and condensers are



### AGAIN T OF THREE LEA



A rear view of the complete "A.C. New Century Super" with valves and super-het coils inserted



DESIGNED BY THREE LEADING EXPERTS

# NEW CENTURY SUPER

## MODEL OF THE MOST FAMOUS OF THE YEAR



therefore used in the anode circuits, as shown in the illustrations. These have carefully chosen values and must be used for satisfactory results.

Do not, therefore, think that a 0.1-microfarad condenser might do instead of the 1 microfarad recommended, as hum or instability may be introduced.

The grid circuits are biased by connecting resistances in the negative ends of the valve circuits. By-pass condensers are used in order to avoid hum and false couplings. Both high-tension and grid-bias circuits are therefore de-coupled and arranged to avoid hum.

Values should not be changed, unless other valves are used when the bias values may have to be a little different from those provided. The bias circuits work automatically up to a point, an increase in the anode current causing an increase in the bias which tends to even things out.

The set has the same number of tuned circuits as the battery model; in fact, similar coils are used. But the method of coupling the oscillator is different. In this set the oscillator is connected to the cathode circuit of the first detector. This arrangement combines efficiency with simplicity and works very well indeed.

### THE WORKING EXPERTS

Then again, the multi-mu valves have the volume control joined to them. The bias method is used and is obtained from a potentiometer connected to the cathode circuits and the screen-grid potentiometer. Thus the screen voltage is regulated with the bias voltage. The advantage of the multi-mu valve over the ordinary type is that relatively strong signals can be handled and the magnification

provided can be adjusted over a wide range. In fact, the strength of the local station can be regulated from a whisper to the full amount.

Mains multi-mu valves have satisfactory characteristics and have been proved in practice to work very well. The second detector is of the grid-condenser and leak type and is able to deal with ample power.

Provision is made at this valve for connecting a gramophone pick-up, when this valve works as an amplifier and feeds the pentode output valve. The combination gives ample magnification and the output when playing records is quite enough for normal purposes.

A volume control must be connected across the pick-up in order that the strength can be regulated.

### PENTODE OUTPUT

A pentode valve must normally have a filter connected to its anode circuit. This acts as a safety device and also reduces the strength of the higher frequencies.

The receiver has a layout very much like that of the battery set. A baseboard is used with metal foil on the upper surface. The foil is cut away at the points where the volume control and the oscillator tuning condenser are fitted.

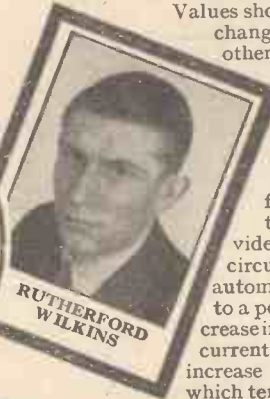
Being earthed, the foil must not make contact with the bracket used for holding the volume control, or this will be short-circuited. Then again, the oscillator condenser is connected in the anode circuit of the oscillator valve. If this should touch the metal foil the oscillator would not work.

It is very necessary to be careful that no other contacts or contact screens, such as those in the valve holders, touch the foil. Every part must be looked over before it is used to see that any contacts having screens are tight.

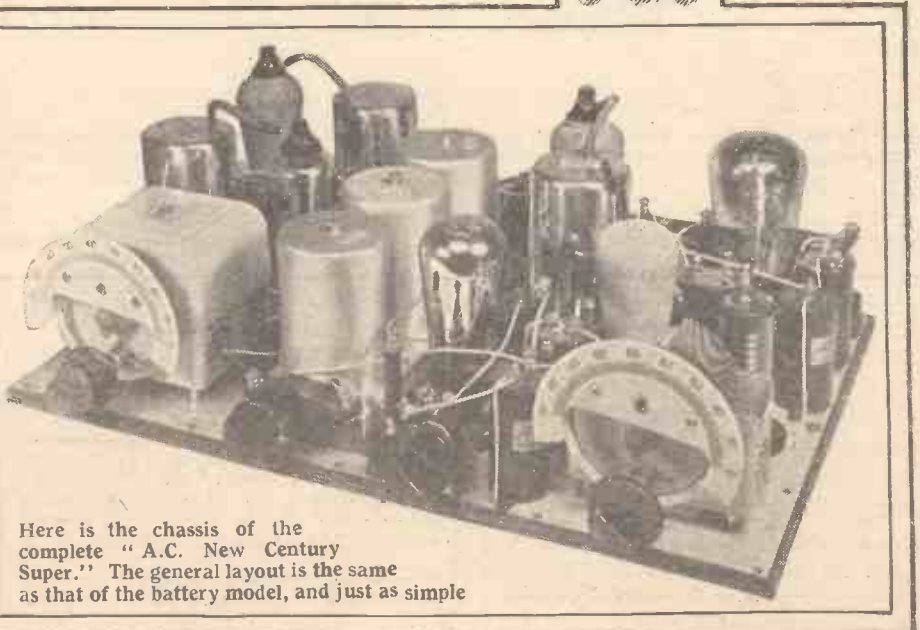
Parts having terminals should also be examined, and it is easier to tighten a loose part before it is



AMES



RUTHERFORD WILKINS



Here is the chassis of the complete "A.C. New Century Super." The general layout is the same as that of the battery model, and just as simple

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POWER UNIT**

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"THE A.C. NEW CENTURY SUPER" (Continued from page 1246)

the set. A description of this will be given next week.

The reproduction of the wiring diagram shown here will interest intending constructors, but it should be borne in mind that a full-size blueprint can be obtained, price 1s. 6d. post free, from these offices. This is a great help in construction, and will undoubtedly appeal to the man who wants to simplify his set construction as far as possible. The full-size print shows every detail. It gives the component mounting and the wiring. With this before you, you simply cannot make a mistake in the construction or wiring up of the set.

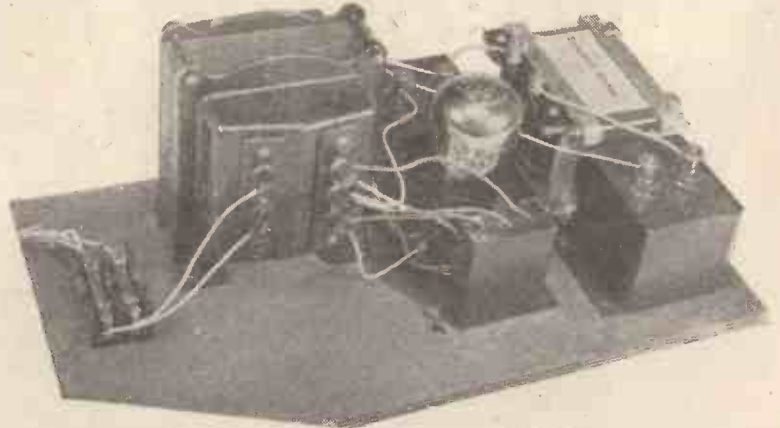
London readers may be interested to know that they can see the set in the Radio Department windows of Messrs. Selfridge and Co., Ltd., Oxford Street, W.1.

Sir Henry Wood is going to Belfast again on December 10 to conduct the Belfast Wireless Symphony Orchestra at a concert in co-operation with the Belfast Corporation, which will be relayed from the Ulster Hall.

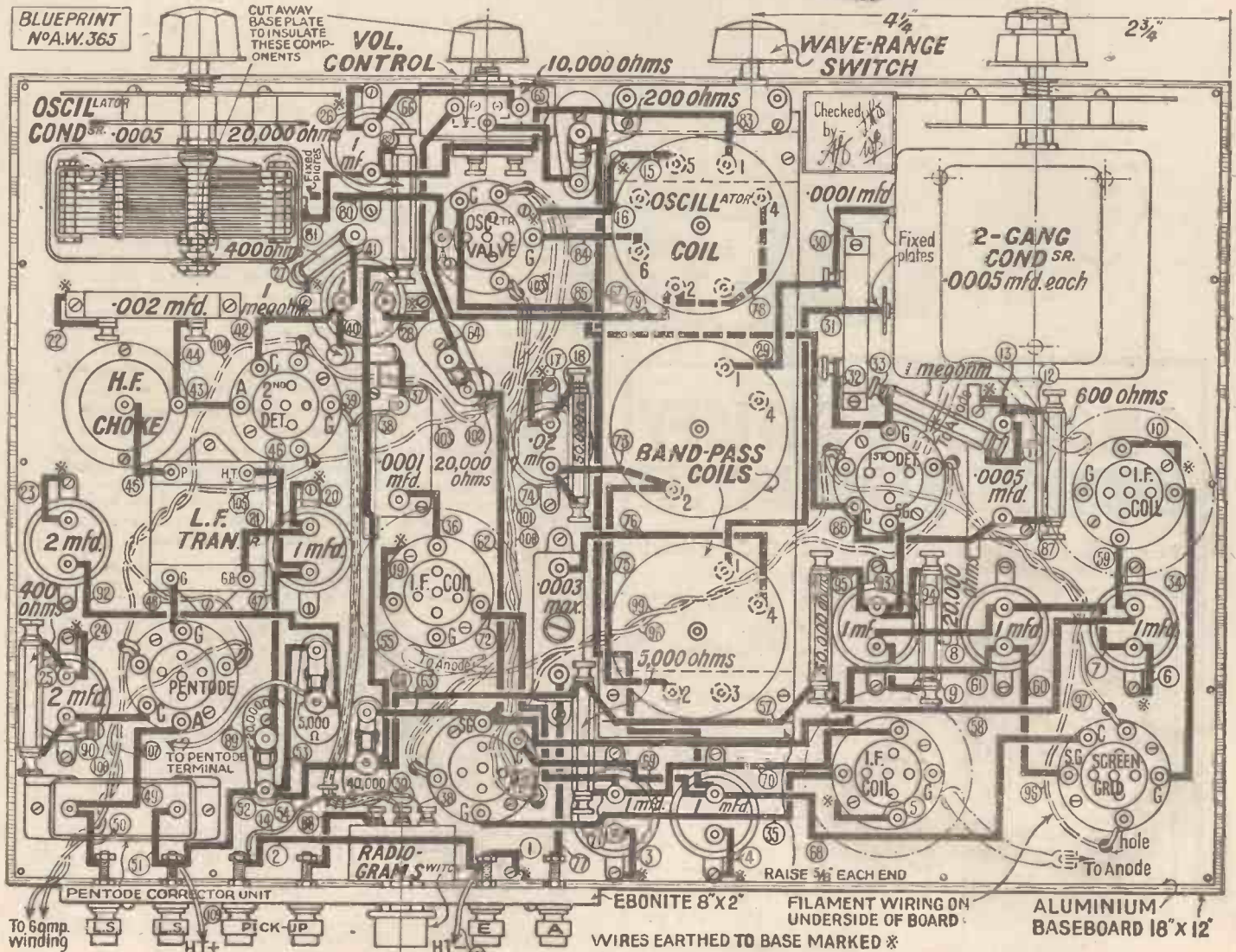
A concert of quiet music, entitled "At Eventide," will be relayed from the Central Hall, Bristol, on December 10.

Anna Meakin will sing a number of her own syncopated songs in the vaudeville programme on December 6.

The mains section, which is connected up to the receiver, and the construction of which will be described



The Birmingham Catholic Choir, conducted by the Rev. Robert Eaton, will give a concert at the Birmingham Town Hall on December 5.



A reproduction of the full-size blueprint of the "A.C. New Century Super." The print can be obtained, price 1s. 6d., post free

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# GREETINGS TO BROADCASTING HOUSE

by  
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JACK AND  
CLAUDE  
HULBERT



DR  
ADRIAN  
BOULT



To the DIRECTOR GENERAL we send our greetings and a bouquet.

To the CONDUCTOR of the B.B.C. Dance Band we offer our congratulations to a combination that is definitely "Hall-marked"!

To the HULBERT BROTHERS we merely say "Chin-chin"!

To CHRISTOPHER STONE we send best wishes for another "record" year!

To PHILIP RIDGEWAY—well, we have already "parade" for him!

To the Director of Programmes, ROGER ECKERSLEY, we offer the choice of two evils, Regional or National!

To the O.B. STAFF we send greetings and best wishes because they certainly all put themselves out for us!

To DENNIS FREEMAN of the Vaudeville Department we send many happy re-returns!

To Dr. ADRIAN BOULT, best wishes and a "Boulton from the Blues"!

To ARTHUR PRINCE, JOHNSON CLARK and CORAM the hope that nothing pre-vents their further appearances.

To the EFFECTS STUDIO we send a coconut, the shell of which is to be used in future for galloping horses!

To STAINLESS STEPHEN we award, without a quaver, many unquestionable marks!

To the ENGINEERS, all the best and may they continue to make things hum!

To HARRY HEMSLEY the wish that he will still "Kid" us in future programmes!

To JOHN (Songs from the Shows) WATT, we send greetings full of gaiety!

To CLAPHAM and DWYER a spot of something other than bother!

To the WHOLE STAFF of Broadcasting House we send crackers so that they may continue to "pull together."



RIDGEWAY  
PARADES.



STAINLESS  
STEPHEN



CLAPHAM  
AND  
DWYER



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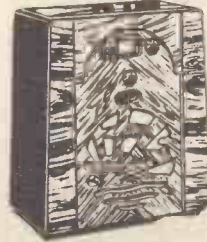
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CABINET MODEL Complete with Lissen Speaker and Lissen S.G., Detector and Pentode Valves. Cash Price £6/5/0. Carriage Paid. Balance in 11 monthly payments of 11/6.

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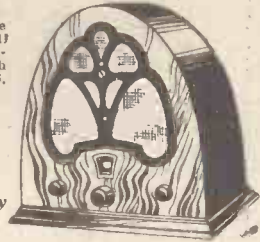
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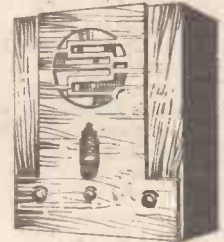
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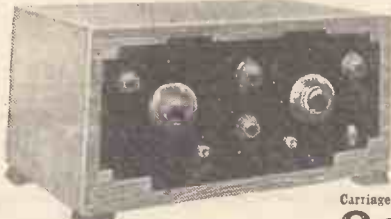


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# The Best Records of the Year

THERE has been such a heavy crop of really good records this year, that it would be safe to say that the following selections are some of the best. At any rate, if you choose any from their particular classifications, I am sure you will thoroughly enjoy them: they are all "hand picked," as the gardeners say.

## ORCHESTRAL—Classical

There are several orchestral works and concertos which have justly earned a place here, but I am confining the selections to those pieces contained on one or, at most, two records. Few of the following are newly recorded, but their mention indicates high merit.

The early part of the year saw two fine performances by the Amsterdam Concertgebouw Orchestra under Mengelberg—*The Funeral March, Götterdämmerung* (Columbia LX156, 6s.) and *Euryanthe Overture* (Columbia LX157, 6s.). Each is really magnificent music, grandly played. Then *Finlandia*, on H.M.V. DB-1584, by the Philadelphia P.O. gave everyone a new liking for this favourite. *Alla Marcia and Intermezzo from the Karelia Suite* (Columbia DX307, 4s.) is well worth hearing, especially the first. Everybody likes—even the lowbrow—something or other of Wagner. Then everybody should hear *Tannhäuser March* and *Prelude to Act 3, Lohengrin* on H.M.V. DB1557, 6s. The Chicago S.O. give a really great performance.

A modest little record with distinct merit is Ponchelli's *Dance of the Hours* (Stern 892, 1s. 6d.). Perhaps two of the "loveliest" of this year's records are the two Grieg Elegiacs—*The Last Spring*, and *Heart Aches* (Columbia LX168, 6s.). These are the most haunting of pieces one may hear. They are by the Concertgebouw Orchestra of Amsterdam. Then back to Wagner: the *Tannhäuser Overture* (Columbia LX170-1, 12s.). Only the latest performance, of course, but really a very fine one. We must find a Bach. Try the *Brandenburg Concerto No. 3 in G Major* (H.M.V. DA 1252-60, 8s.). Here is a lively, bubbling concoction of sheer musical good nature.

## ORCHESTRAL—Light

There has been so much good light orchestral music, that selection of the best is not easy. I am sure these will all be liked:

*Malaguena* and *Abandonado Waltzes* (H.M.V. C2235, 4s.) are two sparkling Spanish numbers which are quite well known. Then to Russia with Albert Sandler's Orchestra: *Souvenir d'Ukraine* and *Black Eyes* (Columbia DB752, 2s. 6d.) are splendidly played "tea-time" pieces. In the same class are *Rose Mousse* and *My Dream* (Columbia DB746, 2s. 6d.). Perfectly simple tunes that you play over and over again. An entirely new one is *Beautiful Galatea* (Panachord 9006,



Yehudi Menuhin

2s. 6d.). This piece of Suppé is quite well played and has some attractive passages.

Here is an old friend, *Petite Suite de Concert*, on H.M.V. C2372-3, 8s. This is a safe "buy," I am sure. Full of understandable melody all through and splendidly played by the L.S.O. Two quite attractive records are *Delirien* and *O Beautiful Maytime* (Decca F2921, 1s. 6d.) and *Il est Charmant* and *A Nous La Liberté* (Decca F2950, 1s. 6d.). Here are Strauss and modern talkie music well rendered. Similarly good is *Love and Life in Vienna* and *Vienna, City of My Dreams* (Stern 981, 1s. 6d.), by Mantovani's Tipica Orchestra, who are well known to listeners. Do not miss the very delightful *Spanish Romance* and *Nun's Chorus from Casanova* (H.M.V. C2435, 4s.). The second title is vocal German, but the record is exceptionally good.

*Eric Coates' Meadow to Mayfair Suite* (H.M.V. C2448-9, 8s.) is a real delight. Here is such English light music as will make one, positively shout for more. Then the London Palladium Orchestra with all their dash and finish in *Blue Devils March* and *Through Night to Light* (H.M.V. B3894, 2s. 6d.). Here are music-hall overtures which will put everybody in good humour.

## BAND

This category has not yielded many outstanding records. Here are the best: *Silver Trumpets* (Columbia DB714, 2s. 6d.), by the Grenadier Guards, is really good music. *Slavonic Rhapsody, Friedemann* (Columbia DX317, 4s.) shows off the Wireless Military Band to advantage. It will remind you forcibly of the No. 2 Rhapsody of Liszt. I like *The Middy and the Elephant*, on Winner 5124, 1s. 6d.). We hear too little

of the Black Dyke Band, who play these. The Welsh Guards Band are very impressive in *Soldiers' Chorus, Faust*, and *Under the Double Eagle* (Broadcast 3136, 1s. 6d.). The volume of the first is astonishing. And if you liked ragtime and want to hear the jolly war-time tunes again get Debroy Somers' *Dixieland* (Columbia DX360, 4s.). And the Coldstreamers performance of *Americana* (H.M.V. C2335, 4s.) will provide a fitting complement to the previous record.

## DANCE

The ephemeral nature of modern dance music makes selection a risky proceeding, but I think the following may be relied on to give you enjoyment for a longer time than most.

Undoubtedly the pick of the bunch is *Samum*, a classical fox-trot (Zono 6188, 1s. 6d.). I am told it is not a fox-trot, really. Then I wish it were. Just hear it. Mantovani and Orchestra have a good pair (waltz and tango) in *For You, Just You, My Baby* and *Little Romany* (Stern 1021, 1s. 6d.). Another fine similar pair are by Geraldo's Tango Orchestra, *Reginello* and *Rosita* (Columbia CB470, 2s. 6d.).

A very delightful record is that by Ray Noble's Orchestra, *A Brown Bird Singing* and *Bird Songs at Eventide* (H.M.V. B6184, 2s. 6d.). Very jolly is *The Little Toy Soldier* and *Sailin' on the Robert E. Lee* (Imperial 2693, 1s. 3d.). Some youngsters sing the chorus of the first most pleasantly. Entirely first rate is *I Give My Heart* and *Good-Night, Vienna* (Panachord

25219, 1s. 6d.). The first is without vocal. Of the novelty type, I liked *Sir Roger de Coverley* and *Turning of the Tide* (Zono 6126, 1s. 6d.), and old times are recalled by *The Veleta* and *Barn Dance* (Winner 5185). You will like these versions of *Where the Blue of the Night* and *Dancing in the Dark* (Brunswick 1258, 2s. 6d.). And another high light (without those wretched vocals) is *Two Heads in the Moonlight* and *Dancing Notes* (Brunswick 1209, 2s. 6d.).

## INSTRUMENTAL

This section would be very large if space allowed, but here are a few of outstanding merit.

**Pianoforte.**—A fine piano recording, and also a brilliant performance, is *No. 2 Hungarian Rhapsody* (Columbia DX350, 4s.), by Friedman. This is simply astonishing! Then the *No. 10 Rhapsody* (Columbia DX 367, 4s.) runs it close. This is by Ania Dorfmann.

An organ and piano record is a novelty; and here is a fine record: *Naijal Waltz and Polonaise from Mignon* (H.M.V. C2397, 4s.).

**Cinema Organ.**—I am sure everybody who likes this instrument will enjoy *Softly Unawares* and *Les Sylphides*, by Harry Davidson. These are on Winner 5512, 1s. 6d.

**Violin.**—Menuhin plays most beautifully *Campanella, Opus 7 Bis* (Paganini) and *Tzar's Bride* (H.M.V. DB1638, 6/-). The first is a really brilliant piece of work.

**Viola.**—Something quiet and soothing is Lionel Tertis's playing of Mendelssohn's *Songs Without Words* (Nos. 1 and 20) on Columbia DB855, 2s. 6d.

**Cello.**—Here are two glorious records: *The Garden of Sleep* and *The Nightingale and the Rose* (H.M.V. B4095, 2s. 6d.). With all the appeal Beatrice Harrison can give to her instrument. And—*Spanish Dance and Minuet* (Paderewski, Columbia LX158, 6s.). These are by Cassado, who makes no attempt at elaboration.

**Quartet.**—The Lener String Quartet need no introduction. Do hear their beautiful playing of Schumann's *Traumerei* and *Adagio* (from *Bach's Toccata in C Major*) on Columbia DB717, 2s. 6d. This is a real musical treat, and everybody knows the first.

## VOCAL.

To make choice easier, I will divide these records into *Classical* and *Light*. Here again, many must be left out for want of space.

**Classical.**—First, a German tenor—Joseph Schmidt. He sings with tremendous power *Strange Harmony* and *When the Stars were Brightly Shining* (Tosca) on Broadcast 5263. A good record, this. Next, a German soprano, the delightful Elizabeth Schumann. She sings



Harry Davidson



Debroy Somers



Albert Sandler



Maurice Elwin

(Continued on page 1268)



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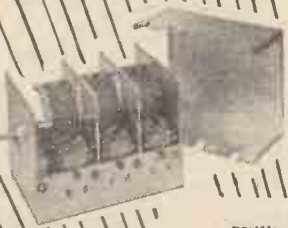


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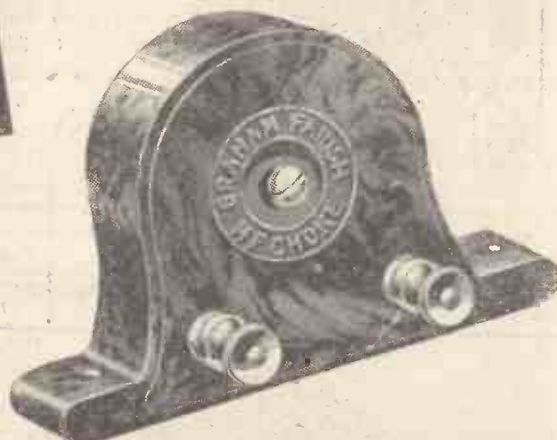


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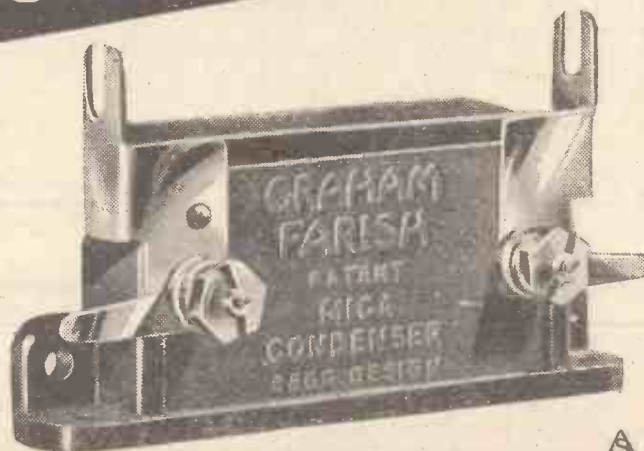
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THE organ at Broadcasting House is only in the chrysalis stage at the moment. Nobody seems to know very much about it beyond the fact that it will be there one day—probably early in the new year—and that it is to be erected behind the grill in the Concert Hall. One of the two consoles will be directly below the grill, as shown in the illustration here.

The builder is to be John Compton, of Willesden, and of cinema-organ fame. Compton's cinema organs are an improvement upon most other types of such instruments in that they seem to contain more solidity. At least, that is how I have come to regard them. The fact that this firm has built some noted church organs will probably be good news to most serious organists.

Even so, I should personally be a little fearful—I hate cinema organs with all my heart—but for the fact that the B.B.C. has asked Dr. W. G. Alcock to act as artistic adviser. That certainly is good news. Dr. Alcock is not a dashing young cinema-organist, but an experienced cathedral organist of the old cathedral school. He will not mind my so describing him; it is the highest compliment I can pay him.

#### No Cheap-toned Stops

So that we need not fear that the instrument will be full of tremulants and general "tripe" in the manner of cheap-toned solo stops. Those of my readers who like cinema-organs will, I hope, forgive me for stating a contrary opinion so definitely when I point out that the fact that the new organ in Broadcasting House is *not* to be of that type will make no difference to them. The usual relays from picture theatres will, no doubt, continue to be broadcast.

I am hoping for something very plain, but very good. I also hope for something not too large. It is not necessary. Old W. T. Best, the famous organist of St. George's Hall, Liverpool, used to say that what he could not play on a three-manual organ with fifty stops he was content to leave unplayed. I understand that mechanically the organ will be first class. The stops are to be small translucent knobs which light up when touched.

An organ for broadcasting should not be



constructed, in my view, in the fashion of an ordinary church organ. When you hear a large instrument in an echoing church, your chief delight is in the grip of the pedals. Half the effect the instrument produces is its power to vibrate, especially in the low notes of the pedals. This vibration is what has always held the hearts of English people. An organ with poor pedal stops is poor indeed.

Unfortunately, this very same effect can only be reproduced by wireless in part. Even supposing you have a very large set and a powerful moving-coil speaker, and even supposing you can reproduce the lowest notes with at least some of their actual vibration, you will hardly find the result satisfactory. Is it reasonable to reproduce a 32-ft. open diapason in your drawing-room?

#### Considering the Receiver

As it is not reasonable to do so, and as the effect is likely to be quite unpleasant, it seems useless to construct an organ at Broadcasting House with "heavy sixteens,"

as we call them. What is wanted is a certain amount of sixteen-foot tone of what is known as the Violone quality. A Violone is a type of stop giving a clear note; it does not throb as much as an open diapason. Therefore it is the type that should be employed mainly for the sixteen-foot tone.

Anything that buzzes or throbs is so much waste of energy; it will not reproduce. I see that the builders will instal plenty of good eight-foot pedal stops. The player should be able to feel he has good pedals beneath him, but he must not expect to have the same feelings as he does when playing an ordinary church or concert organ. After all, the only thing that matters in the slightest is the effect broadcast.

On the other hand, if the pedals sound weak or without depth and the manual stops are brilliant, the organ will sound unbalanced. As the pedals cannot be deepened, the manuals should be machined down, especially the 4-ft. and 2-ft. stops. That is why I think it unwise to have too large an organ for broadcasting purposes. It would be hopeless to have a lop-sided affair, all top and no foundation.

Provided the right instrument is built, an organ at Broadcasting House is going to have many advantages over the church organs now relayed. The first naturally arises out of the splendid acoustics of the concert hall. The reverberation period is given as 1.75 secs. There are very few churches in England whose acoustics are so ideal. The length of the concert hall at Broadcasting House is 106 ft., its width 42 ft., and its height 31 ft. The cubic capacity, by the way, is 125,000 ft. Let us hope that the new organ will contain fine, round diapason and sonorous reeds, not on too heavy pressure. Anything that sounds overblown will be to the detriment of the instrument when broadcast. Microphones are knowing things, seemingly. The best results are only obtainable from the most suitable material.

Finally, I hope sincerely that cinema organists will not be asked to broadcast unless they undertake to play in a dignified fashion and without excessive use of the tremulant.

WHITAKER-WILSON.

#### DO YOU KNOW—

THAT in some super-hets noisy working is caused through faulty valve pins on the plug-in type I.F. coils? These valve socket-type connections should have the pins at the base opened a trifle to get a good contact.

THAT you can sometimes improve the working of a set with a wooden panel (where terminals are mounted on it) by using ebonite bushes on the metal parts, which would otherwise come in contact with the wood?

THAT some screen-grid valves pass as much as 4 and 5 milliamperes of H.T. current and more than the usual .9 volts grid bias is sometimes needed to keep the current down? Other valves with a very high impedance may distort if any negative bias is used on the grid.

THAT you should check up the oscillator anode voltage: if a super-het does not tune properly and appears to give a large number of harmonics?

THAT you should scrap a solid-dielectric reaction condenser in which there is end play or loose movement in the bearings? Any movement here means that the capacity can be varied when the knob is shaken up and down, and not rotated!

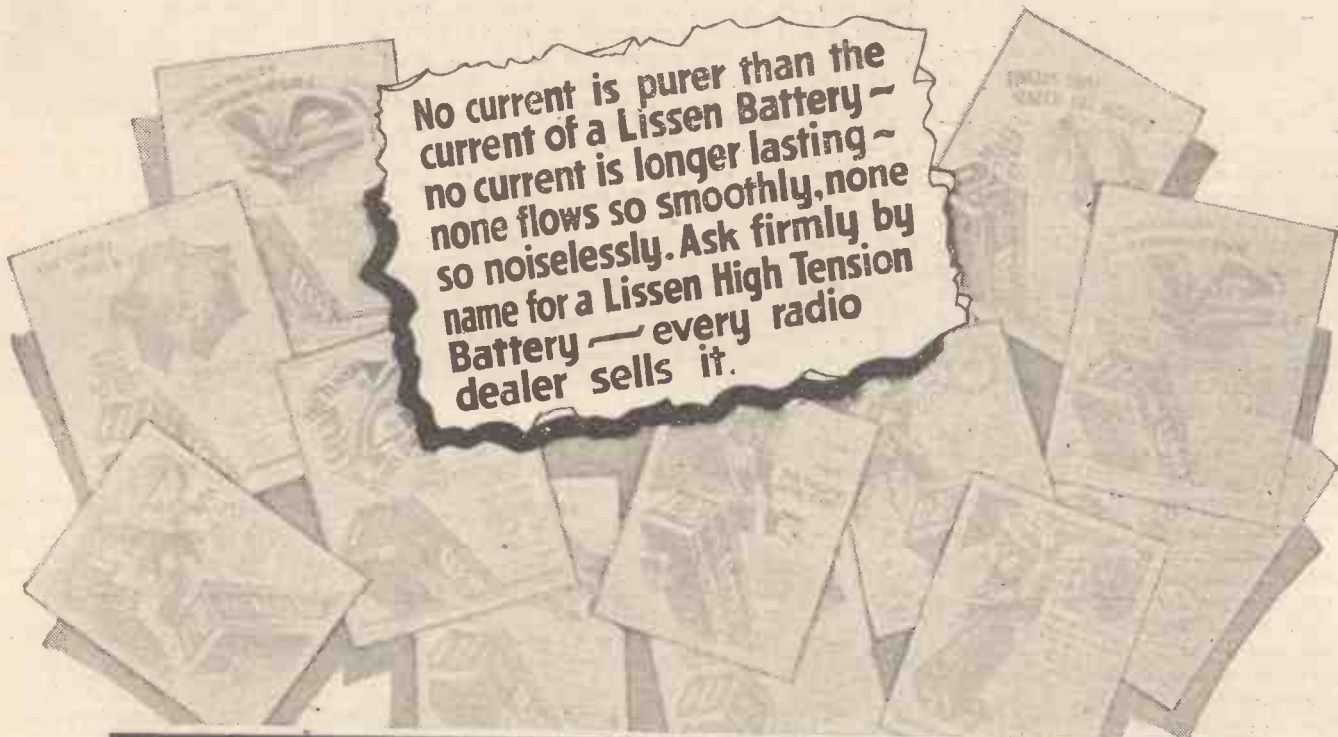
THAT vibration in an ordinary cone speaker can sometimes be checked by slipping a length of valve rubber over the armature driving rod, or binding an inch of adhesive tape round it? This prevents resonance.



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### Battery Testing—a Hint

**SIR**,—My recent experience may be of interest and use to readers of your valuable paper.

Late one night I decided to give my four-valver consumption and batteries a quick test with a meter.

The speaker, set, and batteries are all together in a cabinet. First I tested the H.T. voltage while under load. The meter read 40 volts, yet both battery and meter were in good order, the battery being only ten days old. I immediately tested the consumption, expecting a first-class shock (not electric!). I got it. The meter read 3 milliamperes. The set, however, was performing splendidly and the quality was quite good. I switched off, deciding to go into the matter thoroughly on the next evening.

The next evening I tested the set in the same way and the H.T. voltage now read 135 and consumption 18 milliamperes! Yet the L.T. voltage showed  $1\frac{1}{4}$  volts.

Moreover, when I moved the meter the readings varied. Then it came to me. The loud-speaker magnet was affecting the needle of the meter and I found that on the different occasions that I tested the set I did so when holding the meter on different sides of the L.S. unit. The unit is an Ormond 12s. 6d. unit and the needle was affected when held as much as 6 to 7 in. away. G. F. (Bromley).

### S.G. or Variable-mu?

**SIR**,—If H. S. is thinking of using two screen-grid valves in his set, my advice to him is to buy variable-mu's.

I have recently changed over, and consider that the slight loss of sensitivity is amply repaid by the advantages accruing from the change. Incidentally, from makers' figures recently published, it would appear that the newer variable-mu's will be quite as efficient as ordinary screen-grid valves.

At Crouch End, which is some ten miles from Brookmans Park, I have had to use a variable condenser in the aerial lead and at the same time cut down the volts on the screening grid of an ordinary S.G. valve, in order to prevent detector overloading. There were two disadvantages here, because a proportion of high notes were lost through excessively sharp tuning and cross modulation was introduced if the screening volts were cut down too much.

Now by using a variable-mu valve and biasing at  $-18$  volts, the locals can be

# What Our Readers Think

*The Editor does not necessarily agree with the views expressed by readers and does not accept responsibility for the letters published. Letters cannot be published which do not bear the sender's full name and address*



reduced to comfortable strength without loss of quality, and even with four valves further volume control is not necessary for the radio side.

One further advantage, at any rate for battery users, is that when listening to the locals the current consumption of the variable-mu valves is cut by just over half.

B. D. W. (London, N.).

### Unintentional Pirates

**SIR**,—Re W. A. J.'s comments on unintentional pirates, may I point out that the renewal card is not essential when applying for a licence at a post office? It is desirable that the card should be submitted for record purposes, but no post office clerk under ordinary circumstances would refuse to issue a licence in the absence of the same.

W. A. J.'s acquaintance should write to his local postmaster informing him of his experiences. H. S. E. (Bournemouth).

### The "Wizard"

**SIR**,—Having purchased the "Wizard" kit from the Direct Radio, Ltd., I have the greatest pleasure in writing to you giving the results I have had with this truly magical three-valver. I have built several AMATEUR WIRELESS and "Wireless Magazine" sets, but I must say that for a three-valve set this one takes top score.

I have already logged thirty-seven stations at good loud-speaker reproduction.

This morning I was listening in to the ever-popular Fécamps programme from Radio Normandie until 1 a.m., and at 1.30 I tried for a Yank and, to my surprise, I tuned in an American station on about 270 metres, with an excellent loud-speaker volume. D. R. (Swansea).

P.S.—I have started building your "New Century Super," hoping for further success.

### Cabinet Design

**SIR**,—It is my contention that the makers of cabinets for wireless and radio-gramophone sets are wrong in their designing. Most of these cabinets have the aperture for the speaker from the middle of the cabinet downwards. This, I contend, is too low. I think it has been agreed that the best position for a speaker is the level of the ear and as most people will listen whilst sitting, the height will vary from about 2 ft. 6 in. to 4 ft. 6 in., according to the height of the seat and, of course, the height and position of the listener.

H. S. (Heywood).

The Editor invites letters from readers on all interesting radio subjects. For the most interesting letter published each week a general-purpose valve or other component to the same value will be given.

### The New Patents Act

**SIR**,—W. T. falls into the very pitfall which I pointed out. The official search is *not* extended; the only statutory searching instructions to the examiners are contained in Sections 7 and 8 (limited to British specifications), as of old. The new provision is Section 7 (5), which authorises the citation of any other document "within the knowledge of the Comptroller." Whether the examiner searches further or not is beside the point; he *need not* and it may be (under the Act) that he ought not, but the area wherein he *must* search is unaltered.

Regarding the comparative value of British patents, this is, of course, mere opinion. I quote from the Report of the Departmental Committee which proposed the present changes in the law:

"It was pointed out that . . . patents granted in these countries (e.g., Germany and United States) were said to have a higher reputation . . . than British patents and to offer a better security to those financially interested or invited to assist in their development."

And the witnesses who pointed this out were all experts, authorities, and knowledgeable men. E. C. A. (London, W.C.).

### "RADIO OF TO-MORROW"

(Continued from page 1230b)

additional light projected on to the image on the cathode-ray tube and throw this back through a lens on to the screen. In this way the light building up the image in the first place is only quite small and easily controllable, while we use a much more powerful local source of light to project the image."

"But where is the screen?" I asked.

"This sheet of glass," he replied, "is what we use for the purpose. It gives us stereoscopic vision or at any rate a very good approach to it and at the same time avoids flicker and produces the illusion that the characters are actually in the room with you."

"You mean that every set now has television?" I asked.

"Good gracious, yes. We haven't made a purely radio set for goodness knows how long now. However, it really is high time I heard some of your news. Come along and sample some of this punch."

Lincolnshire Week closes with an outside broadcast of unusual interest: the dedication of the fourteen bells in Boston Stump, the highest church tower in England, on December 17. The old custom of lighting the lantern will also be remembered.



# LISSEN FIXED CONDENSERS AND GRID LEAKS

LISSEN LIMITED, WORPLE RD., ISLEWORTH, MIDDLESEX

*Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention*

## SETS OF THE SEASON

# VARLEY SQUARE-PEAK SUPER-HET



IF you want to hear how a really well-designed super-het works you could hardly do better than to try out the new Varley Square-Peaker, which is one of the most interesting examples of modern super-het practice I have examined this season.

In a season full of good sets the Varley is outstanding. See it in a shop window and you will be drawn to its artistic cabinet. Take it home and you will be amazed at the way it brings in the stations.

### Fine Appearance

I would like to stress the handsome appearance of this set. It really is a



Fine lines distinguish the walnut cabinet of the Varley Square-Peak Super-het Set, of which this is a back view

superior job. Do not overlook the cabinet work when you are comparing the price of the Varley Super-Het with less expensive models. You are paying for good furniture as well as for a good set.

The figured walnut cabinet is admirably proportioned. On the small side, perhaps, but an excellent example of the midget tendency. The base is about 13 inches by 11 inches and the height is about 16 inches.

The top of the cabinet is tapered, pyramid fashion. As I say, for sheer lines this set's cabinet is delightful.

In the top of the cabinet is a drop-fitting handle, so that while it is hidden from view when operating the set, it serves as a handy means of transporting the set from room to room.

The front of the Varley Square-Peak Super-Het has a very pleasing layout for

the controls. What strikes you at once is the unique escutcheon device for the tuning. You actually move the escutcheon up and down.

The act of pulling down the escutcheon uncovers the long-wave calibrations and at the same time covers up the medium-wave stations. When you pull up this device the medium-wave stations come into view and the long-wavers are hidden.

This ingenious and very effective device really works the wave-change switch, so that whichever position you set the escutcheon, you get calibrations to correspond to the wave band to which the tuning circuits have been switched.

### Station Calibration

The tuning scale is marked in stations and in degrees. This contempt of mere wavelengths is a little curious. It would have been better, I think, to have given wavelengths instead of degrees, seeing that there is no guarantee the stations as now marked will stay on their present wavelengths.

Still, I must say the station markings are very accurate indeed. No less than sixty stations are marked on the medium-wave section, and during an evening's test every one of them came through on the loud-speaker, mostly at full strength. Twenty long-wave stations are marked and most of these could be tuned in at fine strength.

I specially commend the wide tuning ranges of this set. Medium waves go from Newcastle on 211.3 metres up to beyond Budapest. On long waves the range extends from Heston Airport's, 830 metres up to Kaunas above Huizen.

Three simple knobs form the controls. One is for tuning, another for switching on-and-off the mains, and the third is for volume control.

### A Modern Super-Het

Inside the set is a five-valve super-het chassis with a circuit of very advanced design. There is an input screen-grid valve, a pentode combined first detector and oscillator, an intermediate screen-grid stage, a second detector, a pentode power output and a valve rectifier for the mains. The screen-grids are of the variable-mu type.

A neat metal chassis occupies the lower section of the cabinet. A marvel of compactness, this. Above is the energised moving-coil loud-speaker.

All you need externally is an aerial and an earth. If you want to add an external loud-speaker there are sockets provided. And for a gramophone pick-up.

*My Tests.*—They prove beyond doubt that this is one of the finest super-hets yet designed in this country. The designer's advanced technique is amply justified.

The quality, always a moot point with super-hets, is in this Varley model exemplary. Although the cabinet is so small there is no boominess. No noticeable high-note cutting in this set. From that point of view you would not know it was a super-het set.

### Wonderful Selectivity

Selectivity? Gets Mühlacker clear of London and separates adjacent giants of the ether without any juggling of controls. In fact with only one knob for tuning and one for volume you could hardly go wrong.

I must tell you I got Algiers just above Mühlacker—a station I rarely hear owing to adjacent-station swamping. All sorts of odd stations I had almost forgotten came romping in during the tests.

### BRIEF SPECIFICATION

**Makers:** Varley, Ltd.

**Price:** £27 6s. od.

**Valve Combination:** Five-valve super-het sequence with pentode for combined first detector and oscillator. Separate valve for mains rectification.

**Power Supply:** A.C. mains.

**Controls:** Single knob for tuning, knob for reaction, knob for mains on-off and special moving escutcheon for wave-changing.

**Type:** Table-cabinet set needing only external aerial and earth to complete installation.

**Remarks:** One of the finest table super-hets on the market.

On long waves the selectivity is above the average. Zeesen was absolutely clear of Daventry and Lahti—another station I seldom hear—came in surprisingly well between Zeesen and Huizen.

Finally, I should like to say how much I have enjoyed trying out this super-het, which, in my opinion, is a great triumph technically and a great joy artistically. An ideal Christmas present!

SET TESTER.

# READY RADIO KITS CATER FOR EVERY CONSTRUCTOR

## READY RADIO

### S. T. 400

Complete Kit,

**£4:17:6**

Or deposit of 9/6 and 11 monthly payments of 9/9

#### MODEL A

Complete Kit, with four specified valves and beautiful walnut cabinet fitted with moving-coil speaker, **£10 . 10 . 0**

Or deposit of 20/- and 11 monthly payments of 21/-

#### MODEL B

Complete Kit, with four specified valves, **£6 . 16 . 9**

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**BUILT IN THREE HOURS  
TWENTY MINUTES**

A new four-valve set which will give you over one hundred programmes—more than fifty at “local” strength. Amazing selectivity and sensitivity; wonderfully fascinating to build and operate. You must build it.

*Full-size blueprint and complete instructions free with every kit.*

## READY RADIO

### “METEOR S.G.3”

Complete Kit,

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Or 9 monthly payments of 9/9

#### MODEL A

Complete Kit, with set of three Mullard valves and beautiful walnut cabinet fitted with permanent magnet moving-coil speaker, **£8 . 17 . 6**

Or 12 monthly payments of 17/-

#### MODEL B

Complete Kit, with set of three Mullard valves (metallic screened grid, detector, and power), **£5 . 7 . 6**

Or 10 monthly payments of 12/6. (A pentode may be used if desired, 8/9 extra.)



**BUILT IN TWO HOURS  
TWENTY MINUTES**

The only kit set to give you all the wonderful features of the S.T.300 plus the additional advantage of ultra-short-wave reception of stations in all parts of the world. Super-sharp selectivity; huge volume; a minimum of thirty stations guaranteed. Moving-coil reproduction.

*Very easy to build. Full instructions, diagrams, and photo-plans with every kit.*

## READY RADIO

### “THREE-O-THREE”

Complete Kit,

**£2:7:3**

Or deposit of 9/6 and 5 monthly payments of 9/-

#### MODEL A

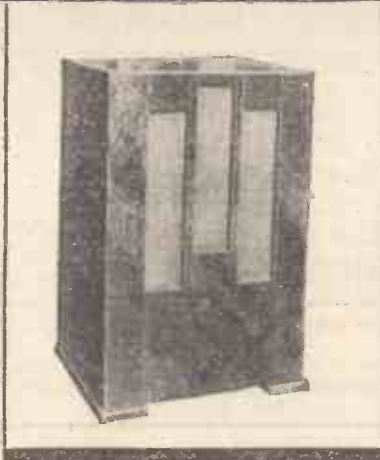
Complete Kit, with set of three Mullard valves and beautiful walnut cabinet fitted with permanent magnet moving-coil speaker, **£6 . 17 . 6**

Or 10 monthly payments of 16/-

#### MODEL B

Complete Kit, with set of three Mullard valves, **£3 . 10 . 0**

Or 7 monthly payments of 11/9



**BUILT IN TWENTY MINUTES**

The most efficient type of detector-two L.F. set. Remarkably selective and sensitive, giving an excellent choice of home and foreign programmes with superb moving-coil quality. Incorporates the unique Ready Radio dual-range coil, fitted with four-in-one control (on-off, wavechange, selectivity, and volume control all operated by one knob). Only five components to mount and five wires to connect—you will build it in twenty minutes.

*Full instructions, diagrams, and photo-plans with every kit.*

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# READY RADIO

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Telephone: Lee Green 5678. Telegrams: Readirod, Blackvil, London.

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Please send me full details of your Kits and tell me about your Registered Users' Scheme. I enclose 1½d. stamp to cover postage.

NAME .....

ADDRESS .....

A.W.16-

Mention of “Amateur Wireless” to Advertisers will Ensure Prompt Attention

## USING A MAINS H.T. UNIT WITH THE "NEW CENTURY SUPER"

QUITE a large number of readers who have assembled the "New Century Super" are asking for details of the correct procedure for operating this highly popular set from H.T. mains units.

It is therefore proposed in these notes to describe how it is possible to "common" certain of the H.T. terminal supplies on the receiver so that several H.T. terminal points may be fed from a single mains-unit output terminal. Thus mains units having only, say, three output terminals may be used to feed the five terminal points of the receiver.

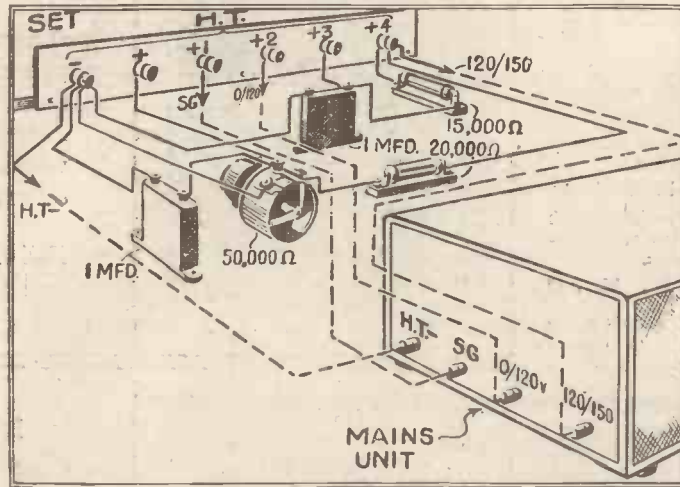
A study of the theoretical circuit will show that by the use of fixed or variable resistances, the power tapping of any mains unit can be called upon to supply current to the intermediate H.T. positive points of the set which do not require a large current.

For instance, there is no reason why H.T.+3 should not be fed from the same point as H.T.+4; provided a 10,000 or 15,000-ohms resistance be connected between the two points. Either of these resistances will be suitable to give the required voltage drop between the potential applied to the anode and that actually required for the auxiliary grid of the pentode.

If a resistance is incorporated between these two points, it will be necessary to connect a 1-microfarad condenser between the auxiliary grid terminal on the valve-holder and the negative H.T. terminal of the set to stabilise the voltage.

The foregoing modification, however, only eliminates one of the excess H.T. terminal points on the set. There is still another to be dispensed with before it will be possible to make use of a three-output terminal mains unit.

Referring back once more to the theoretical circuit, and visualising what are the theoretical requirements of the various valves, it would seem that H.T.+ (without a numerical indicat-



This diagram shows how it is possible to "common" some of the H.T. terminals of the "New Century Super" by the use of resistances

ing figure) is the terminal point which should now receive consideration.

This terminal point feeds the first-detector valve screening-grid. If we are to get best possible reception, we must make our first detector extremely sensitive.

A variable voltage supply to this point will certainly tend to make for maximum sensitivity in the first detector valve and, the current requirements at this point being small, no great drain will be thrown on to the maximum power tapping of the mains unit by adding this extra point to it.

The simplest way to accomplish what is required is to connect a high-resistance potentiometer between maximum H.T.+ and H.T.—

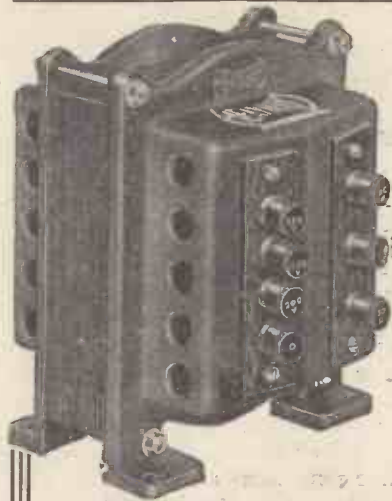
Constructors who are out for the very bare essentials could adopt the suggestion as it stands, but it is safer to fit a fixed resistance of about 20,000 ohms in series between the positive H.T. feed lead and the positive end of the potentiometer.

A practical wiring plan modification is given here which will be of assistance in understanding the foregoing explanation.

Just one final word: whatever make or type of mains unit is employed, it must be one capable of delivering at least 20 milliamperes at 120 to 150 volts.

A first musical play by the Hon. John Weir will be broadcast on December 13 (National) (Regional). It is called *Busman's Holiday*.

A special feature of the Midland Regional Studio Orchestra's concert, on December 16 is Mark Brewer's "The Linnet's Parade."



### SPECIFICATION 717 TRANSFORMER

Soundly constructed with special metal end plates protecting the core. Insulated terminals. Strongly clamped laminations. Extremely good voltage regulation with negligible temperature rise.

**SECONDARY OUTPUTS**  
250+250 volts. 60 ma.  
2+2 volts. 6 amps.  
2+2 volts. 1 amp.

PRICE ... .. 34/-

## EXCLUSIVELY CHOSEN FOR THE "NEW A.C. CENTURY SUPER"

HEYBERD MAINS TRANSFORMER has again been chosen by the Technical Experts of "Amateur Wireless"—specified exclusively for the A.C. version of the "New Century Super." Convincing evidence of their confidence in Heyberd mains apparatus is shown in their choice of the Model 717 Transformer for the most important set of the year. Heyberd have specially designed this Transformer to the specification of "Amateur Wireless" Technicians. You can, therefore, be fully confident that your Transformer will supply the exact amount of power required by the "New Century Super." Remember, when you buy Heyberd Transformers you buy components designed by leading radio engineers, manufactured by skilled British workmen from the finest British materials. Transformers are thoroughly tested at every stage of production—and GUARANTEED.



**PLEASE NOTE.** Hundreds of Heyberd 717 Mains Transformers have been manufactured in anticipation of the demand, and immediate delivery can be given from stock. It is advisable, however, to place your order early.

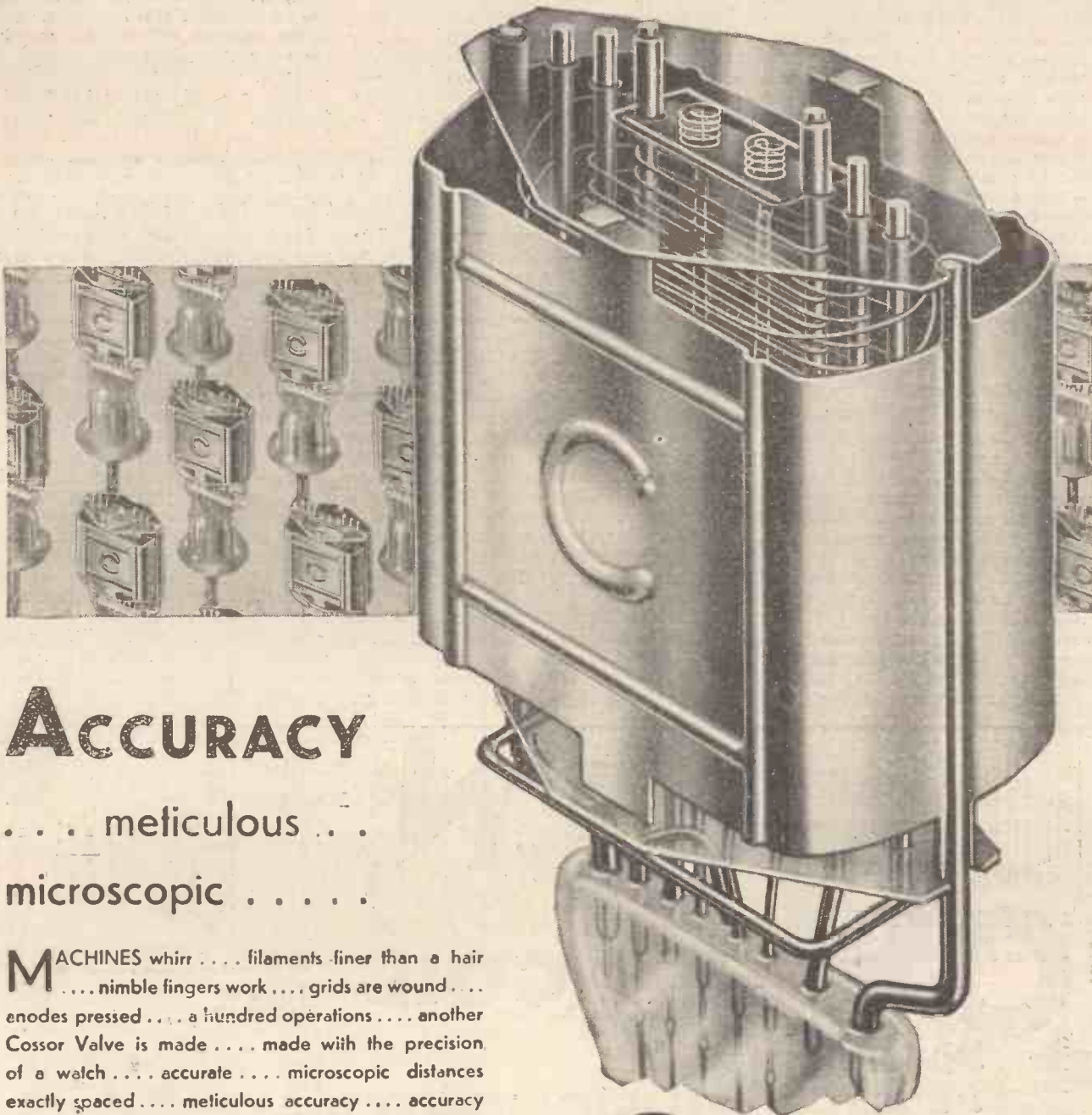
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# COSSOR VALVES

To A. C. COSSOR LTD., Melody Dept., Highbury Grove, London, N.5.

Please send me, free of charge, a copy of the 40-page Cossor Valve and Wireless Book B.17.

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A.W. 3, 12/32

Send for a free copy of the 40-page Cossor Valve and Wireless Book which contains a wealth of interesting and useful information including Radio Definitions—Useful Circuits—List of Stations, etc., etc. Please use the Coupon.

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

Mention of "Amateur Wireles:" to Advertisers will Ensure Prompt Attention

**"THE ETHER MUSIC TWO"***(Continued from page 1220)*

so that if you have not the first-mentioned parts at hand you will know which alternatives it is safe to buy. Recommended accessories are given, so that you will know what battery and mains supplies and speaker are suitable for the "Ether Music Two." The components are listed under separate headings so that you can see at a glance if you have any old parts on hand which will do, and so that you do not have to delve into technicalities when ordering new parts. Of course, there are a number of complete kits of parts which can be bought for this new "A.W." "star" set.

*A full-size blueprint for the "Ether Music Two" can be obtained for one shilling, post free, from the Blueprint Department, "Amateur Wireless," 58-61 Fetter Lane, London, E.C.4.*

**Starting the Construction**

Take the panel first. The holes have to be drilled for the three-panel components, for the wood screws along the lower edge and, of course, for the full-scale window.

If you are an expert with a hacksaw you will find that it takes only a few minutes to cut the necessary rectangular hole, using the template as a guide.

Another good plan is to mark the lines of the hole to be cut, to drill a number of small holes close together and to knock out the centre of the rectangle thus formed. The edges of the hole can afterwards be smoothed out with a flat file. The holes for the wavechange switch, reaction condenser

and main condenser shafts present no difficulty. They are made with an ordinary drill and bit. The three small holes for the wood screws are made in the same way.

In some kits the ebonite strip for the pick-up and aerial and earth terminals and radiogram switch is supplied ready drilled, but you can easily cut this from a strip of ebonite and drill the seven small holes needed. If an ordinary terminal block is used for the loud-speaker terminals, there will be no need to do any further ebonite drilling.

**Mount the Parts**

Mount the panel components first. The window for the full-scale condenser dial is easily mounted. The escutcheon plate in the front will hide any small defects in your ebonite handiwork! The glass is mounted at the back.

The condenser itself, which is operated by the special slow-motion control, is mounted on a small block of wood which raises it a small distance from the baseboard and brings the operating knob up to a suitable height. If necessary, packing should be put underneath the condenser so that the control shaft does not rub against the panel, but passes freely through the hole. There is no reason why the hole for this shaft should not be quite big, as it is, in any case, hidden by the control knob.

Fix the switch and reaction condenser to the panel when you are satisfied about the mounting of the main condenser.

**The full-size blueprint is an invaluable guide when you come to this stage**

**in the construction.** Of course, you can scale off the positions of the screw holes from the reproduction of the blueprint given here, but it is ever so much easier if you have the full-size blueprint, which can be put flat down on the baseboard, and the holes for the component fixings pricked through.

There are only eleven baseboard parts to mount, altogether. When you have finished this job, the set will look virtually complete. There is only the wiring to be done.

**The Wiring—It's Easy!**

If you have never built a set before, you may be a little afraid of the next constructional job, the wiring. If this is not your first set, then you will be in a position to appreciate how easy it is in the case of the "Ether Music Two." It really is very straightforward. The main leads between the components are of bare wire enclosed in insulated sleeving. The battery flexes are connected to a number of terminals on the baseboard parts and one battery wire goes to the switch on the panel.

In next week's issue some helpful constructional hints will be given for those enthusiasts who are making up the "Ether Music Two" as their first set and who need a little more detailed advice than can be given in this Special Christmas Number. So don't forget; more about the "Ether Music Two" next week.

*The "Ether Music Two" is on view this week in the Radio Department windows of Messrs. Selfridge & Co., Ltd., Oxford Street, London, W.*

# COLVERN

## T.D. COIL

**Specified for the  
"ETHER MUSIC TWO"**

The Colvern T.D. Coil is completely screened and incorporates tapped aerial coupling and reaction.

Four alternative aerial tapplings are arranged as sockets with a wander plug.

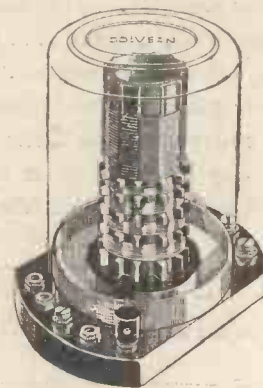
The first two tapplings give aerial couplings similar to those normally employed but with greatly increased selectivity.

Numbers 4 and 5 give a high degree of selectivity with weak aerial coupling suitable for use in a swamp area. There is no break through on the long wave-band from B.B.C. stations.

**Price 8/6**

Suitable for detector L.F. type or screen-grid receivers.

**COLVERN LIMITED, Mawneys Road, Romford, Essex**

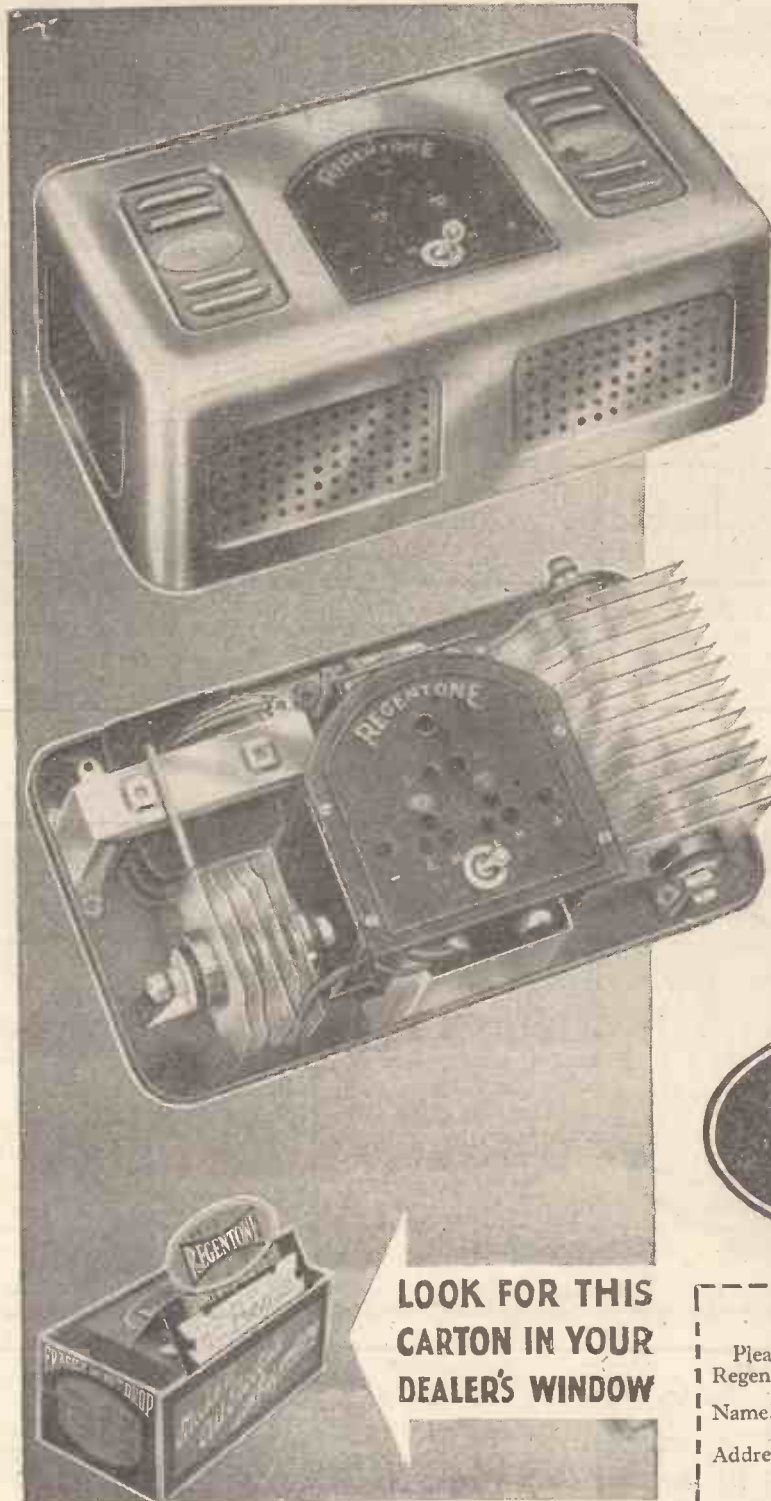


**TYPE T.D.**

Send for the Colvern  
circuit booklet, ★  
R.L. 10.



# A BATTERY SET BECOMES A BETTER SET WHEN ELECTRIFIED WITH REGENTONE



An all-electric receiver is constant in efficiency of output, because the supply of power never varies.

If you have a battery set, a portable, or a battery kit set, why not enjoy the advantages of All-electric Radio in the cheapest way possible?

Join up a REGENTONE Mains Unit in the same manner as a dry battery, connect to the electric supply socket, and your set becomes permanently powered by the mains at a cost not exceeding 6d. per month. Regentone mains units cost from 39/6, or 8/- down.

*They fit inside all portables, A.C. or D.C.*

## STAR FEATURES COMMON TO ALL REGENTONE MAINS UNITS IRRESPECTIVE OF PRICE

- ★ Seven voltage tapings.
- ★ Line voltage output regulator.
- ★ Solid drawn steel case.
- ★ High efficiency smoothing, including 16 mfd. condenser capacity, ensures silent operation under all conditions.



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### FILL IN THIS COUPON NOW

Please send me FREE and POST FREE full details of Regentone Mains Units

Name.....

Address.....

MY PRESENT SET IS ..... A.W.4

*Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention*

**"PARALLEL-FEED PITFALLS"**

(Continued from page 1233)

seen that something very unpleasant is happening.

Fig. 2 shows the usual arrangement, in which the signal from the anode of the first valve passes through the coupling condenser  $C_1$ , and the primary of the transformer, and thereby generates a stepped-up voltage in the secondary. These two voltages are added together and applied to the grid of the second valve.

A greatly amplified current is thus caused to flow in the anode circuit of the second valve, returning by way of the bias resistor. To see more clearly what happens to it then, the important parts of the circuit have been redrawn in Fig. 3.

The first valve is represented by  $R_3$ , about 10,000 ohms, or whatever the valve resistance may be.

The 100,000-ohm resistor has been omitted, because it is so high in comparison that it does very little.  $R_1$  carries the amplified signal current, so may be thought of as a little generator feeding the circuit  $R_3, C_1, C^2$ . All these items are low in impedance compared with the transformer primary, which therefore takes nearly all the voltage that appears across  $R_1$ , steps it up and applies it to the grid. There it competes with the original signal from the first valve, but as it has had a stage of amplification it can hardly be described as fair competition.

If the second valve is of the very steep slope type now obtainable the competition is of the smashing order, and reduces business to about one-fifth normal. Both

current and voltage in the output are reduced to this extent, and as power is the product of both, the output power is one twenty-fifth or 4 per cent. of what it should be. Hence it follows that the remaining 96 per cent. has been lost. *Quod erat demonstrandum.*

That is assuming a valve with a slope of 7.5 milliamps per volt and a transformer step-up of 1 to 4. If these quantities are less the massacre of power is on a less sanguinary scale, but it is serious at the best. If in a moment of brilliant thought the transformer secondary is reversed, or that the fed-back signal *assists* instead so quenches, then the assistance is so hearty

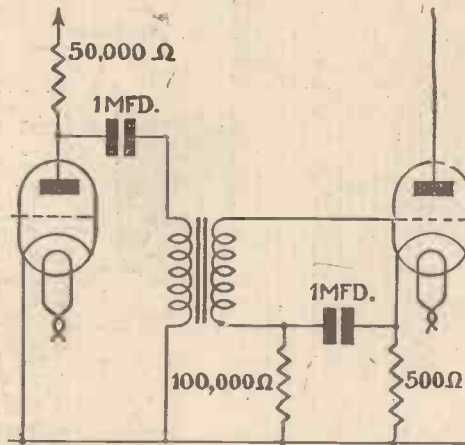


Fig. 4. Most satisfactory system of using parallel-feed coupling with automatic bias. Note the position of the de-coupling resistance

but unrestrained that continuous motor-boating is set up.

Clearly, then, this method is bad.

There are several ways out. One is to revert to Fig. 1 and use a condenser of at least 50 microfarads—electrolytic, of course. That is about the soundest way. Another is to forego the extra bit of amplification that is obtainable by connecting the two transformer windings in series, and to adopt the Fig. 4 circuit. The values shown are typical.

While the possible loss due to unsuitable biasing arrangements has been discussed in connection with the parallel-feed transformer, the same argument applies to ordinary resistance or choke coupling except that there is not the step-up effect of a transformer. But although the loss is thus smaller, the original amplification is smaller, so any loss is all the more to be deplored.

**"IMAGE" FREQUENCIES**

SUPPOSE the intermediate circuits of a super-het are tuned to 100 k.c. Then for a given setting of the local oscillator there may be two different stations capable of giving a beat frequency of this value, one transmitting on a carrier 100 k.c. above the local-oscillator frequency and the other 100 k.c. below. This is known as "image" interference. It may be cut out by passing the undesired signal through a rejector circuit formed by connecting part of the input coil to earth through a series condenser, the input circuits as a whole being tuned by a second condenser to the desired frequency. B. A. R.

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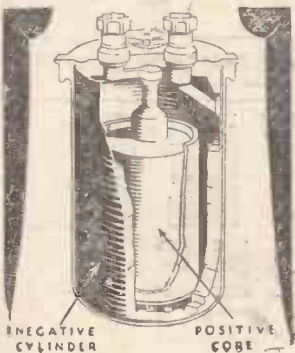


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**"THE BEST RECORDS OF THE YEAR"**

(Continued from page 1252)

two of the most delicious folk songs—in German, of course—on H.M.V. DA1274 (4s.). They are *Was i' Hab* and *Der Vogel Im Wald*. Hear her whistle, too! Another German record I liked very much, although one side is a very gloomy story, is Decca Polydor CA8082, 4s.: *The Drummer Boy and Rhine Legend*. They are by Schlusnus and show the versatility of this great singer. Here is an Italian gem from the *Pearl Fishers*—*Mi Par d'Udir Ancora*, backed by *O Dolce Incanto*, from *Manon*. Hear Gigli sing these on H.M.V. DA1216 (4s.). You will enjoy them tremendously.

Light.—Heddle Nash is always good; he was never better than in *My Pretty Jane* and *Mary of Argyle* (Columbia DB720, 2s. 6d.).

You will find a finely dramatic pair in Dennis Noble's *Son o' Mine* and *The Rebel* (Columbia DB750, 2s. 6d.). These Freebooter Songs are splendid fare as he sings them. For children from seven to seventy, hear "Uncle Stanley's *Buckingham Palace* and *Bad Sir Brian Bolany* on *Panachord* 25102, 1s. 6d. These are utterly charming. Now for a French gem—one by Yvonne Printemps. Two of the most "more-ish" things I know are *Plaisir d'Amour* and *Au Clair de la Lune* (H.M.V. DB1625, 6s.). Worth every penny, because you'll play it till it's worn out. For old-time Cockney humour I commend John Thorne's singing on *Imperial of Pretty Polly Perkins of Paddington Green* and *The Crocodile* (2667, 1s. 3d.); *The Ratcatcher's Daughter* and *Villikins and His Dinah* (2714, 1s. 3d.). Two negro spirituals are impressively sung by Marcus Browning on *Winner 5500* (1s. 6d.). They are *Deep Ravine* and *De Blin' Man Stood on the Road an' Cried*. Maurice Elwin always

sings well songs of a particular type. Here are two of his best: *Somebody Loves You* and *Smuggled on Your Shoulder* (Decca F2916, 1s. 6d.). Also *From One Pair of Arms to Another* and *Pagan Moon* (Decca F3095, 1s. 6d.). Here is a good one for a sing-song: *Twankydllo*; *Ching a Ling* and *High Barbaree* (H.M.V. B4240, 2s. 6d.). In rattling fine style by Stuart Robertson and Male Quartet.

**MISCELLANEOUS.**

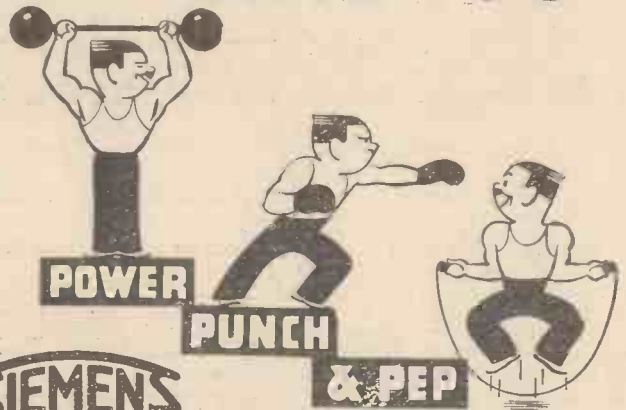
Here are all sorts, mostly very humorous. Everybody should have at least two or three for Christmas. First, a few of the best monologues: Stanley Holloway is excruciatingly funny in these two *Columbias* (DX353 and DX321, 4s. each). *The Lion and Albert* and *Three Ha'pence a Foot*; *Old Sam* and *Beat the Retreat on Thy Drum*. Then that best of ventriloquists—Johnson Clark. Hear his witless sketch, *The Poacher's Son* on *Zonophone* 6191, 1s. 6d. So to Gillie Potter: his gibes in *The Truth about the B.B.C.* on Decca K650, 2s. 6d., must have made some of the mandarins writhe. Julian Rose is good on *Broadcast 820*, 1s. He records his wireless turn—*Mrs. Blumberg's Boarding House*.

Now for one or two humorous songs of merit. I am sure you will like these two: *Zonophones* 6098 and 6182, 1s. 6d., respectively. Max Lindsey in *Only Me Knows Why* and *Now's the Time to Fall in Love*, then Clarkson Rose in *The Gag Song* and *She Was Only Somebody's Daughter*. Of a different school is *Wilkie Bard's Medley* (H.M.V. B4132, 2s. 6d.). Anyone who can't join in this is indeed in a bad way! I believe you will overlook the German backing (*Darling, Do You Come from Spain*) for the sake of that comical ditty *When Yuba Plays the Rumba on the Tuba*, by the Revellers, on H.M.V. B4164 (2s. 6d.). Here's a good one by the Western Brothers—*The Big Drum Major* and *The People Upstairs* (*Broadcast* 3225, 1s. 6d.). The noises in the first are as funny as the song. Now for a record of a type entirely alone—*The Old Brigade* (Columbia DX379, 4s.). This musical epitome from Waterloo to 1914 (Dobroy Somers' Band) with Norman Allin singing the title song and Ion Swinley's declamation makes a very impressive picture in which solemnity and levity are artistically blended.



Is this the smallest set in the world? A Guernsey enthusiast, Mr. R. Gill, has built this midget receiver in which an efficient single-valve circuit, with a Mullard valve, is used. The set is rather less than 2½ in. square and weighs under ½ lb. It is claimed that it can receive twenty-one stations on a standard aerial

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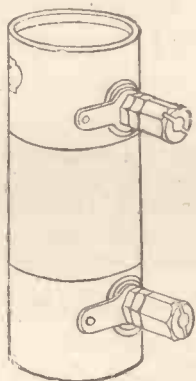
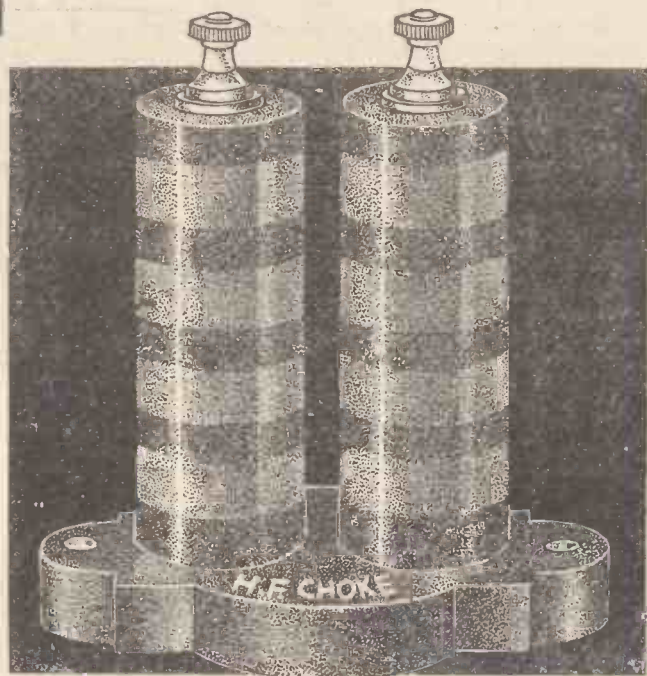
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A weekly review of new components and tests of apparatus conducted by J. H. Reyner, B.Sc., A.M.I.E.E.

**AMPLION MOVING-COIL SPEAKER**

A NEW chassis-type moving-coil speaker which we have recently tested is the Amplion M.P.22 permanent-magnet model. This loud-speaker employs a large E-shaped permanent magnet which is constructed of 1/2-in. chrome steel and which weighs about 6 1/2 lbs. The magnet is fixed to the back of the very rigid metal chassis, and from the periphery the diaphragm is suspended. This latter is of the type having the suspension formed as a part of the outer edge, this being turned over and ribbed to give the necessary flexibility. The centering device employed is of the usual web type, and allows ample axial movement, at the same time keeping the coil quite centrally in the gap.

The moving coil is of the low-resistance type, but the necessary input transformer is supplied with the speaker and is mounted on the metal chassis. This transformer is

of the multi-ratio type and is actually suitable for use with all types of output valve.



New Amplion moving-coil speaker

For testing purposes the loud-speaker was mounted up behind a 2-ft. 6-in. baffle-

board. The overall reproduction obtained was very good indeed and the speaker appears to be capable of handling large inputs of 3 or 4 watts or more without any sign of distress.

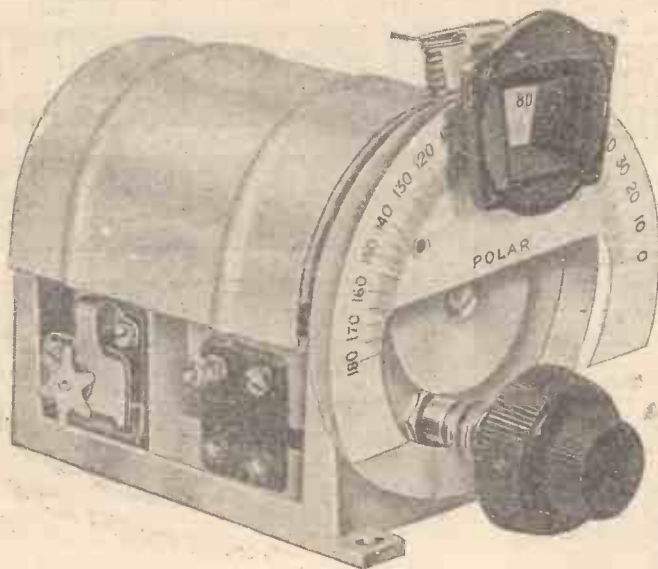
This speaker retails at the very reasonable price of 39s. 6d.

**TELSEN DRUM DIAL**

A WELL-MADE slow-motion drum dial which we have recently had the opportunity of testing, is that manufactured by Messrs. Telsen, Ltd. This drive has been designed primarily for use with Telsen condensers, but the construction is such that it may be used with variable condensers of almost any type. The framework of the drive is formed from heavy gauge aluminium sheet and is quite rigid. It can either be mounted on the panel or allowed to rest on the baseboard,

(Continued on page 1272)

**UNIKNOB**



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**"WE TEST FOR YOU"**

(Continued from page 1270)

special flanges being provided for this purpose. The slow-motion drive is obtained by means of a cord passing round a groove on the side of the drum and also round the main driving spindle. This method gives quite a smooth control and no back-lash at all was noticeable. The same type of drive is used for rocking the stator of the left-hand condenser, thus allowing a useful and variable trimming action to be obtained over and above that normally obtained by the use of the trimmers on the condensers themselves.

Two white ivorine scales are provided with the drive, one being marked in wave-lengths and designed for use with Telsen condensers and Telsen matched tuning inductances, the other is marked in 100 divisions and is for use where different coils or condensers are employed. The scale is illuminated from the rear by the usual method employing a small 4-volt bulb.

The drive is retailed complete with a neat escutcheon plate and full instructions with template for fixing.

This drive can be recommended.

**BLOCK ACCUMULATORS**

**T**HE conditions of use of the ordinary wireless accumulator are quite different from those for which the battery was first invented. The plate type of battery works best under conditions of continuous and fairly heavy discharge. In a wireless set, we take a rather small current for short periods separated by lengthy periods of rest.

This calls for special construction and the mass plate type has been in use for a number of years. This form of construction, however, has now been carried many steps farther by Messrs. Block Batteries, Ltd., who have entirely eliminated the ordinary plate formation.

The necessary active material is compressed into two cylinders one within the other, while the space between the two is filled with dilute sulphuric acid in the usual



One of the range of Block accumulators, embodying a novel plate construction

way, this permeating throughout the more or less porous plate material. The whole is enclosed in a light bakelite cylindrical container which can be obtained in a variety of colours. This construction is eminently suitable for a slow intermittent discharge.

The cylinders of active material are considerably lighter than the customary grids of lead filled with paste, although there is not very much saving in actual bulk. The

sample we received for test was of 80-ampere hour capacity and only weighed 7¼ lb., which is less than half that of a similar battery of the ordinary type.

On test, we found that the accumulator gave its rated discharge, provided the current taken was not excessive. If the current is too great, the acid is not able to circulate sufficiently rapidly through the plates, but with ordinary wireless use the accumulator will give good service.

The development is an interesting one, and should have a good appeal, particularly in view of the marked reduction in weight.

**The Wireless and Gramophone Trader Year Book and Diary, 1933.**

The new edition of this extremely helpful year book and diary has just been issued. In its 400-odd pages it includes a useful diary section for the year, a wealth of information on the mains supply voltages, servicing, set specifications, and so on, and a very complete index to the trade. This latter directory section is in four parts, being distributed under the sections of an alphabetical list of names and addresses of manufacturers, of wireless and gramophone factors, a list of proprietary names and of the goods supplied and services rendered by the firms detailed in the first section. In this way it gives a very extensive index of the names and addresses, the trade names and production details of radio concerns. The year book costs 5s. 6d., post free (7s. 6d. overseas), and is issued by the Trade Publishing Co., Ltd., St. Bride's House, Salisbury Square, Fleet Street, E.C.4.

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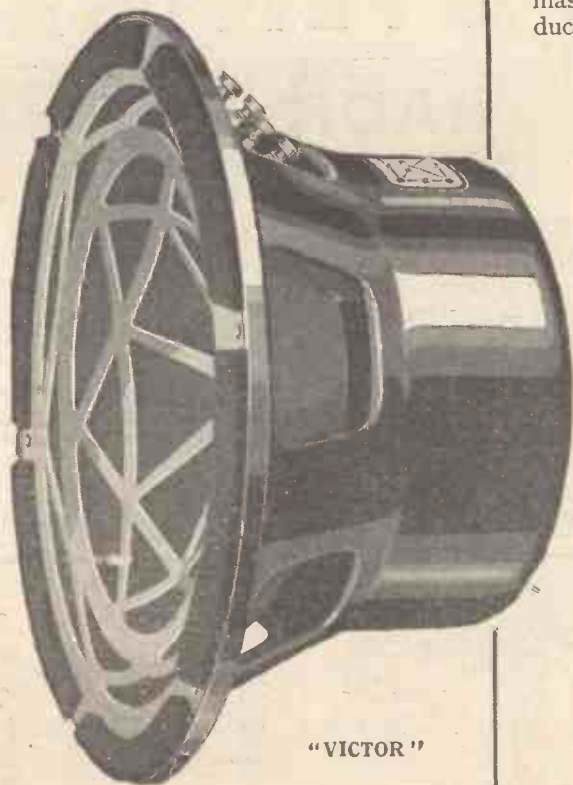
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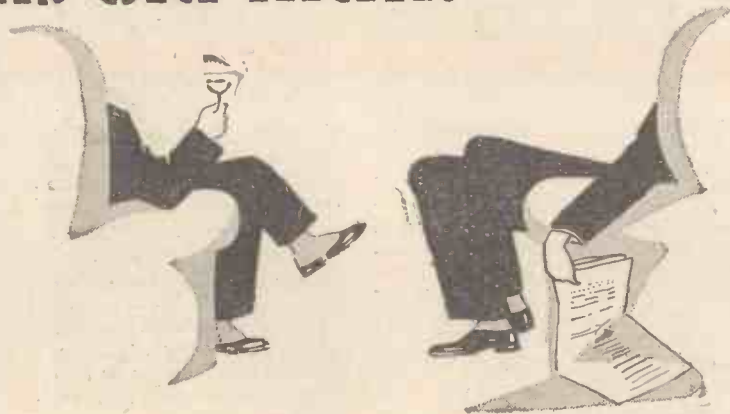
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"CHALLENGER"



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"Sounds tame."

"Possibly. By the way, I really must do something about my radio set. Hardly up to standard for Christmas festivities."

"The set is all right. What you need is a decent loud-speaker in place of that wheezy out-of-date affair; a speaker like mine."

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# In My Wireless Den

Weekly Notes : Theoretical and Practical

## USING A VOLUME CONTROL

MANY sets have a volume control in addition to the reaction. This control may be joined in the aerial or screen-grid circuit and when properly used, overloading of the detector is avoided.

The mistake should not be made of connecting a volume control to a point in a circuit where overloading of one or more valves can occur no matter how the volume control is dealt with. To take a very bad case, the volume can be adjusted by connecting a resistance across the loud-speaker itself. But what about the valves in the set? They may be greatly overloaded and no adjustment of the volume control resistance will affect this.

If, on the other hand, the volume control is connected in the aerial circuit, the grid magnification of the set will be used even when receiving the local station.

This may not be the best state of affairs and so it might prove better to have two controls, perhaps ganged together. One will be connected to control the input to the

first valve or will be joined to the first valve and the other will be connected to the first low-frequency circuit. The truth is, that the volume control is a most important part of a set and many sets are not properly designed in this respect.

## LOOK TO YOUR AERIAL

THE fact that present-day sets are usually very sensitive in comparison with those of a year or two ago is no good reason for taking less trouble with the aerial and earth than formerly.

In general terms, we want to receive as much signal and as little noise as possible. One arrangement of aerial and earth could be said to be much better than another if the ratio of signal strength to noise were greater.

Now it would not be correct to state that in every case a high aerial is better than a low one nor a long aerial better than a short one. But generally it will be found that a high aerial of good length is better than a low and short one, provided the aerial is well arranged.

Keep the wire well away from pipes and gutters. Well insulate the ends and in brief hang the aerial in as clear a space as possible. Use the shortest possible length of wire inside the house and do not fasten it to the wall of a room.

## SENSITIVITY AND POWER

THERE appears to be some little confusion in the minds of some people regarding what is meant by the terms sensitivity and power.

It is sometimes thought that a sensitive set must also be a powerful one. This need not be so, however. A powerful set is one having a large output stage capable, when fully loaded, of producing considerable volume. If this stage has in front of it only a detector, then probably the local stations will be heard at full strength. There will not be enough magnification for the weaker signals from distant stations to be heard at all well.

A set having several stages of amplification would be a sensitive one. This set would magnify the weakest signals, amplifying them to the point where they would fully load the power stage. If the stage happens to be a small one, the maximum volume will naturally also be small. But if, on the other hand, the set had a large power stage, the set would be correctly described as sensitive and powerful.

Modern mains sets, with their power pentode output stages, are considered powerful enough by many, but the different types have widely varying degrees of

(Continued on page 1276)

## MAKE IT A SOVEREIGN SKY HAWK S.G.3



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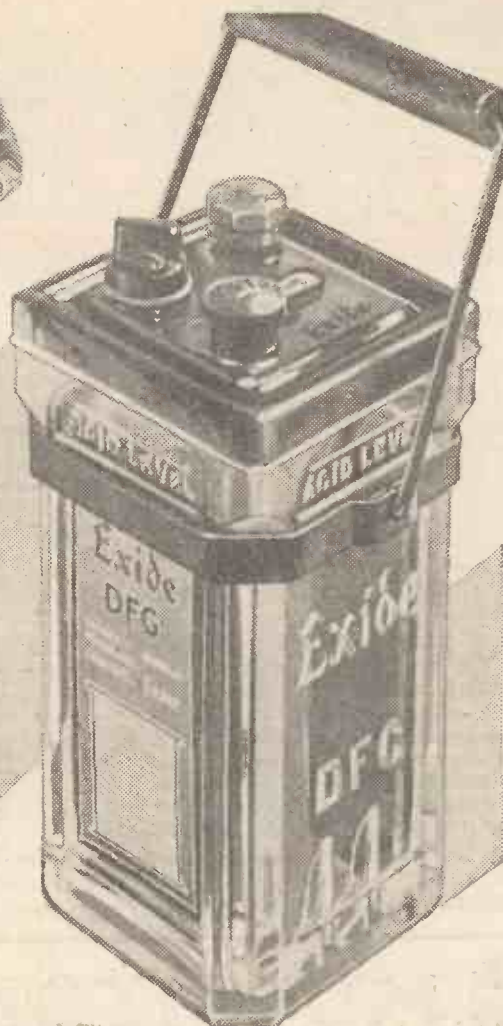
No. A14. A modern design Radio Cabinet, 3 ft. high, 1 ft. 9 ins. wide, 1 ft. 2 ins. deep. Will take a baseboard 18 ins. by 12 ins. or smaller. The top panel above the fret we will cut to your specification. Should you be using an ebonite panel, a paper pattern must be forwarded. Hand polished Oak, Mahogany or Walnut.

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P.17

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"WIRELESS DEN"

(Continued from page 1274)

sensitivity. With some, you can receive many more stations than with others at full volume, as their sensitivity is greater.

USING A PENTODE

IT is not satisfactory to take out an ordinary power valve and to connect in its place a pentode unless the circuit is adjusted to suit the new valve.

The output circuit will usually not be the same for the best results in the two cases. A pentode must generally have a higher anode circuit load.

Most moving-coil loud-speakers are fitted with a tapped transformer and it is, therefore, only necessary to use the pentode winding when changing over.

When a high-resistance loud-speaker is used without a coupling transformer of the right ratio it is advisable to fit a choke capacity coupling. The choke should have an inductance of 50 henries or more and be tapped. One side of the loud-speaker may then be joined to negative high-tension and the other side through a 2-microfarad condenser to a tap on the choke.

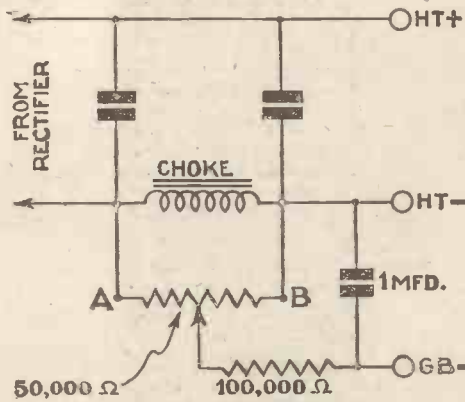
A centre-tapped choke is useful, but if the choke has other taps the best one may be found by trial. It pays to adapt the loud-speaker to the valve from the points of view of both quality and power output.

A point that should be remembered when considering the question of controlling volume is that the normal circuit produces a certain amount of noise.

The amount of the noise often varies with

the degree of amplification. If, therefore, the volume control is connected to vary the magnification, the noise usually falls off as the amplification is reduced which is naturally an advantage.

A control that merely adjusts the strength of the signal applied to the valves will, from this point of view, not be as good. Such a control might take the form of an adjustable condenser joined in the aerial circuit or a potentiometer joined across the aerial coil. With both arrangements the magnification of the set is not affected when the control is operated. The noise remains and so when the volume is reduced the relative strength of the noises heard increases. A combined input and magnification control is usually satisfactory, and in many sets a single control which adjusts the amplification is all that is needed.



A NEW WAY OF GETTING G.B.

GRID bias in an A.C. mains receiver is usually obtained by including a resistance in one of the circuits and utilising the fall in voltage across it.

It is possible, however, to take advantage of the fact that there is a drop across the smoothing choke or speaker field winding when this method is used. The field winding or choke may be in the positive lead and should be moved to the negative. This change will usually not affect the smoothing in the slightest degree.

Point A in the diagram will be more negative than point B, but often the difference in pressure is too great for the bias requirements of the last valve.

It is customary to fit a potential divider of about 50,000 ohms across the choke, as shown, and to tap off the bias required. Two separate resistances may be used if preferred, the voltage being divided according to their values.

If they are equal, half the voltage is obtained from the tap. De-coupling is usually necessary and may take the form of a 100,000 ohms resistance and a 1 or 2-microfarad condenser, as shown in the sketch.

There should be no difficulty in setting up the circuit. First, measure the drop across the choke. Then connect a potentiometer or two resistances, arranging the values of the separate resistances to give the right pressure. You cannot easily measure the pressure at the G.B.—terminal itself.



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17/6

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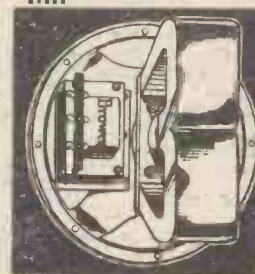
M.C.32

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9v. grid bias 1/-

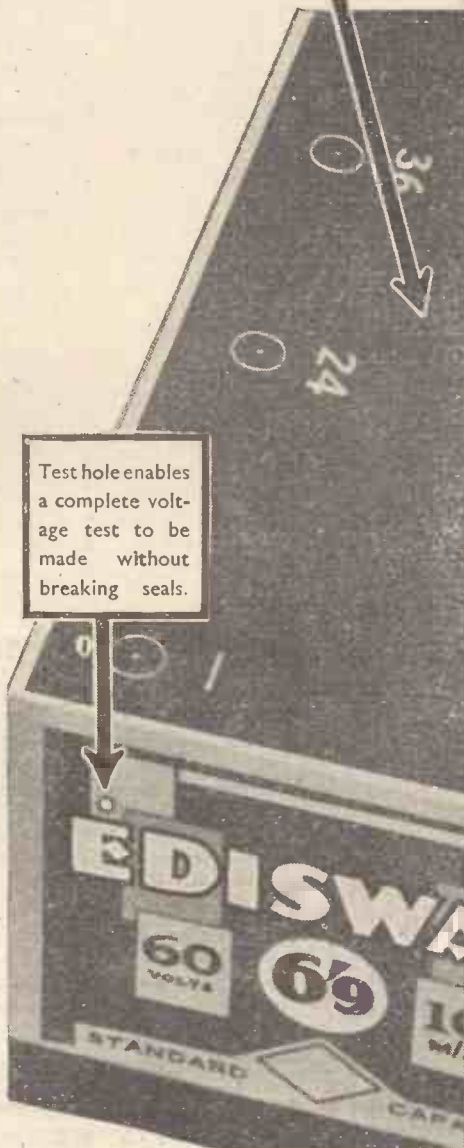
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# OUR QUERY DEPARTMENT?

The attention of readers is directed to the rules printed below. Replies are sent by post, only a selection of queries of general interest are printed here.

## "New Century Super"

SIR,—I am thinking of building the "New Century Super," but, having a mains unit with only three positive output tappings and giving 20 milliamperes output, I am wondering whether I can successfully make use of this accessory.

J. H. (Croydon).

The mains unit you have in your possession will be quite suitable for use with the receiver in question. We assume you are somewhat worried regarding how to connect five positive H.T. terminals on the receiver to only three positive output tappings from the eliminator. You should not let this worry you. A descriptive and illustrated note relating to how this can be accomplished is published on another page this week.

## Cathode Mixer

SIR,—I have heard the expression "cathode mixer" in connection with super-het design and cannot understand exactly to what this refers. Does it mean something to do with the "first detector" stage and the mixing of the locally applied oscillations with the incoming-signal oscillations?

T. D. (Wallington).

The expression "cathode mixer" does refer to the combining of the locally applied oscillations with the incoming signal oscillations in a super-heterodyne receiver. Both the first detector valve and the local oscillator valve have their cathode circuits "commoned" in some way, so that the oscillations from the special oscillator valve can be made to influence the grid-cathode circuit of the first detector. In the case of a super-het designed for use with mains valves, the cathodes of the two valves are connected together via a common biasing resistance. Feed-back through the H.T. circuit, of which the bias resistance forms a part, allows of both frequency oscillations being combined to create a mixer circuit.

## Old Valves and Instability

SIR,—I have one of your original "Century Super" sets, which has given complete satisfaction since first built, some eighteen months ago. Recently, however, trouble has begun, and it is mainly in connection with long-wave working. As soon as I switch over to the long waves the receiver becomes so unstable as to be almost unmanageable. I tried some simple experiments which did not lead me far. Now I

find the instability is spreading to the medium waves. Replacement of G.B. and H.T. batteries has not effected a cure. Can you suggest what is likely to be causing the trouble?  
C. J. (Wrexham).

It seems most probable that your valves are becoming aged and that their internal impedance has dropped sufficiently to make them work in an unstable manner. You can verify the point by checking the anode-current consumption of your valves with a milliammeter. Slightly excessive current will indicate aged valves. Adjustment of grid bias over and above that normally required will not effect an improvement; in fact, it may stop the valves from working. The only cure is a new set of valves, if all of the present ones have been in use the whole eighteen months, or new valves in place of those which are the full age of the receiver.

## WHEN SUBMITTING QUERIES

Please write concisely, giving essential particulars. A Fee of One Shilling (postal order), a stamped addressed envelope, and the coupon on the last page must accompany all letters. The following points should be noted.

Not more than two questions should be sent with any one letter.

The designing of apparatus or receivers cannot be undertaken.

Modifications of a straightforward nature can be made to blueprints, but we reserve to ourselves the right to determine the extent of an alteration to come within the scope of a query. Modifications to proprietary receivers and designs published by contemporary journals cannot be undertaken.

Readers' sets and components cannot be tested at this office. Readers desiring specific information upon any problem should not ask for it to be published in a forthcoming issue, as only queries of general interest are published and these only at our discretion. Queries cannot be answered by telephone or personally.

Readers ordering blueprints and requiring technical information in addition, should address a separate letter to the Query Department and conform with the rules.

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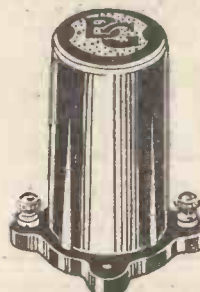


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**W.B. MANSFIELD SPEAKERS**

THE magnet system of the new W.B. Mansfield speakers was described recently in AMATEUR WIRELESS No. 545 and the new speakers embodying this special magnet construction are now marketed. One of these speakers is illustrated by the accompanying photograph. The magnet system results in a very high fixed density



One of the new W. B. Mansfield speakers, the Junior model

and a special arrangement of the magnet poles (of steel alloys) cuts down the magnetic resistance and reduces the stray field. The pole piece is of steel having a very high cobalt content, but the back of the magnet is made from a different alloy, which is a better "conductor" of magnetism than cobalt.

The back thus acts simply as a return piece to complete the magnetic circuit.

The Mansfield Senior (improved PM4) speaker embodying this novel construction costs only 42s. It is sold complete with a three-ratio transformer. The Junior model costs 27s. 6d.

**GENERAL CALL SIGNALS FOR AMATEURS**

SHORT-WAVE listeners who are keen on tuning-in transmissions from amateur stations may be interested to learn that a system of "general call" signals is now in use for Swedish amateur transmitters.

The general call for all Swedish amateurs is SM0XA, while that for all members of the S.S.A. (a radio organisation) is SM0SA. In addition to these, there is a general call

signal applying to each of the numbers following the nationality prefix in the call-signs of Swedish amateurs.

SM1XA, for example, is the general call for all "SM1" amateurs, while SM2XA applies to all "SM2" amateurs, SM3XA is the general call for those having the figure 3 after the nationality prefix in their call-signs, and so on. W. O.

**THE "A.C. NEW CENTURY SUPER" CABINET**

In connection with the console cabinet for this new receiver, it should be noted that the correct type is the A 14, and not 814 as specified.

When H. R. H. Prince George visited the factory of Pye Radio Ltd., he inspected an oscillograph used in testing, and watched an oscillograph of his own voice



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**6/9**

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**8/6**

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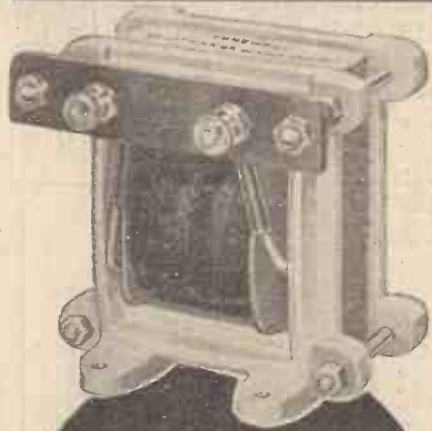


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**On the Spot!**

If you want to have a comprehensive catalogue of speakers absolutely on the spot, then write at once through my Free Catalogue Service for the new Blue Spot catalogue. This deals with all the popular speakers—31K, 45R, 32PM, 100D, and so on. **891**

**New G.E.C. Sets**

The G.E.C. have just sent me a handy catalogue of sets, speakers and valves for the new season. There is an additional section on Magnet H.T. batteries and accumulators. The catalogue is abridged, of course, especially in the valve section, but it is a very useful little production and a handy guide to the salient features of G.E.C. products. **892**

**Dubilier Metallised Resistances**

Metallised resistances are all the rage these days and in order to tell you something about them and why they have such excellent characteristics, Dubilier have produced a book which is devoted entirely to resistances of this type. Performance curves and data tables are given and there is a description of special resistances for use on car sparking plugs to cut down interference when using a radio set in the car. **893**

**B.T.H. Pick-ups**

I have just received a very interesting and informative folder dealing with B.T.H. pick-ups and tone arms. It is helpfully technical, but not too involved. It gives performance curves, showing the average characteristics of the B.T.H. Senior de Luxe and Minor pick-ups. Facts and figures are given in connection with the frequency range and voltage output. Altogether a useful publication. **894**

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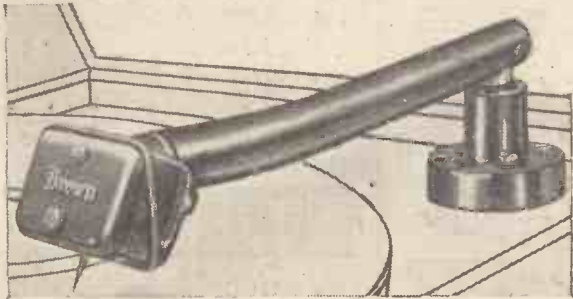


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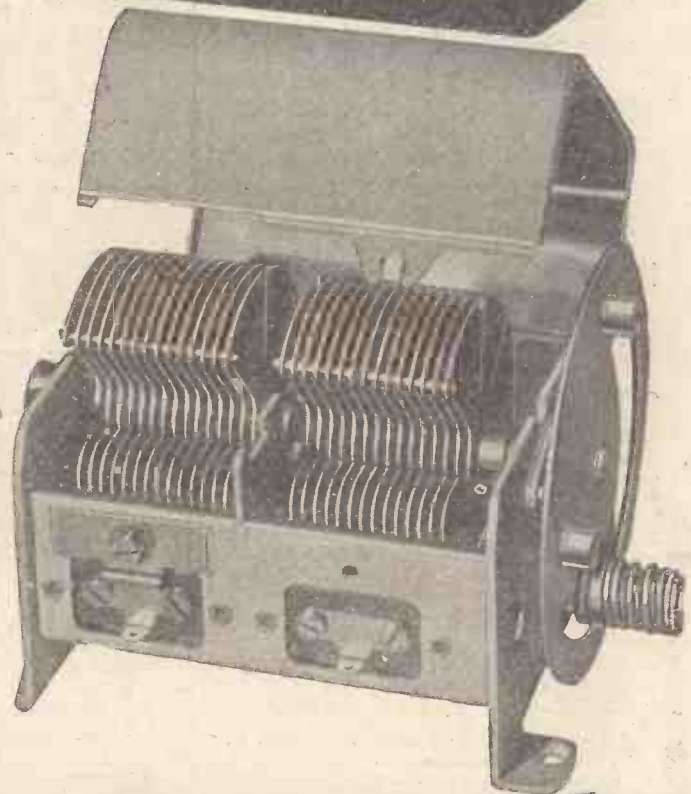
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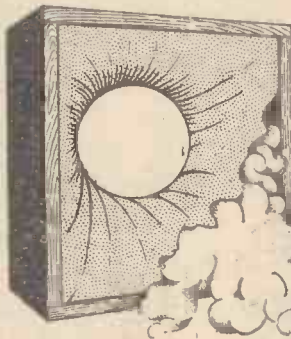
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## STANDARD

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We provide personal attention and show even bigger savings on your battery expense. Install the Standard which lasts for years, because it recharges itself when the set is shut down. This PERMANENT saving is enjoyed by thousands of enthusiasts. Ample level current brings in difficult stations without background. Eventual replacements merely a matter of changing cartridges at a few pence each. Such great promise deserves your investigation. DO IT NOW.

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Popular Type Battery for Ordinary Sets.  
Any Voltage Any Capacity 5/- Down  
Model H5, No. 3 size, 12,500 milli-amp capacity, 120 volts, 84 cells. Price, complete without trays 37/8  
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Other capacities 2,000 to 25,000 milliamperes.

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It picks up Radio like a sponge does water. I get more kick out of my Set than I did with my outside aerial. The missus is tickled to death now that there are no loose wires to worry her, and she delights in asking her friends to find the aerial. Of course, the narrow adhesive strip is hidden under the picture rail or skirting—Bill has got his under the carpet. It will stick anywhere. It increases selectivity and cuts out static.



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Send your list of Radio needs for our quotation. Kits, Parts, Sets, etc. Everything in Radio stocked. Prompt delivery; seven days' approval. Catalogue free. Twelve and Standard Wet H.T. replacements stocked.  
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**TELSEN TONE CORRECTOR**

READERS will see that in the "A.C. New Century Super" described on other pages in this issue a tone corrector is fitted in the output circuit of the pentode. This tone corrector is a handy Telsen component which can be fitted to many sets and makes a great difference to the output quality. It is a single component, the neat bakelite casing housing a .01-microfarad condenser and a 25,000-ohm leak. It is connected in the output circuit across the speaker terminals; so it can be added to



A new Telsen component, the tone corrector

any set in a few minutes without altering any of the wiring. The tone corrector is made by Messrs. Telsen Electric, Ltd., and costs only 3s. 6d.

**CHEAP INDUCTOR SPEAKERS**

READERS should note that price reductions have recently been made in connection with the well-known N. & K. Farrand inductor speakers. The chassis of the larger model now costs £3, while in cabinet form it is £4 16s. The Junior chassis costs £2 10s., and in cabinet form £4 5s. These speakers are supplied by A. Brodersen, 11 Northampton Square, Goswell Road, E.C.1, from whom full details and a free list can be obtained on mention of AMATEUR WIRELESS.

**"HOW TO WRITE BROADCAST PLAYS"**

THIS is the title of the most interesting book on the subject of drama which I have read for a long time. It is written by one who should know—Val Gielgud, Productions Director to the B.B.C. It costs a modest half-crown and is published by Hurst & Blackett.

In an introduction, the author talks sound sense about radio drama in such a manner as to interest anybody—whether they want to write broadcast plays or not.

Then follows the full text of three charming plays, all of which have, of course, already been broadcast. They are *Exiles*, *Red Tabs* and *Friday Morning*. After each of these plays the author calmly appends what he calls a "Comment," but which is really a trenchant criticism of his own work.

This volume will teach you a great deal about play-writing and also will increase your interest in radio drama as a whole. And if you have any talent in that direction it might happen that you will send Mr. Gielgud something worth his producing. I know he wants good plays; he told me so a week or two ago.  
W. W.

Emily Broughton and Foster Howard are the singers, and Elsa Tookey the instrumentalist, at a Midland Regional concert on December 11.



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You will be surprised to hear the extra volume and better quality reproduction of which your set is really capable. The Amplion Permanent Magnet Moving Coil Speaker will give your set a bigger scale, clear high register without shrill and full bass without boom. It will handle five to six watts input without any sign of distortion. . . . Get even better results from your Radio—fit an AMPLION speaker. It has a universal transformer, so it can be connected to any set large or small. Price **39/6**

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This Receiver also tunes to Ultra-short Waves.

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BROADCASTING STATIONS

Broadcasting Stations classified in order of wavelengths. For the purpose of better comparison, the power indicated is that of the carrier wave.

Table with columns: Kilo-Metres cycles, Station and Call Sign, Power (Kw.), Kilo-Metres cycles, Station and Call Sign, Power (Kw.), Kilo-Metres cycles, Station and Call Sign, Power (Kw.). Lists various international broadcasting stations.

A broadcast of music by Bach and given by members of the Birmingham Bach Club is to be relayed from Birmingham Cathedral to Midland Regional listeners on Wednesday, December 7.

The Symphony Concert by the City of Birmingham Orchestra will be relayed from the Birmingham Town Hall to Midland Regional listeners on December 8, with Isolde Menges as the principal soloist.

Burlesque No. 2 in the West Regional programme will be given on December 6, and the play chosen is Dr. Knock.

The third Lincolnshire industry represented in the evening talk on December 15 is the Grimsby fishing, and is to be relayed from the studios by Alderman Frank Barrett. Noises accompanying the sale of catches will help listeners to realise the animated scene in the Fish Market!

Several unusual part songs will be heard during a concert by the Ross-on-Wye Orpheus Society from the New Theatre, Ross-on-Wye.

A Welsh programme from Swansea will be given on December 9.

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Incorporating the most recent development in valve design—full mains voltage indirectly heated filament. These valves work direct off either A.C. or D.C. supply. No mains transformers or break-down resistances required. Considerably lower current consumption than any other mains valves. Remarkably free from mains hum. A920 (G.P.), W310 (R.C.), T920 (L.F.), 1718 (1125 Power), 1817 (Rectifying Valves), EG50 max., 1416; E8410, 125 max., 1516. Descriptive Leaflet on request.

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With British components. All instructions complete, ready for assembly. Highly efficient, yet cheap, because the Ostar Universal High Voltage Valves cut the cost of transformers and breakdown resistances. Work off either A.C. or D.C. 2-Valve Receiver, with Rectifier, £8.10.0. 3-Valve Receiver, £9.5.0. 2-Valve Amplifier, with Rectifier, £4.10.0. 3-Valve Amplifier, with Rectifier, £5.5.0.

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## MOVING COIL SPEAKERS

are acknowledged by the greatest experts to be the finest in the world in each of their price classes.

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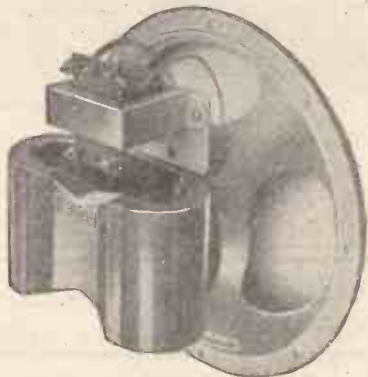
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## SUPER JUNIOR MODEL

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## The Battery Set with Mains Technique

and the  
Unique  
Six-Sixty  
Tuning  
Dial



Write for particulars. Type 3-32 as above 10 gns. exclusive of batteries.

Tuning is a joy on the remarkable and exclusive Six-Sixty Tuning Dial. Every station by name illuminated by the moving beam of light, and the beam switches off when tuning is complete to save your battery. Station after station in a moment. No groping, delay, or difficulty. Clean-cut separation. Insist on seeing this modern receiver before buying radio. The famous Six-Sixty Chassis set with its "Pre-Selector" band-pass tuning, and modern valves has unusual power, range and selectivity. Built-in moving-coil speaker. Handsome figured walnut cabinet.

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50 Ohms to  
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**P.P.M. SOUNDEX 27/6**

**CELESTION**  
The Very Soul of Music

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**FULL-SIZE BLUEPRINTS**

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25/- Two (D, Trans) ... .. AW330  
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Inexpensive A.C. 2 (D, Trans) ... .. AW346  
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Mascot Two (D, Trans) ... .. AW353  
Ideal Regional 2 (D, Trans) ... .. AW357  
Quality 30s. Two (D, Trans) ... .. AW361  
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New-style Radiogram (D, Trans) ... .. WM299

**THREE-VALVE SETS (1s. each)**

New Favourite Three (D, RC, Trans) ... .. AW334  
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P.W.H. ("Mascot" D, RC, Trans) ... .. AW337  
Home-Lover's Battery 3 (SG, D, Trans) ... .. AW341  
£8 Radiogram (SG, D, Trans) ... .. AW343  
New Regional Three (D, RC, Trans) ... .. AW349  
World-Ranger Short-wave Three (D, RC, Trans) ... .. AW355  
Wizard (SG, D, Trans) ... .. AW360  
£2 2s. Family Three (D, 2 Trans) ... .. AW368  
Percy Harris A.C. Radiogram (D, RC, Trans) ... .. WM294  
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Economy Radiogram (SG, D, RC, Trans) ... .. WM276  
Triple-tune Four (2 SG, D, Trans) ... .. WM293  
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Table Quad (SG, D, RC, Trans) ... .. WM303

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James Short-wave Super (Super-het) ... .. AW328  
Simple Super (Super-het) ... .. AW340

**SIX-VALVE SETS (1s. 6d. each)**

A.C. "Century Super" (Super-het) ... .. AW295  
"Mains Unit (1/-) ... .. AW295A  
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A.W., 4d., post free ... .. AW363  
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Universal Push-pull Amplifier ... .. AW300  
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A-P-A Radio Unit (SG, D.) ... .. WM281

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Short-wave Plug-in Adaptor (6d.) ... .. AW326  
Short-wave Super-het Adaptor (6d.) ... .. AW329  
Ether Searcher Radio-gramophone Motor Board ... .. AW333  
"A.W." Short-wave Adaptor ... .. AW339  
"Mascot" Mains Unit ... .. AW350  
"A.W." Trickle Charger ... .. AW352  
Add-on Band-pass Unit ... .. AW359  
Short-wave Adaptor for New Century Super ... .. AW367  
A Simple Mains Unit ... .. WM385  
Voltage Regulator ... .. WM287

Copies of the "Wireless Magazine" and of "Amateur Wireless" containing descriptions of most of these sets can be obtained at 1s. 3d. and 1d. respectively, post free. Index letters "A.W." refer to "Amateur Wireless" sets and "W.M." to "Wireless Magazine."  
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Amateur Wireless Blueprints Dept., 58-61 Fetter Lane, London, E.C.1

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General Correspondence is to be brief and written on one side of the paper only. All sketches and drawings to be on separate sheets. Contributions are always welcome, will be promptly considered, and if used will be paid for. Communications should be addressed, according to their nature, to The Editor, The Advertisement Manager, or The Publisher, "Amateur Wireless," 58-61 Fetter Lane, London, E.C.4.

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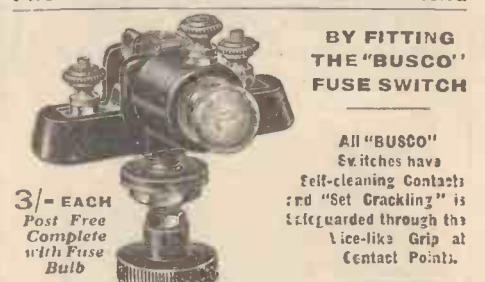
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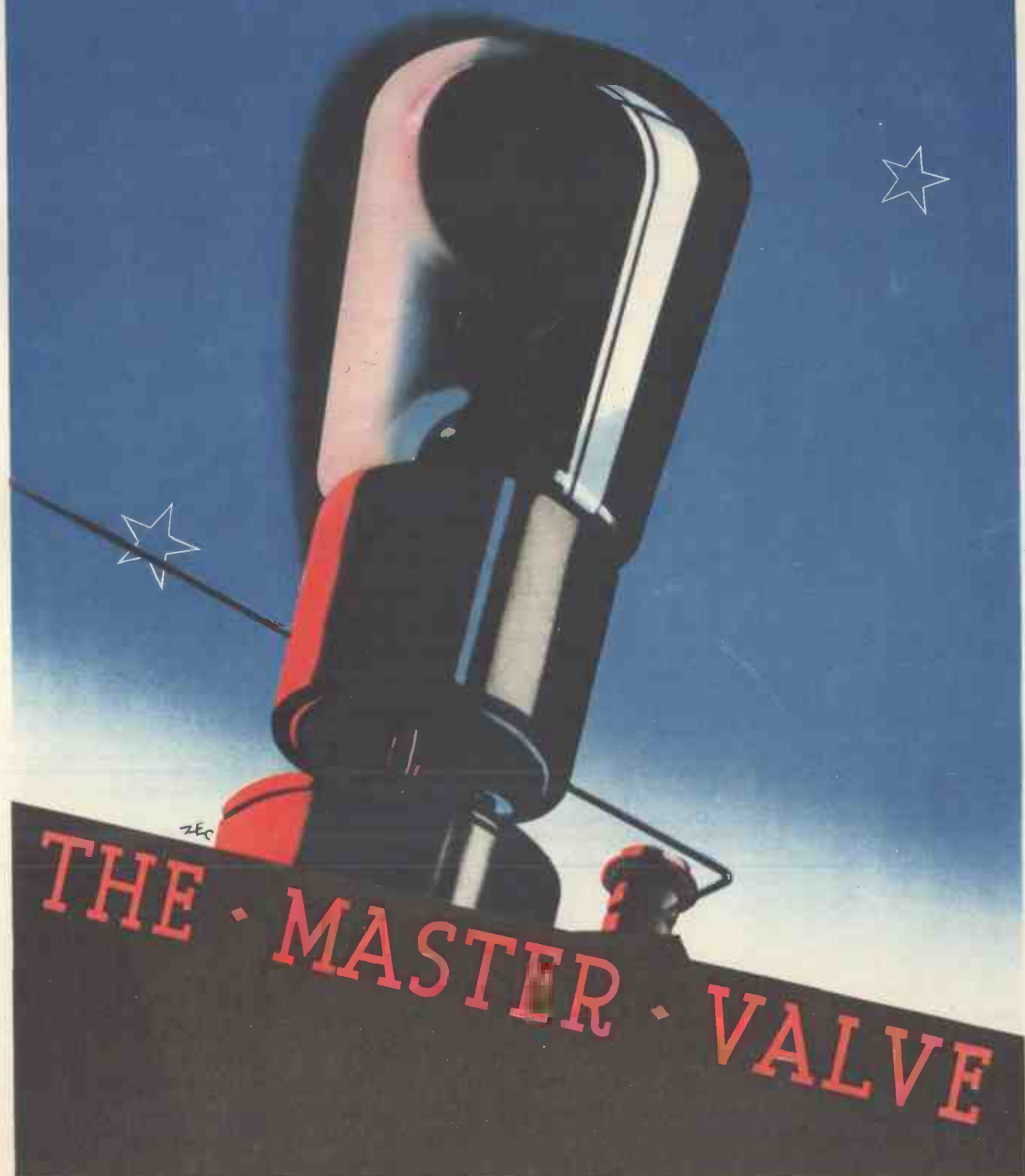
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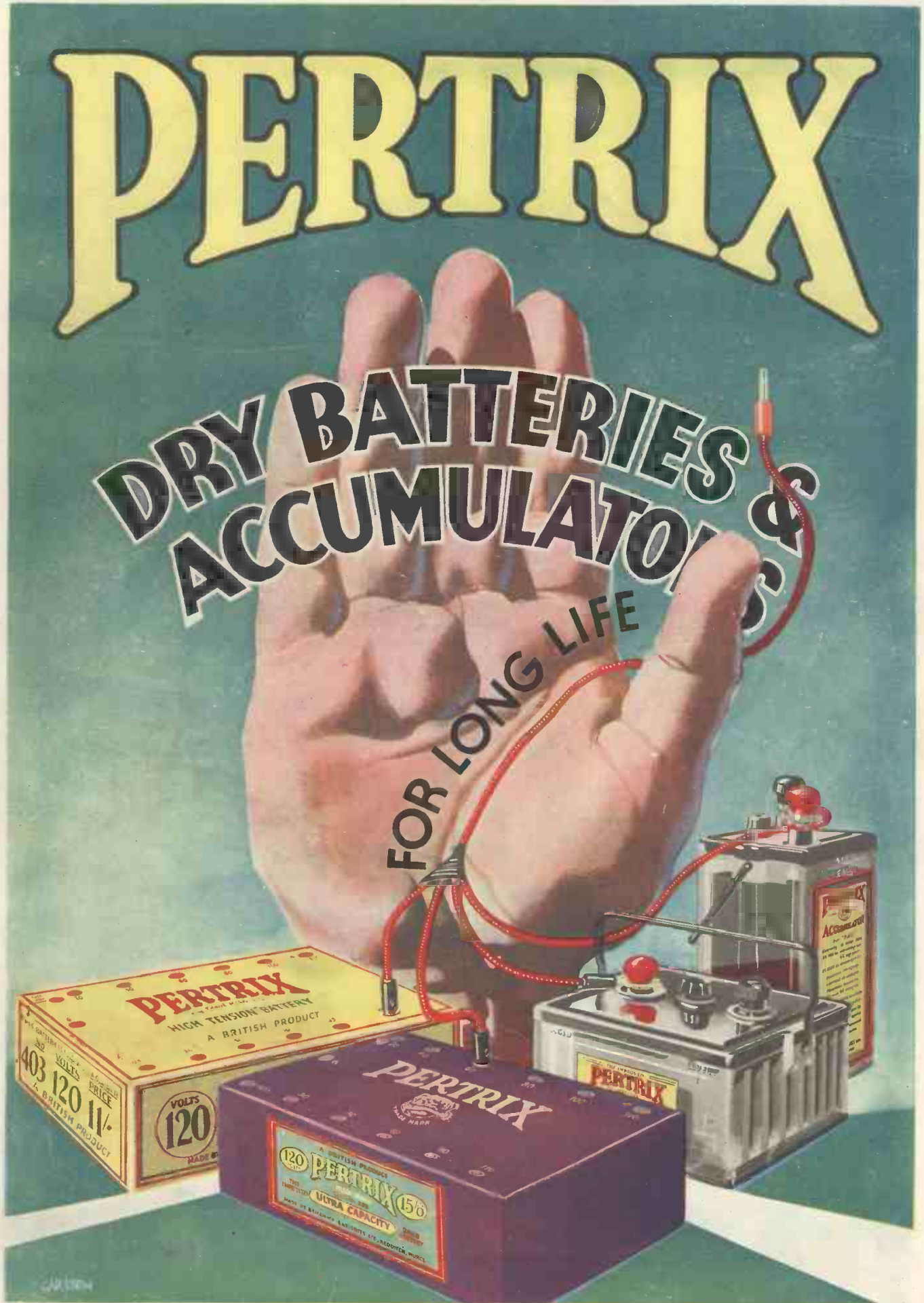
**BOTH** kinds of valve are identical in operation, assuming they are of the indirectly heated type. Usually they both expend the same amount of power (4 watts) in actually heating the filament, though the meter consumption is greater with the D.C. type, owing to the loss incurred in "dropping the volts." In the A.C. valve the mains supply is transformed down to 4 volts and the current consumption is 1 amp. For D.C. valves the terminal voltage varies, the high-voltage type being the more economical as regards the power actually drawn from the mains. With a 40-volt D.C. valve, for instance, the current consumption is only one-tenth of an ampere. A 4-volt A.C. valve could, of course, be used with a D.C. supply, provided it was connected up in series with a suitable resistance, but it would be extravagant on the meter.

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# WIRELESS MADE EASY

## XMAS SUPPLEMENT

**PULLING A VALVE DIAGRAM TO BITS.**

Page eight

**"BUILD AS YOU LEARN" FEATURE.** By Percy W. Harris.

Pages four, five and six

## WHICH SIZE HIGH-TENSION BATTERY IS BEST?

battery is connected have a low impedance the current flowing through them—and drawn, remember, from the battery—will be very much greater than with high-impedance valves.

We have, therefore, to choose a size of high-tension battery that will be capable, at the voltage of the battery, of meeting the maximum current demands. *The size of the battery varies because set's current requirements vary.*

With a little two-valver, for example, the voltage required would be just as much as with a

three-valver, but the two valver, owing to its small current requirements, would work on a smaller size of battery than the three-valver.

From this you will see that unless something is known about the current consumption of the set it is very difficult, if not impossible, to say which size of high-tension battery is best.

Let us see how the set's high-tension current needs are distributed in the set. We shall then know how to set about choosing a suitable size of battery.

**TOOLS YOU'LL NEED FOR SET BUILDING.**

Page seven

**"ELEMENTARY WIRELESS COURSE" FEATURE.** By J. H. Reyner and the Staff of "Amateur Wireless."

Pages two and three

IT may surprise some beginners to know that high-tension batteries have different sizes. This question of size is quite distinct from the voltage.

We can have a 108-volt or a 120-volt high-tension battery in standard, double-capacity and treble-capacity sizes.

*What, then, do we mean by the size of the high-tension if this does not refer to the voltage? We mean the actual size of the cells inside the high-tension battery.*

A battery is really a number of cells joined together, either in series or in parallel.

### 1 1/2 VOLT CELLS

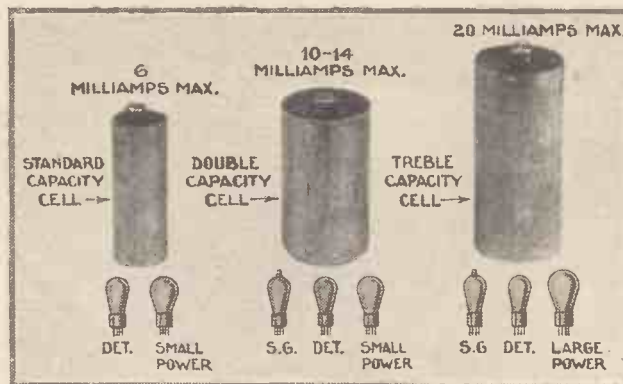
In a high-tension battery there are many small cells, each of which has a voltage across its terminals of 1 1/2 volts. These cells are connected together in series, which means that negative of one cell is joined to positive of the next and so on throughout the series.

*The total voltage of the battery made up of these cells is the voltage of one cell multiplied by the number of cells.*

In a 108-volt battery, then, there are seventy-two little cells, each of which is 1 1/2 volts. The voltage of the cells does not in any way depend on the size of the cells, so that whatever size cell we use in the battery the total voltage with seventy-two cells will always be 108 volts and for 120 volts there will be eighty cells.

Since the size of the cells does not affect the voltage of the battery, you might ask why we use different sizes. The reason is that the size of the cell determines how much current can be taken from the battery.

If the valves to which the



Here are three different sizes of cell as used in standard-, double- and treble-capacity high-tension batteries. Although the sizes are different the voltage of each cell is 1 1/2 volts. The size determines the amount of current you can take from the battery. The diagram will serve as an approximate guide as to the best size for your set

### WHY YOU SHOULD ORDER NEXT WEEK'S "AMATEUR WIRELESS" NOW.

**BECAUSE** we have arranged for the "Wireless Made Easy" supplement to contain some particularly useful and important features, including:—

**WHAT THE BEGINNER SHOULD KNOW ABOUT MODERN VALVES—THE BEST AERIALS FOR TO-DAY—HOW THE BEGINNER CAN ERECT THEM—PRACTICAL HINTS AND TIPS FOR BEGINNERS**

A very short experience with sets will show you that the valve taking most of the current is the final or power valve. This valve will often take more current than all the other valves put together.

In brief, we might say that the power valve really determines which size of battery you must use for working the set efficiently. There are three possible sizes, as already mentioned.

The standard size of battery has small cells, which are capable of delivering up to about 7 milliamperes of current. The double-capacity size will give between 10 and 14 milliamperes. The treble capacity will give up to a maximum of 20 milliamperes.

### MAXIMUM CURRENT

These figures mean that a given size of cell will permit a certain maximum amount of current to be withdrawn from the battery without seriously interfering with the action.

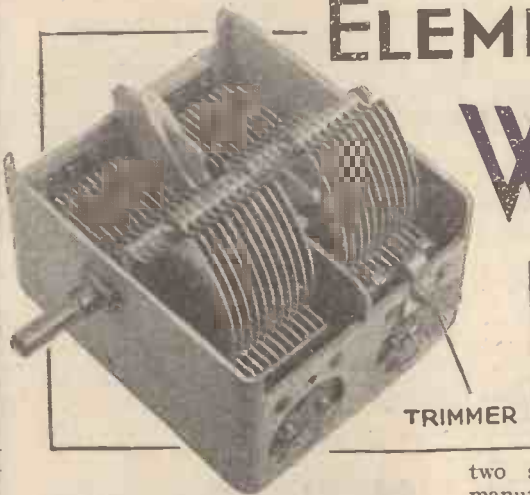
*If the current ratings are much exceeded an action called polarisation is set up and in time this will ruin the battery or very greatly reduce its life.*

If a battery is consistently over-run by taking more current from it than the makers recommend not only is the life of the battery reduced, but all sort of queer effects, such as "motor-boating," are produced.

Really the only type of set that can be worked economically from a standard-capacity battery is a two-valver. Even this must have a small power valve. For example, you might be using a PM2A power valve, which takes 6 1/2 milliamperes at 120 volts. This would not leave

(Continued on page six)

# ELEMENTARY WIRELESS COURSE FOR BEGINNERS



Here you see a typical two-gang condenser, which is really two .0005-microfarad variable condensers with a common spindle for the two sets of moving plates. Note that the two sets of fixed plates are insulated from one another

In this week's instalment of the specially-prepared course on wireless for beginners, J. H. REYNER, B.Sc. (Hons) A.M.I.E.E. and the STAFF of "AMATEUR WIRELESS," describe and illustrate the working of the two-gang tuning condenser, which is a component widely used in the modern set

**I** EXPLAINED last week how we could improve the selectivity of our receiver by using two tuned circuits.

**Does each one require a tuning condenser?**

Certainly, and each tuning condenser must be adjusted to the correct tuning point if the arrangement is to behave properly.

**Isn't that very difficult to do?**

Not particularly. It is possible, however, to simplify the operation by mounting both the tuning condensers on the same spindle. This gives us a *gang condenser*. Most modern receivers incorporate such an arrangement so that the various tuning circuits may all be operated at once.

**Do the two circuits tune at exactly the same point?**

It is the business of the designer to see that they do! Theoretically, if we make the coils exactly the same so that their inductances are equal they should require the same tuning capacity for any particular frequency. So if we make the two sections of our gang condenser very accurately so that each has the same capacity at any setting of the dial the two circuits will both tune to exactly the same frequency.

**Is that easy to do?**

It requires careful manufacture. The construction must be rigid, and there must be no possibility of appreciable differences in any of the dimensions. This is quite feasible although, sometimes, in order to make up for small manufacturing errors, the end vanes on the moving plate assembly are split at intervals which enables the plate to be bent slightly.

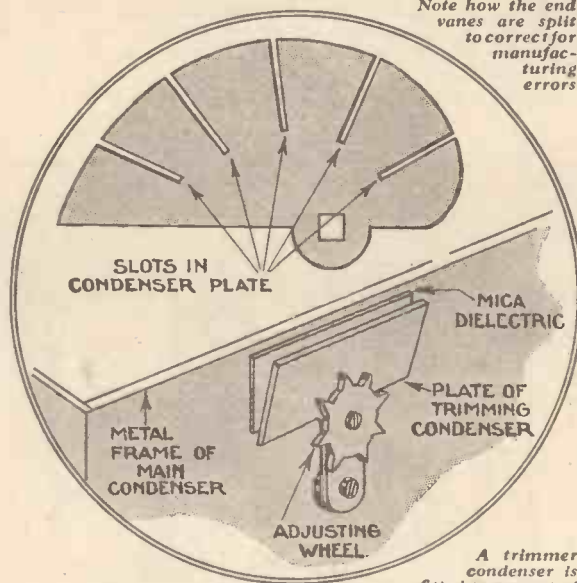
Thus, if the capacity of any one part of the scale is found to be a little too great on one condenser section, the end vane at this portion is bent away from the fixed vane slightly in order to reduce the capacity. This is actually done by a comparison between the

two sections during the process of manufacture.

**What are these things on the side?**

They are called *trimmers* and are for adjusting stray capacities. A tuning condenser is not the only way of obtaining capacity. Any two metallic bodies or even wires will act as the plates of a condenser and will thus have some capacity effect between them.

## POINTS ABOUT GANG CONDENSERS



Note how the end vanes are split to correct for manufacturing errors

A trimmer condenser is fitted to one set of plates so that two circuits can be accurately matched up during reception. Note the metal frame forms one plate of the trimmer

In addition to the tuning condenser we have a small extra capacity which we call *stray or circuit capacity*. This is not necessarily the same for the two circuits, since they are connected up differently and to allow for this we place small trimming or balancing condensers on each section of the ganged condenser.

**How do they work?**

The usual method is to provide a small plate of springy metal connected to the fixed plates of the condenser. This is adjusted by means of a screw to be at varying distances from the

metal framework of the condenser.

The metal framework is in contact with the moving plates so that we have, in effect, two extra plates on our tuning condenser and the capacity between these plates depends upon the distance between them. We can adjust the total capacity of the condenser within small limits by rotating the screw on the trimmer.

**How much variation is usually allowed for?**

The maximum is usually about one-tenth of the total condenser capacity.

**You say the tuning circuits are connected differently. How are they used?**

There are several methods. One method is to adopt what is termed *loose coupling*.

We pick up signals on the aerial in the usual way and introduce the voltages into the first tuned circuit. When this circuit is properly tuned, oscillating currents build up to an appreciable value so that the first coil produces a magnetic field.

This influences the second coil which is placed a short distance away and induces voltages in this secondary winding.

If this second circuit is also tuned to the correct frequency these voltages are able to set up a considerable oscillating current again, so that we are able to develop quite large voltages across the tuning condenser of the second circuit. We use this to operate our detector or amplifier, whichever we choose.

**What did you say was the advantage of this?**

You obtain a double filtering action. Suppose we have two wireless signals, one of which we want, but the other (which we do not want) is ten times as strong.

## GANG CONDENSERS SIMPLY EXPLAINED

We adjust our first circuit to tune to the signal we want, but there will still be an appreciable current in the circuit due to the unwanted signal, because it is so much stronger.

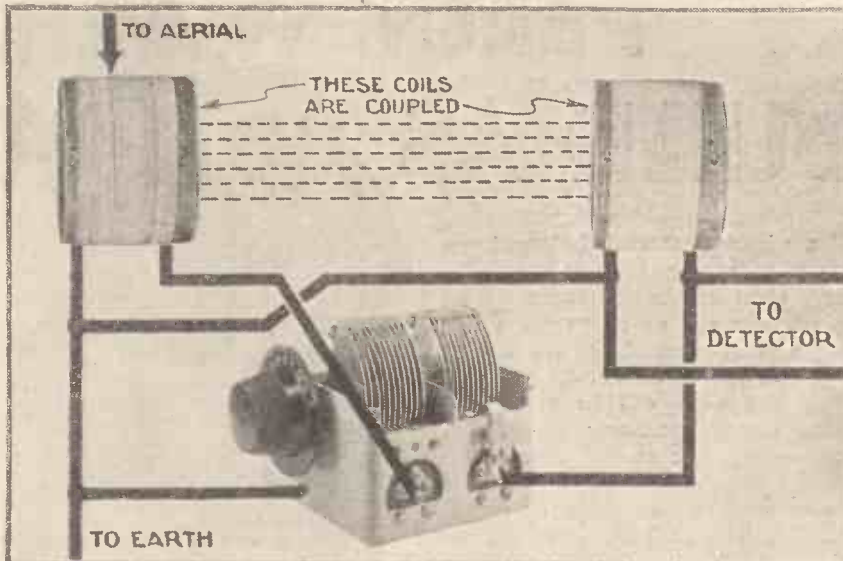
Suppose we assume that due to the tuning of our circuit the strength of the current from the unwanted station is reduced to one-tenth. We now have the signal strength from both the wanted and the unwanted stations of the same value. We can hear the station we require, but it would be badly jammed, as we call it. This is where the second tuned circuit comes in.

Both these currents induce voltages in the second circuit which, again, is tuned to the wanted station. Therefore we shall obtain the full current at this frequency, but the other frequency will be reduced to one-tenth, as it was in the first circuit.

You see that while the signal we require has been handed on unaffected, the interfering signal has been reduced by two successive stages of 10 to 1, so that instead of being ten times as strong as the signal we require, it is now only one tenth as strong and would not cause any serious interference.

*That is very useful. Are these coupled circuits much used?*

To quite an appreciable extent. They are often called *band-pass tuners*, for a reason which you will appreciate later on. The name means that they will only accept a very small band of frequencies and will cut off all frequencies outside.



A simple pictorial diagram that clearly shows how two coils in the aerial-tuning arrangement can be tuned with a single knob by the aid of a two-gang condenser

Here the voltage from the first circuit is applied to the grid of an H.F. valve and in the anode circuit we place another tuned circuit. The action of

see that the wireless signals have to be filtered twice before they reach the detector, so obtaining an improved selectivity in much the same way as with the coupled-circuit system.

### NEXT WEEK

#### SCREENING :

#### What it is and what it does

the two circuits is much the same as before, but we have, in addition, the amplification of the valve, so that we not only increase the selectivity,

#### Which is the better arrangement?

The choice depends upon circumstances, such as the amount of high-frequency amplification required. Thus we sometimes use one system and sometimes the other, or in many sets we can use a combination of the two. The band-pass three type of receiver, so popular to-day, employs two tuned circuits of the loose-coupled or band-pass type in the aerial circuit, and a third tuned circuit in the anode circuit of the high-frequency valve. The selectivity obtained with such an arrangement is incomparably better than that of the simple single-tuned arrangement we have so far considered.

#### Is there any loss in tuning so many circuits together?

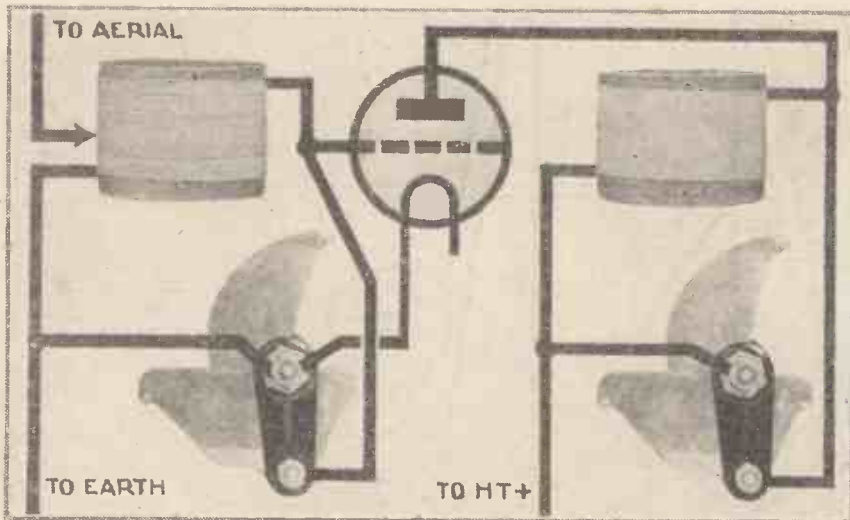
It is necessary to be careful, of course. If any one circuit is not properly in tune, both the signal strength and the selectivity suffer. It is necessary to ensure that the coils are all *matched*, as we call it. They must have the same inductance.

The condenser sections must all be similar and we must trim up the circuit so as to compensate for the small differences in "stray" capacities.

#### It seems rather a lot to me!

It is easy to do if one pays the money. Matched coils are more expensive than coils which have only to be approximately right. Similarly, the accuracy demanded of the condenser requires more extensive construction.

In fact, if we are striving for simplicity, it is customary to limit the number of circuits to two. If this is done the trimmer of one of the condensers can be arranged to be operated from the panel.



Another very simple pictorial diagram that will help those who do not understand theoretical circuits. Here we show the connections for tuned-anode coupling, with a tuned circuit in the aerial circuit and a similar tuned circuit in the anode circuit of the valve. For simplicity separate tuning condensers are shown though it would be quite possible to use a two-gang condenser

*Can you continue adding circuits like this?*

Yes, if you wish, although it is more usual when using a number of tuned circuits to link them together by means of high-frequency-amplifying valves.

but also the signal strength.

There are various ways of connecting the tuned circuits in the anode circuit of the valve, and we shall discuss these later.

From the pictorial diagram you will

# PERCY W. HARRIS'S BUILD AS YOU LEARN



Fitting the home-made screen to the completed set

IN our lesson last week I showed you how to re-assemble, on the base-board, some of the components from the previous set, so as to begin this week a practical study of the screen-grid valve and its circuit.

Our first work will be to fix the second tuning condenser in position, remembering that at the moment we shall not include any reaction—at least no additional reaction given by a controlling condenser. We shall get reaction—plenty of it!—in some of our experiments, but I want you to see how we shall avoid unwanted effects before, in a later lesson when we have obtained stability, we apply additional reaction.

### ADDING COMPONENTS

With the second condenser in position then, and a duplicate of our first simple coil in place, put the third valve holder in the position shown, with the 1-microfarad condenser we had left over.

The screen-grid valve has the usual four pins on its base and an additional connection at the top. The two filament pins and the control grid pin are the same as in an ordinary valve, but the pin which is used for the plate connection in an ordinary valve now becomes the screening grid, the actual plate connection being taken to the terminal on the top. This screening grip has to be made positive and is, therefore, connected to a positive H.T. tapping, the voltage being arranged according to the makers' instructions and being always less than the plate voltage.

You will remember that in our previous set the eight terminals were used for aerial and earth, low-tension negative, low-tension positive, high-tension negative, high-tension positive, and

loud-speaker respectively. In the present set we have to have two instead of one high-tension terminals but there is no need to fit an additional terminal as we can make the low-tension negative and the high-tension negative common, both being, in any case, connected together inside the set.

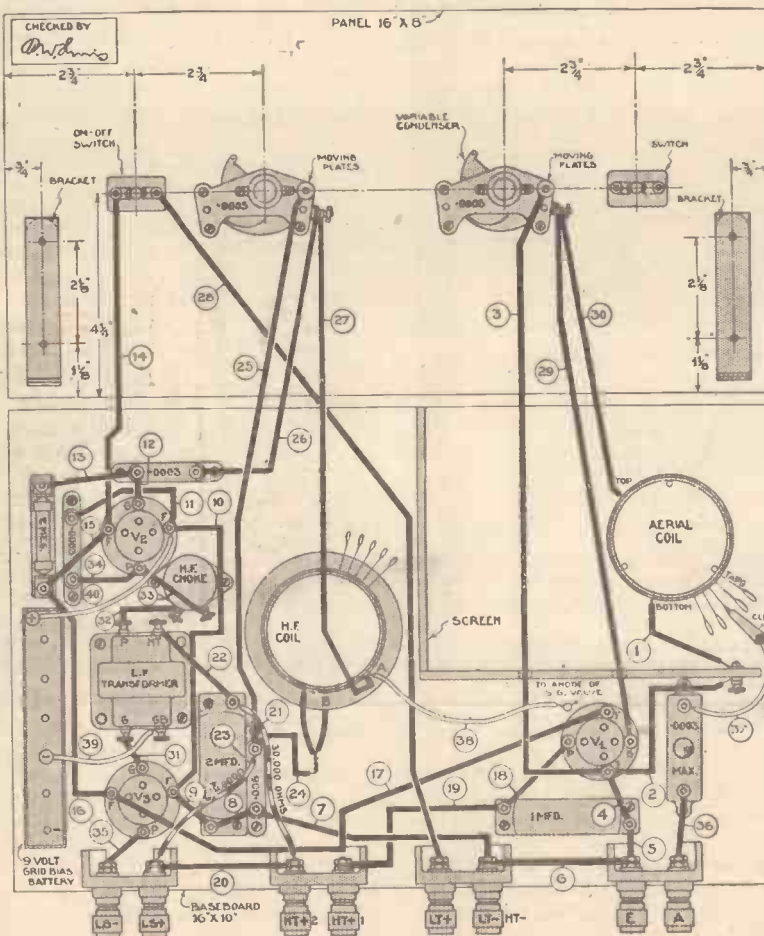
When this is done the terminal which was previously high-tension negative can be high-tension positive 1 and the previous high-tension positive will be positive 2. High-tension positive 1 will be taken direct to the screening grid and a path will be provided to earth for high-frequency currents through the 1-microfarad condenser.

### SIMPLE CONNECTIONS

The connections to the screen-grid valve and to the first tuned circuit are quite simple. We come through our compression condenser to one of theappings, just as we did in the first set, while the top end of the tuning coil is joined both to the fixed plates of the variable condenser and to the grid of the screen-grid valve. The lower end is, as before, joined to earth and the negative side of the filament.

Our next problem is to decide how to couple the screen-grid valve to the detector circuit. The signals must be applied to the grid and filament of the detector valve as voltage changes and so we must arrange between the plate of the valve and the high-tension supply some form of circuit across which voltage changes will be set up.

We could arrange a resistance as we did when experimenting with low-frequency coupling, but for a number of reasons this would be very inefficient. Now if we arrange a tuned circuit with a coil and variable condenser and if we tune this circuit to the incoming signals, we shall get two very important advantages. The first will be that when the circuit is tuned to the same frequency as our input circuit, quite a big high-frequency current will be built up in it, considerable voltage changes will occur across it and it will be an



A quarter-scale layout of the new screen-grid three set, showing the new arrangement of the components on the baseboard



# BUILDING A SCREEN-GRID SET

## COMPONENTS REQUIRED

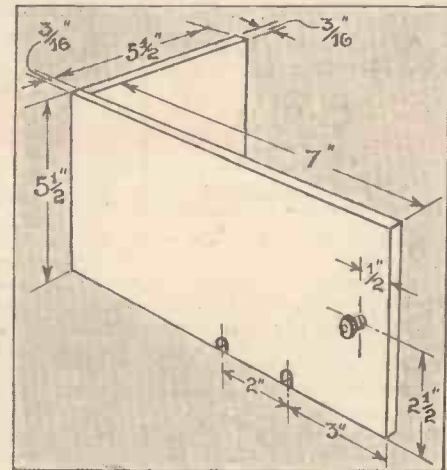
Eborite panel, 16 in. by 8 in.; wood baseboard, 16 in. by 10 in.; four terminal blocks to take terminals, marked: Aerial, Earth, L.S.—, L.S.+, H.T.—, H.T.+, L.T.—, L.T.+; two .0005-microfarad variable tuning condensers, filament on-off switch; three valve holders; low-frequency transformer; high-frequency choke; compression-type condenser of .0003-microfarad max.; two .0003-microfarad fixed condensers; .006-microfarad condenser; 1-microfarad fixed condenser; 2-microfarad fixed condenser; 2-meg-ohm grid leak and holder; 10,000-ohm spaghetti resistance; 30,000-ohm spaghetti resistance; two home-made tuning coils as previously described; sundries, such as panel brackets, wander plugs and spade tags, tinned-copper wire, screws, etc.

efficient form of coupling. Secondly, as the big currents will not be built up to maximum *except* when it is tuned to the wanted signals, unwanted signals which are out of tune will not be magnified to the same extent. In this way we may add to our selectivity.

We shall have two troubles. The strong current in the second coil will set up a big magnetic field which in turn will cause feed-back into our first circuit, and secondly, the efficiency of the circuit may be so great that even

winding, let us connect our second variable condenser across its two ends. We will also connect one end of the coil to the plate of the screen-grid valve and we will take the other end of the coil straight to high-tension positive 2.

We now have our circuit joined up as mentioned previously and we want to apply the voltages which are set up across it to our detector valve. We can easily do this by connecting the end of the coil which is joined to the plate of the screen-grid valve, to our detector grid condenser. There is no need to make a further connection to filament, for the simple reason that the other end of the coil is joined to filament through the high-tension battery. There is, however, need for decoupling, to prevent feed back of h.f., so we insert our spare 10,000-ohm resistance and the spare .006 condenser as shown, so that there is a path to filament for the h.f. currents without going through the high-tension battery. It is also advisable to shunt



A working drawing of the simple screen used to separate the two tuned circuits of the new set described to you this week

with the same grid bias voltage on the output, and join high-tension positive 1 to about 80 volts or whatever the maker of the screen-grid valve tells you is the screen voltage for his particular type.

## NEXT WEEK: Percy W. Harris Adds Selectivity to Power

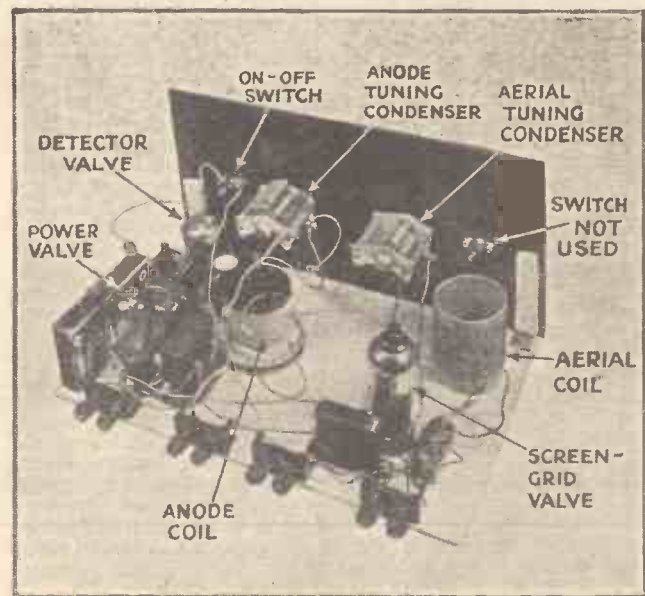
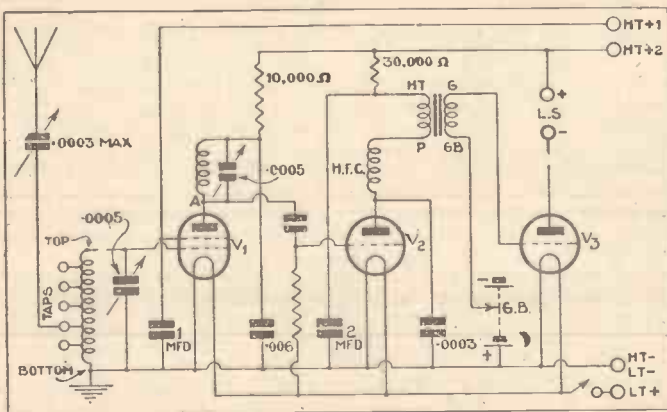
the plate of the detector valve to filament, so we use the spare .0003 condenser for this. Later, the reaction condenser will replace this fixed condenser.

## AERIAL TAP

Use a fairly low tapping on the aerial coil, set the second condenser at maximum so as to be well out of tune with your local station, and then turn the first condenser until you hear a station; now turn the second condenser and the station will increase in strength until

On the right you see a view of the new Percy Harris set with valve but with the screen removed to show the layout of the baseboard components

Below is the complete theoretical circuit diagram of the set, with screen-grid, detector and power valve sequence. Note that in this circuit only the medium-wave portion of the anode tuning coil is wired up, the long-wave and reaction winding being omitted



the tiny remaining capacity in the screen-grid valve may be sufficient to hand back enough energy to make the set oscillate. Let us take our original coil and ignoring for the minute the long-wave winding as well as the reaction

Now complete the filament circuit of the set through the switch as shown in our wiring diagram, put your detector valve and output valve into their respective sockets, using the same valves as we used for detector and output before,

the whole set goes into oscillation which will be due to the feed-back from the second coil to the first.

Now take the second coil in your fingers and turn it round until it lies on  
(Continued on page six)

3 0's 5



TUNING CONDENSER

3 0's 1



REACTION CONDENSER

3 0's 3



GRID CONDENSER

### A.B.C. OF REACTION CONTROL

in the form of "squeals," are quite permissible when you are searching for a foreigner. No normally tolerant neighbour is going to complain of that.

What he has a right to expect, though, is that when you have discovered the point at which oscillation is produced you will endeavour to keep below it.

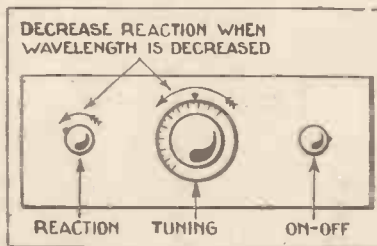
Probably the oscillation that causes the most trouble to neighbours is that set up without the knowledge of the offending set's owner. Often a set is tuned in to a foreign station on what is known as the "silent point" of the reaction control.

It is possible, when your set is tuned exactly to the wavelength of an incoming signal, to be oscillating violently without causing any audible squeal. This produces a sort of moaning noise in other people's sets, as well as spoiling the quality of your reception and theirs.

There is quite an easy way to find out if you are "silent-point" receiving. It is this. Always make a point of swinging the tuning dial each side of the point of tune.

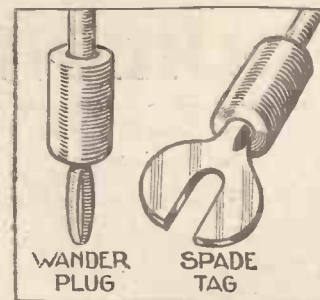
If the set has been receiving the signal on the silent point of oscillation this swinging to each side will cause a violent squeal. The pitch of the squeal will increase as you get farther away from the tuning point.

Conversely, it will become lower as you get back to the exact point of tune, so that at that point the frequency of the oscillation will be so low, due to the negligible difference in the local oscillation and the incoming oscillation, that it is below audibility.



When you decrease the setting of the tuning condenser it is essential to decrease reaction at the same time, especially if the reaction knob has been adjusted just short of the point of oscillation

Nevertheless, the set is then in a highly unstable condition, and you should never allow it



to continue, for the sake of your quality and your neighbours.

Remember also that the reaction "need" varies as the tuning range is altered. At low wavelengths you will find that less reaction application is needed to produce reaction than at the higher part of the tuning range. Be ready, therefore, to reduce reaction as you come down the tuning range, and to increase it slightly as you go up.

The most sensitive condition of the detector valve is not when the set is oscillating, but when it is just about to oscillate. The essence of good reaction control is, then, to make sure that you are at the threshold of reaction but that you are not actually oscillating.

This advice applies to the reception of distant stations. For home stations the less reaction you use the better will be the quality.

IN most three-valve sets the reaction is the most important control. Its effect on the selectivity has been clearly explained in previous supplements. In addition to this effect the reaction can introduce all sorts of queer results if improperly handled.

One of the most dreadful crimes in wireless reception is to allow the reaction to be advanced to the point where the detector valve is in a continuous state of oscillation.

This is specially reprehensible if the first valve of the set is the detector, for then the oscillations are being injected right into the aerial—and out into the ether for miles around your home.

Serious interference with neighbouring sets can be caused by excessive use of reaction. Occasional burst of oscillation,

### "BUILD AS YOU LEARN" (Cont. from page five)

its side, the two windings being at right angles, this will probably increase the stability by reducing the feed-back between them. Try twisting this coil about in different positions until you get the minimum of feed-back. You may not be able to find any position where the set does not oscillate when both circuits are in tune, but you will get a good idea of how the position of component parts affect the feed-back in a set of this kind.

#### REDUCING FEED-BACK

How can we reduce this feed-back? We can do a great deal by screening, so the next experiment I want you to perform is to take two pieces of wood, of the sizes shown, and nail them up in the form indicated. Now take the foil and fasten it to the inside so as to form a metal lining.

Take a small metal screw, pierce a hole in the foil and wood, and then secure it in the wood with a nut so as to make contact with the foil by its head. The screw will now project on the other side and can be used as a terminal. Stand the screen in the position shown and repeat your experiment. The set will still be unstable. Now connect the screen terminal

to earth. Stability will be obtained at once and the second coil can now be placed upright on certain parts of the board.

Once you have found the general effect on signals try and repeat your experiments out of broadcasting hours so as to avoid the possibility of interfering with your neighbours. The main purpose of the experiments this week is to make you fully acquainted with feed-back effects. Remember that none of the experiments this week will enable you to make the set completely free from feed-back, but you should be able to reduce the band over which oscillation occurs to comparatively few degrees or even to nothing over most of the scale. You will also get a good idea of the tremendous amplification possible with this wonderful type of valve. Selectivity in all these experiments will be rather poor.

In next week's experiments I will show you how to get not only stability but a greatly enhanced selectivity in the circuit with which we have been experimenting. Meanwhile may I ask you to obtain a further high-frequency choke? It will also be an advantage to have a second crocodile clip.

### WHICH SIZE H.T. BATTERY? (Ctd. from page one)

much for the detector valve in the two-valver.

Would a standard-capacity battery do? Yes, if you drop down to 108 volts, when the current taken by the valve also drops, with this particular valve to about 5 milliamperes, leaving 1 to 2 milliamperes for the detector.

#### SAVING THE ANODE CURRENT

It is a good tip to use a 108-volt battery instead of a 120-volt battery, especially if great volume is not needed. You can often save just enough current to enable you to use the smaller size of battery.

The double-capacity battery will give up to 10 milliamperes quite comfortably, and at a pinch will go up to about 14 milliamperes. This enables you to use a larger power valve with the two-valver, or to use a screen-grid valve in front of the detector of a three-valver.

For three-valvers with larger power valves, such as the PM22, a treble-capacity battery is essential unless frequent and therefore costly renewals are to be avoided.

Remember this rule: It is never extravagant to use a larger battery than the set demands, but

it is always very costly to use a battery that is too small for its job.

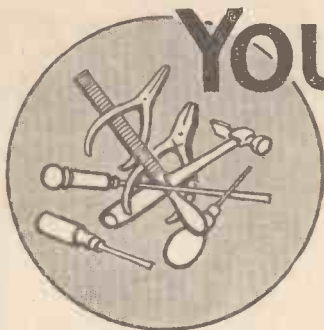
The great difficulty in making listeners appreciate this simple rule is that it is not easy to prove its truth except over an appreciable period of time.

Many set users consistently use too small a capacity or size of high-tension battery and yet never realise how much money they are wasting because it does not occur to them that the very frequent renewals they have to make can be avoided by getting larger batteries in the first place.

#### REAL ECONOMY

You might ask where the economy of getting a double-size or treble-size battery comes in—surely these cost twice or three times as much as the standard-capacity type? The answer is that the larger sizes of battery are cheaper in proportion to current-delivering capacity than the standard or small-size of battery.

Quite apart from the question of saving money, which is very real and important, you must never overlook the fact that a set running from an undersized battery, while quite satisfactory at the start, will often develop symptoms of instability later.



# YOU'LL NEED THESE TOOLS FOR SET BUILDING

*A very simple kit of tools will serve for the construction of "Amateur Wireless" sets, as we explain in this practical article for the beginner*

SO greatly has modern set-building been simplified that you will need very few tools to build our constructor's sets. The whole lot can be purchased for considerably less than one

One-sixteenth drill, for dial indicators and other fiddling small holes, one-eighth for starting most panel holes and for small bolts, three-sixteenths, one-quarter, five-sixteenths, and three-eighths. Add to these a countersinker for taking countersunk screws, such as are used for

quarter-inch width to the end of the blade.

Costing about one shilling this tool will enable you to fix inaccessible terminal and bolts. It is invaluable for all practical wireless work.

The other screw-driver must have a fine blade—about four

the various connecting leads.

Lest you should be tempted to think that the cost of the tools we have mentioned adds appreciably to the cost of your home-made set we should like to remind you that one set of tools will outlast a large number of sets.

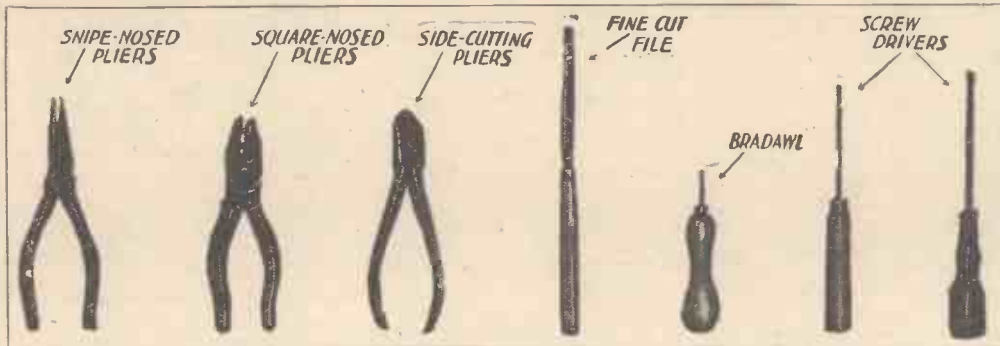
### AS EXPERTS!

Once you have equipped yourself on the lines suggested you will be competent to build every set we describe. You will have the satisfaction of knowing that you are doing the job of assembly with just the tools our constructional experts use in the AMATEUR WIRELESS workshops.

In addition to the small kit mentioned, you could, of course, invest in a small table vice. This is useful for holding the work steady, but is not indispensable.

### SOLDERING

Although most of the sets are wired up with leads fixed under the component terminals, the more expert constructor often prefers to solder the leads to tags. Soldering bits are very cheap



Here are most of the small tools you want for home radio construction. Note the different kinds of pliers on the left and the several types of screw-driver on the right

pound, even assuming you buy the very best on the market.

Few though the tools are for set-building, it is essential to equip yourself with the right kind, otherwise you will be put to all manner of quite unnecessary difficulties.

### NO EXPERIENCE!

If you have never before built a wireless set, and have never had occasion to use tools, there is no need to worry, because very little experience is needed to handle the group of tools we are about to suggest.

Building a wireless set consists mostly of drilling the panel and fixing components by means of wood screws. These simple operations can be carried out very easily by the novice if he has the necessary tool-kit.

We may as well start with the question of the drill, since this tool makes or mars the panel of the set. For panel-drilling there is nothing to beat a good hand or breast drill fitted with what are known as twist drills.

A hand-drill is not expensive, and quite a good one can be bought for less than six shillings. If you prefer the luxury of a breast drill there are plenty available around ten shillings.

Fitted to these are the twist drills, which you can buy as a set for about two shillings. The sizes essential for set-building are as follows:—

fixing the panel to the base-board.

Next we come to the question of pliers, as used for most of the tightening processes in construction, as well as for wiring.

It is as well to invest in the electrician's type, with stout insulated handles, so that you run no risk of a "shock" when tinkering with the set during reception experiments.

Three distinct types of pliers are needed. For a start you must have a pair of square or flat-nosed pliers, used for tightening big nuts on components. Half a crown!

Next on the list is a pair of snipe-nosed pliers for wiring and small nut fixing. Another half a crown!

### SIDE-CUTTERS

Lastly, your pliers outfit will be completed by a small pair of what are known in the tool trade as side-cutting pliers. These are very useful for snipping off the ends of wires after the leads have been secured under terminals, when it would be impossible to get at the spare end of the wire with the snipe-nosed pliers. About two shillings.

The next most important part of the constructor's equipment is screw-drivers. Two, at least, should be bought. One is a long thin-bladed affair with an insulated handle, and about a

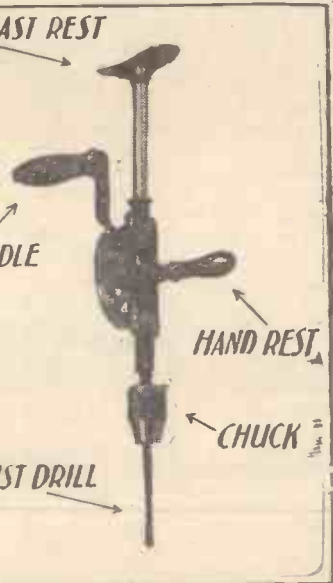
inches long and one-eighth wide—for getting at the grub screws of control knobs. This, and the tool above, should not cost more than one shilling a piece.

There are still several odds and ends that will help you in making a wireless set. For example, you ought to have some sort of bradawl, for locating the holes on the base-board for taking the component fixing screws. Sixpence to one shilling.

A scribe is another useful and inexpensive little tool that will greatly aid your location of the panel-drilling holes and for centering holes generally. Price as above.

Although not perhaps an essential, a rule of some sort ought to be included in your kit. Get an eighteen-inch rule of boxwood, marked in eighths of an inch. This is a very easy rule to read and will serve for all panels and baseboard you are likely to use. A foot-rule is not so useful.

Files will complete your tools. You might get a small set of these files, though all you need with most of our sets is a fine-cut file for cleaning the tags of components, before making pressure contact with the loops of



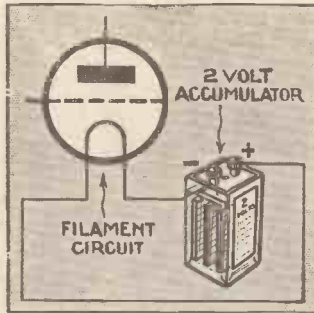
A breast-drill, which can be purchased for a few shillings, will enable you to make a good job of the panel component fixing. Here you see a good example of the breast-drill, fitted with a twist drill for dealing with ebonite

and even an electric bit can be purchased for about half a guinea.

# PULLING A VALVE DIAGRAM TO BITS

*Theoretical circuit diagrams need have no terrors for the beginner if each valve stage is carefully "pulled to bits" as shown in this informative article specially written for the supplement*

THERE is nothing difficult about a theoretical circuit diagram if you know what the symbols are intended to represent. During the past weeks we



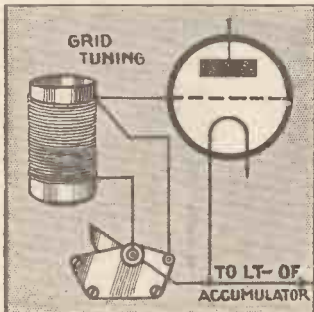
The filament circuit of a valve consists of an accumulator connected across the filament

have given various symbols from time to time, so that by now most readers of the supplement should be able to recognise the components of a set from its theoretical diagram.

Every set has certain common symbols. You will be well on the road to understanding a theoretical diagram if you can instantly recognise the chief valve circuits.

Let us in this week's article take to bits a typical valve circuit, such as you will find in every valve set's theoretical diagram.

We start with the familiar circle, which in symbolic form represents the bulb of the valve. In a two-valve circuit, for example, you will soon be able to pick out the two circles representing the valves. There will be three circles in a three-valver, and so on.



The grid circuit of a valve consists of an impedance of some kind, a coil or a transformer usually, connected between the grid and the negative side of the filament

Now we'll add the filament to the valve. This is symbolised as a loop through the bottom of

the circle. In the actual valve construction the filament will very likely be a looped length of thin, coated tungsten.

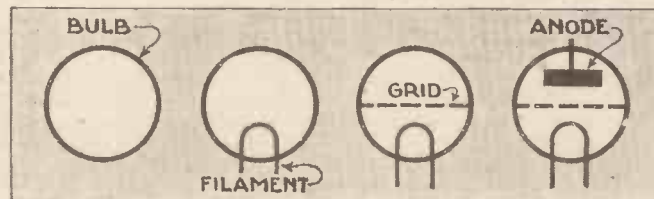
Now for the grid. This, in the valve, is a meshed coil surrounding the filament. In the symbol it appears as a dotted line above the loop for the filament.

### ANODE SYMBOL

The third electrode in the valve is the anode or plate, which in the valve symbol is shown as a short thick line at the top part of the circle, above the grid line.

The complete symbol for a three-electrode valve, consisting of a filament, a grid, and an anode, is a circle with loop, dotted, and straight lines. If the valve is a screen-grid, there will be another dotted line for the extra grid between the normal grid and the anode lines.

Every valve, no matter what its position in the set, has three main circuits. These are the filament, the grid, and the anode circuits.



Here we pull to bits a valve symbol, showing you what each part of the symbol means in relation to the three electrodes of the ordinary valve

Let us deal firstly with the filament circuit. There are, you will see, two ends to the loop forming the filament. These filament ends have to be connected to a battery, which will cause the filament to heat up and so emit electrons.

The usual battery used for this job is called an accumulator, and for modern battery valves a two-volt accumulator is required. One of the two terminals of this battery is marked in red and is the positive. The other terminal is marked in black and is the negative.

### FILAMENT CIRCUIT

The filament circuit is very simple. It is just a question of connecting the accumulator to the filament ends. One end of the filament goes to the positive and the other to the negative. That's all—but remember that one side of the filament will be more positive in potential or voltage than the other end, because it is connected to a higher point of potential, namely the positive

terminal of the accumulator.

In most battery sets, the filament circuit is broken in either the positive or the negative leads to insert an on-off switch, which is a simple device that enables one side of the battery to be disconnected when the set is not required to operate.

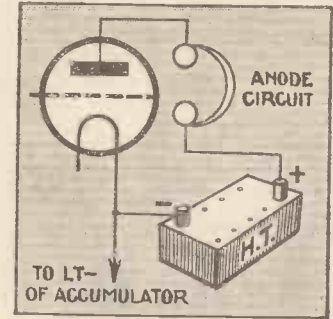
Now for the grid circuit. The grid has only one connection, as you can see from the diagrams. Then how can it make a circuit, you may ask. Really, we ought to speak of the grid-to-filament circuit, for that would at once show that the so-called grid circuit is the path between the grid and the filament.

### GRID TO FILAMENT

This path can be made up of one of several components. It may be, and often is, the secondary winding of the coupling transformer. Or it may be a tuning coil and tuning condenser, as in the diagram on this page.

One side of the coil is taken to the grid and the other side to the

In our diagram we have shown a pair of headphones, but in their place we could have another tuning coil or a low-frequency coupling, such as the



The anode circuit of a valve consists essentially of a high-tension battery between the anode of the valve and the negative side of the filament

primary of a transformer.

Note that the negative side of the filament is a pivotal point. It is the return for both the grid and the anode circuits. It is also one of the accumulator connections.

We take this point, low-tension filament negative, as the point of reference when considering the voltage on the anode and on the grid.

### ZERO POTENTIAL

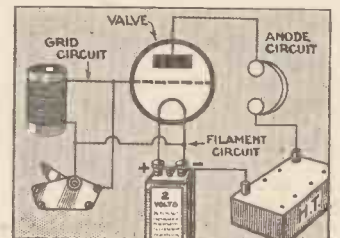
For example, in the grid circuit diagram the grid is said to be at zero potential, because it is connected through the tuning circuit to filament negative, and is therefore at the same potential.

The anode, on the other hand, is connected to the filament negative through a high-tension battery, and the anode is therefore the battery's voltage positive with respect to the fila-

### HIGH-TENSION

We have now to consider the anode or plate circuit of the valve. This circuit is taken as the external path between the anode of the valve, which, like the grid, is, of course, a single point of contact, through one or more anode circuit components, which always includes the high-tension battery, and so back to low-tension negative.

The anode circuit of the valve is the outlet for the energy amplified or detected by that valve. One of its jobs is to feed the anode of the valve with positive potential from the high-tension battery. Another job is to provide a means of coupling the valve to the next stage of the set.



Here you see a complete valve circuit, with its three external circuits—called the grid circuit, the anode circuit and the filament circuit

ment Every wireless circuit diagram can be split up into separate valve circuits as shown on this page.