

A NEW DEPARTURE

FULL-SIZE  
PRINTS OF  
AMAZINGLY  
SELECTIVE "3"

# Amateur Wireless

and  
Radiovision

Every  
Thursday

Vol. XVIII. No. 449

Saturday, January 17, 1931

The "1931

## ETHER SEARCHER"

A SET GUARANTEED TO MEET  
PRESENT-DAY CONDITIONS.



FULL-SIZE  
WORKING  
DRAWINGS  
IN THIS  
ISSUE

RECEIVES FIFTY STATIONS, EACH CLEAR & SHARP



LONDON

# An irksome task eliminated

## No more Coil Changing with this NEW LEWCOS ACHIEVEMENT

The Lewcos Twin Two-Pin Base  
Price 12/6

Ref.: TT/PB

Many users, both expert and amateur, testify that the Lewcos Two-Pin Coils have reached a standard of efficiency on which it would be difficult to improve, but another device to eliminate coil changing when Two-Pin Coils are used has recently been perfected.

With this new Lewcos achievement you can switch from the Medium Broadcast Waveband, 235-550 m., or to the Long Waveband, 1,000-2,000 m., by the turn of a knob. The twin sets of coil holders are arranged at right angles to each other in order to prevent damping by the coils not in use.

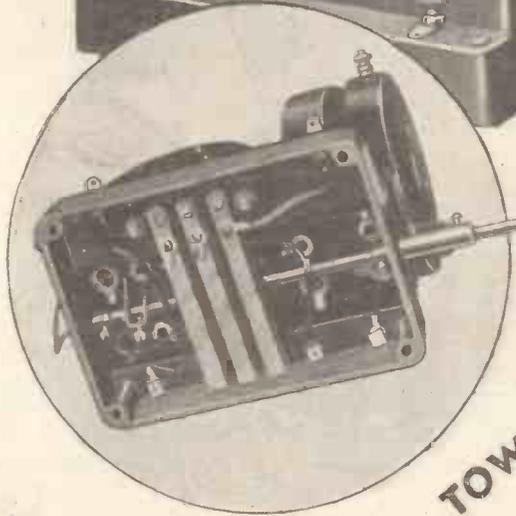
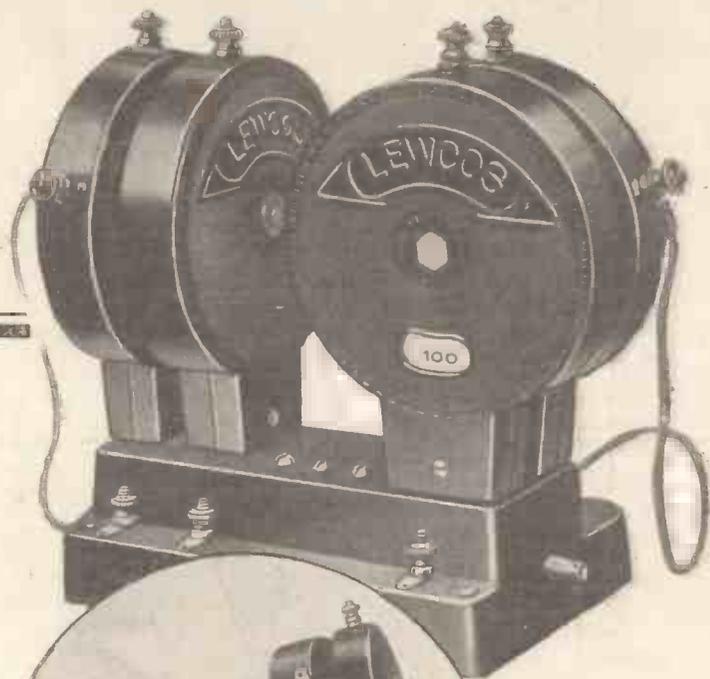
This useful component comprises a moulded base containing switching apparatus conforming to telephone practice, viz., cam-operated blades with silver contacts.

Its robust design, high-class materials and workmanship ensure efficiency.

Write for fully descriptive leaflet, Ref. R.69.

Recommended Coils for use with the Lewcos Twin Two-Pin Base:	
60 X	40 C.T.
250 X	100 C.T.

Specially suitable for circuits which have been described from time to time in "Amateur Wireless."



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



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



LEWCOS RADIO PRODUCTS FOR BETTER RECEPTION

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

REPRODUCTION... THAT MAKES YOU VISUALISE

# Vaudeville

STRAIGHT FROM THE SPOTLIGHT!

each 'turn' complete in itself—different—the famous operatic singer is quickly followed by an equally famous dance band . . . by a popular comedian . . . by a musical burlesque . . . and so on through the programme.

Each item in its turn is so faithfully reproduced by TELSEN that one can scarcely refrain from applauding as each turn comes to a close.

The rapid tonal changes of so varied a programme are a severe test on your Set, but, when TELSEN TRANSFORMERS are incorporated, they only tend to prove the unlimited capacity of these famous components.

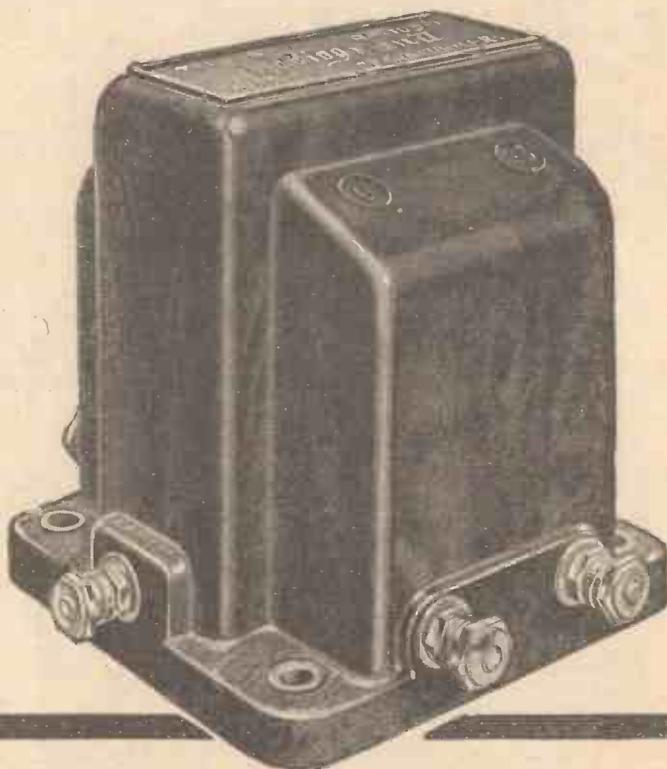
TELSEN Transformers are scientifically designed and built by expert radio engineers. Put one in YOUR Set . . . you will be amazed at the realism . . . the purity . . . and the greater volume. For real enjoyment, fit—



# TELSEN

## TRANSFORMERS

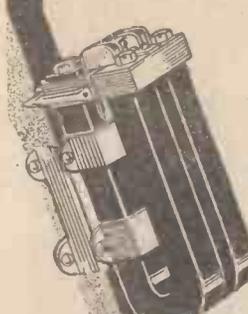
- "ACE" ... 5-1 and 3-1 8/6
- "RADIOGRAND" 5-1 and 3-1 12/6
- "RADIOGRAND" SUPER 7-1 17/6



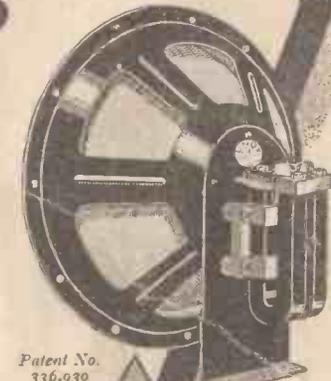
Adv. of Telsen Electric Co., Ltd., Birmingham

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

# Not a moving coil, but — the *Dynamic* 8



Patent No. 336,930



Patent No. 336,930

*The unit which triumphs in every test*

The Undy 8 pole *Dynamic* Loud-speaker Unit gives a volume and clarity of reproduction far beyond any other, yet working on a minimum of power is amazingly economical to run.

This extreme sensitiveness ensures the maximum result from every receiver, however small, and removes the necessity of high-power final stage valves, with the consequent saving on power whether from batteries or mains.

Within the few months of its introduction the "Undy" has literally swept the country—pronounced popularity which proves its amazing efficiency.

*Hear the Undy at any radio store and realise its pronounced superiority.*



# UNDY

## 8

POLE *Dynamic* UNIT



## WESTINGHOUSE METAL RECTIFIERS for ALL-MAINS RADIO

WESTINGHOUSE

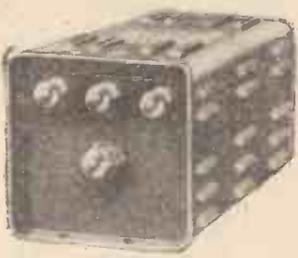
Why have the trouble... the worry... the expense of batteries and accumulators if your house is on the mains? Why risk missing a specially good programme because "the battery's down again"?

Our booklet, "The All Metal Way, 1931" gives complete information as to the most suitable type of rectifier for converting any battery-run set into an all-mains set.

If you are buying a mains set, make sure that it incorporates the Westinghouse Metal Rectifier—most of the good makes now do. If you are building such a set, send for the forty-page

booklet, "The All Metal Way, 1931." It is written by our technical staff and contains informative sections on radio sets, eliminators, battery chargers, moving coil loud-speakers, etc.

(Please enclose 3d. for your copy)  
PRICES of the Westinghouse Metal Rectifiers are from 15/-



### USE YOUR A.C. MAINS AND A WESTINGHOUSE RECTIFIER

THE WESTINGHOUSE BRAKE & SAXBY SIGNAL CO., LTD.  
82, YORK ROAD, KING'S CROSS, LONDON, N.1. Phone: North 2415

COUPON. Please send me your forty-page booklet, "The All Metal Way, 1931," for which I enclose 3d. in stamps. NAME \_\_\_\_\_ ADDRESS \_\_\_\_\_ PLEASE WRITE IN BLOCK LETTERS.

A.W.17,1/31

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



# MORE POWER LESS HUM

WITH THE ...  
AC/PI

## The MAZDA AC/PI

### CHARACTERISTICS:

Filament Volts . . . . .	4.0
Filament Amps (approx.) . . . . .	1.0
Max. H.T. Voltage . . . . .	200
Amplification Factor . . . . .	5
Anode A.C. Resistance (ohms) . . . . .	2,000
Mutual Conductance (mA/V) . . . . .	2.5

**PRICE 17/6**

There is no need to use a directly heated output valve in your all-mains set—with consequent risk of hum and the additional inconvenience of having to provide a separate L.T. winding on your transformers. Use the AC/PI—the finest output valve ever developed for all-mains sets, a valve which gives a huge output at only 200 volt H.T.!

# MAZDA RADIO VALVES



**THE EDISON SWAN ELECTRIC CO., LTD.**  
*Incorporating the Wiring Supplies, Lighting Engineering,  
and Radio Business of the British Thomson-Houston Co. Ltd.*

Radio Division:

1a Newman Street, Oxford Street, W.1  
Showrooms in all the Principal Towns

# EDISWAN

V.85

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

HERE IS THE  
**RADIO GRAMOPHONE CABINET**  
YOU ARE LOOKING FOR  
INSTALL A  
"LANGMORE"

and have your Gramophone, Wireless Set, Loud-speaker and Batteries all in one cabinet.

These cabinets are very strongly constructed of selected Oak and Plywood. Size overall, 3 ft. 2 in. high by 21 in. wide by 15 in. deep.

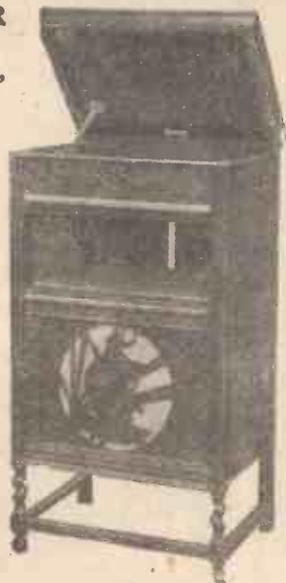
**THE TOP SECTION.** Size, 4½ in. high by 18 in. wide by 14 in. deep, gives ample accommodation for gramophone and pick-up.

**THE CENTRE SECTION.** Size, 10 in. high by 18 in. wide by 14 in. deep, is for the wireless set, to take a panel either 18 in. by 7 in. or 18 in. by 8 in.

**THE BOTTOM SECTION.** Size, 14 in. high by 18 in. wide by 13½ in. deep, gives accommodation for loud-speaker and batteries.

The whole of the back is enclosed by double doors, so that all parts are easily accessible. ALL are fitted with hinged top, heavy platform to take a 12-in. turntable for the gramophone, and a substantial baseboard for the wireless set.

BEAUTIFULLY FINISHED  
:: JACOBEAN OAK ::



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Phone: Holborn 4894.



**IDEAL FOR RADIOGRAMS**  
**NO INTERFERENCE**  
*if you fit a*  
**PAILLARD**  
**ELECTRIC INDUCTION MOTOR**

No brushes or commutator to cause interference. No belt. The motor runs smoothly and silently, without variation in the revolution speed even with largely fluctuating mains current. 12" velvet-covered turntable, automatic brake and cut-out. For 100-130 and 200-250 v. A.C. 7¼" x 5½" x 5½".

£4/17/6 (without Unit Plate, £4/10/0).

Super Pick-up and Arm, £2/2/6.  
Portable Gramophone Cabinet fitted with Paillard Motor, Super Pick-up and volume control, £8/15/0 complete.

**APOLLO GRAMOPHONE CO., LTD.**  
4-5 Bunhill Row, London, E.C.1



A  
**good item**  
**on any**  
**programme**

*Player's*  
*please*

It's the  
**Tobacco that Counts**

N.C.C.899

**TWO WONDERFUL VALVES**

*Highest Efficiency*  
*Lowest Price!*



**SUPER-DETECTOR**

Slope ... 2Ma/V  
Mag. Factor 15  
Fil. Current 0.15 **6/6**

**HYPER-POWER**

(2-vel)  
Slope ... 2.3Ma/V  
Mag. Factor 5  
Fil. Current 0.3 **8/-**

Steep Slope, low impedance, splendid volume, beautiful tone. Wonderful reproduction of the bass notes.



Ask your dealer or write for free folder to:-

**IMPEX ELECTRICAL LTD.**  
Dept. J.  
538 High Road, Leytonstone, E.11

*Best way to all Stations*

LITTLE STORIES OF GREAT MOMENTS



**"Look!  
It's going-it's going!"**

There was gladness in some hearts and consternation in many when Stephenson's Rocket started on its first perilous journey. Long embittered critics were confounded and the habits of a nation transformed. It was the complete triumph of a lifetime spent in doing one thing and doing it well.

It is this same spirit of "doing one thing and doing it well" which has, for years, been behind all T.C.C. endeavour. That is why T.C.C. have never made anything but Condensers, and that is why T.C.C. Condensers are unmatched—for accuracy and for dependability.

One of the many types is shown here. It is the T.C.C. .0003 mfd. Upright Mica Condenser. Price 1/6.



TELEGRAPH CONDENSER CO., LTD., N. ACTON, W.3.

7251

# FERRANTI

The goodness of FERRANTI components is reflected in the performance of FERRANTI All-electric Radio. Experienced constructors know that nothing less than the best satisfies Ferranti, and in every detail the range of All-electric Radio maintains the traditions Ferranti have established.

2-VALVE SETS for the REGIONAL Twin Transmissions. No tuning. Either programme at the turn of a switch. Good radio in its simplest form. £16

2-VALVE SETS for the Local Station. Long and medium waves. Dial illuminated and scaled in wavelengths. £16

3-VALVE SETS. Capable of superb reproduction, ample volume, and sufficient selectivity to ensure variety. £25 to £28

CONSOLES incorporating the 3-valve Set and a Moving-coil Speaker. From 28 guineas to £55

RADIO-GRAMOPHONES providing magnificent reproduction of gramophone records and the broadcast programmes. 75 guineas

All these Sets have plug and socket for gramophone pick-up. All are fitted with fuses and safety switch, and dual ratio (1-1 and 15-1) output transformer.

Easy Hire Purchase Terms are available.

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ALL-ELECTRIC RADIO  
IS SUPREME

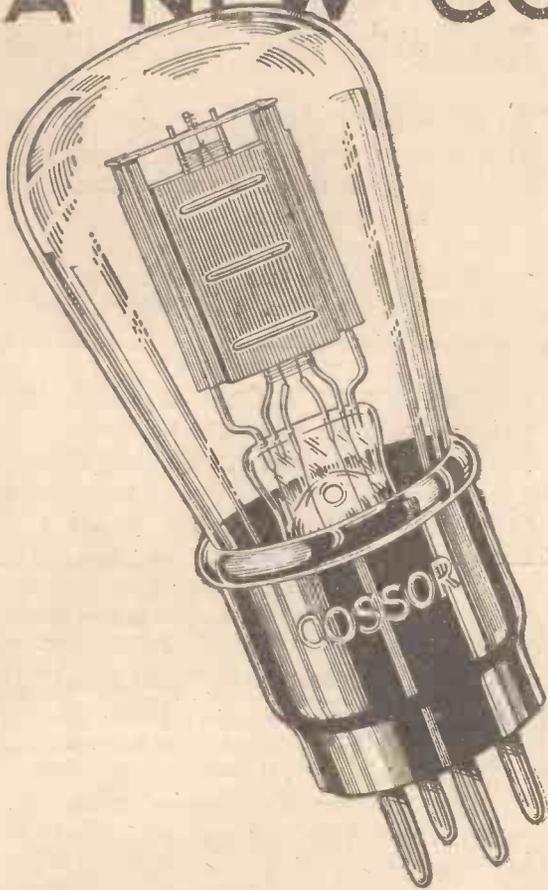
FERRANTI LTD.

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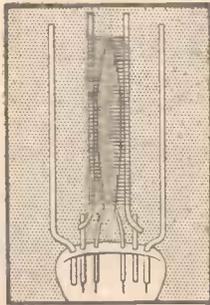
Don't Forget to Say That You Saw it in "A.W."

# 210HL

## A NEW COSSOR VALVE

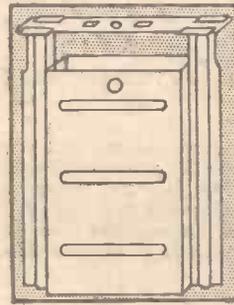


DESIGNED especially for more efficient H.F. amplification in non-screened grid Receivers, the new Cossor 210 H.L. possesses features of vital interest to all users of that type of Set. Amongst these may be instanced its special grid current characteristics. By the complete elimination of grid current in this valve a remarkable degree of distortionless H.F. amplification is ensured without the necessity of employing grid bias. As a result the Cossor 210 H.L. can be worked under the most efficient operating conditions—its amplification unimpaired by the effect of bias. Because of this and because of the other special features of the Cossor 210 H.L. detailed below the use of this new valve will effect a considerable increase in the efficiency of any non-screened grid Receiver.



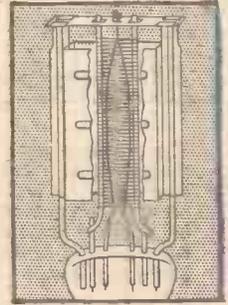
**SEVEN POINT SUSPENSION**

Practical experience has shown that the Cossor 7 point suspension system definitely eliminates microphonic noises. The system is employed in the support of the exceptionally long filament of the Cossor 210 H.L.



**MICA BRIDGE MOUNTING**

Permanent alignment of the electrode system is ensured by a stout mica bridge which forms an integral part of the anode assembly. When finally secured in position the whole structure becomes one interlocked unit.



**UNIFORM PERFORMANCE**

The Cossor mica bridge construction permits no variation of characteristics due to differences in inter-electrode spacing. Complete uniformity of performance is therefore ensured between all valves of the same type.

The new Cossor 210 H.L. 2 volts, 1 amp. Impedance 22,000. Amplification Factor 24, Mutual Conductance, 1.1 m.a./v. Anode voltage 75-150. Price . . . . . **8/6**

Be sure to get one of our novel, circular Station Charts, which give identification details of nearly 50 stations with space for entering your own dial readings. Ask your dealer for a copy, price 2d. or send 2d. stamp to us and head your letter 'Station Chart A.W.'

## THE NEW

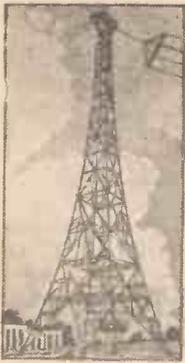
# COSSOR

## 210 H.L.

A. C. Cossor, Ltd., Highbury Grove, London, N.5

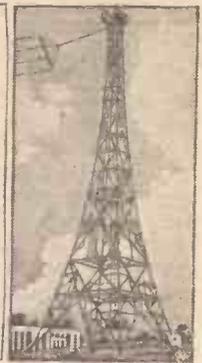
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Advertisers Appreciate Mention of "A.W." with Your Order



# Amateur Wireless

and  
Radiovision



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THE LEADING RADIO WEEKLY FOR THE  
CONSTRUCTOR, LISTENER & EXPERIMENTER.

## NEWS · & · GOSSIP · OF THE · WEEK

### A BUMPER NUMBER

HERE'S another bumper issue of AMATEUR WIRELESS—the great feature of which is a fine new receiver, the "1931 Ether Searcher." For months the Technical Staff has been working on the production of a new set which really can cut out unwanted stations and which, at the twist of only one knob, can bring in up to fifty stations, all on the speaker. You may be dubious and think that, with the ether so crowded as it is, no set could do this; but it can—the "1931 Ether Searcher" does do it!

### A FREE CONSTRUCTION PLAN

THIS amazing set is a three-valver with one screen-grid stage, and the secret lies in the special tuning system employed. The set is easy to build, and, to make the constructional work easy for novice and expert alike, we are giving in this issue a

free full-size wiring and layout plan. You will find this near the centre of this issue. Just remove the complete sheets from the issue, and there you are, ready to make up one of the best sets that has ever been produced.

### NEXT WEEK

AND, by the way, do make sure of getting next week's issue. This will contain further information and constructional details with regard to the "Ether Searcher," and there is bound to be a big demand for it. You will be disappointed if you find that the newsagent is sold out next week; so make sure now and order your copy to-day. See details on page 90.

### HAVE YOU HEARD ICELAND?

IN spite of several reports to the contrary, the Iceland transmitter has not yet come on the air. The wavelength will be 1,200 metres, and announcements will

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be made in Icelandic with occasional use of German and English. Arrangements have been made for every school in Iceland to be equipped with a receiver so that all scholars can obtain the benefit of the special school transmissions which will be arranged.

### IMPROMPTU BROADCASTS

A GERMAN radio station recently organised a novel broadcast. Four people were invited to the studio—a gardener, a bookbinder, a seamstress, and a housewife. No special subject was given, but the four were invited to just chat among themselves. After a preliminary canter to get used to each other, the microphone was "opened" in their midst. The remarks were quite spontaneous. They joined in the discussion with such enthusiasm that the station director was ultimately forced to fade them out as the time limit had been overstepped. Within a few moments of the fade-out the station was telephoned with requests that the broadcast might continue!

### SETS IN PRISON

IT is interesting to hear that wireless sets are now being installed in prisons. During the last six weeks Kolster-Brandes



LOGGING THOSE FIFTY STATIONS! When you have made up your "Ether Searcher," you, too, will be able to study a map of Europe and tune in practically any station you want—WITH NO INTERFERENCE

**NEXT WEEK: ANOTHER BUMPER NUMBER WITH MORE ABOUT THE "ETHER SEARCHER"**

# NEWS · & · GOSSIP · OF THE · WEEK

—Continued

have supplied sets to Norwich Prison and to H.M. Prison, Perth. This development bears out the remarks of the Home Office official, who says: "Wireless is already installed in several prisons, and I foresee the time when broadcasting will be used extensively for both education and entertainment of "good conduct" prisoners.

## DIALLING THE SET!

**E**VEN now tuning isn't a difficult process: with one-knob sets it is child's play. But the possibility of an automatic tuning control worked in the same way as the new dial-type telephones is rumoured. It is reported that patent rights have been granted to two Nottingham men for their invention of a dialling device for automatically tuning and controlling receivers and transmitters. It consists of a mechanism operated by a dial similar to that used in connection with automatic telephones.

## THOSE INTERNATIONAL BROADCASTS

**A**MERICA (the Columbia chain in particular) is relaying many British items just recently, and there is an "international" complex on the other side of the Atlantic. Mr. C. W. Horn, of the National Broadcasting Company, was intimately connected with a large part of the preliminary development work on international broadcasting. He says: "I foresee that we shall gradually improve and increase the number of broadcasts until, without any definite announcement or warning, we shall be arranging programmes for international consumption without giving much thought to the question as to whether or not conditions will be suitable."

## A PRIZE FOR A LICENCE

**C**ZECHOSLOVAKIA has had a bright idea! There are now 293,000 listeners in Czechoslovakia, and it is expected that

the 300,000th will take out a licence in a week or so. To mark the event, the Czech broadcasting authorities will make a presentation to the lucky 300,000th listener! It's a pity the B.B.C. doesn't do something on these lines!

## WHAT LISTENERS WANT

**I**NTERESTING side-lights on what the average listener expects from the B.B.C. are revealed in the analysis of the *Daily Mail* ballot, recently, concluded. Readers were asked how they would allocate a million pounds to B.B.C. programmes for 1931. To simplify matters, all broadcast matter was classified under the five headings of Vaudeville, Plays, Popular Music, Classical Music, and Talks. Vaudeville and Popular Music still head the list, but not in quite so pronounced a fashion as in 1927. There is evidence of support for the talks, but plays do not seem to be popular. A typical day's analysis shows that Vaudeville secured 100 votes, Popular Music 99, Classical Music 25, Talks 15, and Plays only 7.

## THE TALKS CONFERENCE

**A**N overwhelming majority at the National Conference on Broadcast Lectures decided in favour of broadcasting the talks at 8 p.m. or thereafter. Opinion was divided as to whether talks series should consist of six or twelve talks, and whether each talk should be of twenty minutes duration or thirty minutes. It is interesting to record that a strong appeal was made not to "talk down" to listeners. The professorial manner of some talkers is, we know, deeply resented by listeners.

## SCHOOL BROADCASTING

**F**ULL details are now available of the proposed broadcasts to schools for the spring and summer terms of 1931. The Central Council for School Broadcasting, a body of teachers and others engaged in

education, have no desire to make broadcast lessons compulsory, but they claim that broadcasting can furnish first-hand information beyond the resources of the average school. Although still in the stage of experiment, school broadcasting has certainly assumed a very important part. "We know that at this moment 3,000 odd schools are taking these talks," said a B.B.C. official "and we estimate that altogether at least 5,000 schools listen."



A school for broadcasters. In order to train artistes for the microphone a school has been started in London dealing with this special branch. Pupils attend the school, and sing, speak or play their particular instrument before a microphone. Almost immediately afterwards they hear their performance amplified, from a record, from which they can pick out the mistakes.

## H.M.V. TELEVISION

**E**LSEWHERE in this issue we record our impressions of H.M.V. television. Some suggestion has been made in the daily press that the B.B.C. should extend facilities for experimental transmissions of this system. But it cannot be too greatly emphasised that the apparatus in question is only in the laboratory stage. An insuperable difficulty in using the broadcast facilities of the B.B.C. for this system

## OUR FREE WIRING PLAN

In this issue we have adopted a novel and practical idea for giving a free full-size constructional chart and wiring plan of the "1931 Ether Searcher." Simply detach the sheets from the issue and use them as a template for panel drilling, for mounting the parts and for wiring. The chart simplifies wiring because the wire lengths are given in full size. Any novice can make up the "Ether Searcher" with the aid of this free print.

of television would be the wide frequency channel required. Readers will recall that the Baird experimental transmissions are confined to the 9-kilocycle channel available for sound broadcasting. The B.B.C. adopts the view that, while it is naturally interested in all technical developments allied to its service, it has no power to offer facilities for experiment. Actually, there is not the slightest indication that the H.M.V. engineers desire such facilities at this stage.

## SUNDAY PROGRAMMES AGAIN

**C**ONSIDERABLE space has of late been devoted to controversy about the make-up of the B.B.C.'s Sunday programmes. We are particularly interested to see that an appreciable amount of correspondence in the daily press records favourable impressions of the present programmes on Sunday. And when we look at the advance programmes we must admit that with Albert Sandler, the Gershom Parkington Orchestra, and the Wireless Military Band there is little cause to complain of the absence of light music on Sundays.

## MOSCOW CALLING!

**H**AVE readers heard the *English* broadcasts from the Moscow station on 1304 metres? This station is easily heard in London on a three-valve all-electric set. The broadcasts are frequently made in the English language and relate to propaganda on the Russian Soviet Five-year plan. From what we have heard it would seem that the proudest boast of a Soviet worker is that his output has exceeded the requirements of the Five-year Plan! Touching little episodes are broadcast to show how workers who were disgruntled before the revolution are now happily working for the good of the cause. Sometimes a Russian delivers the English broadcasts, but on one occasion we distinctly recognised a Clydeside accent!

# HOW TO CONTROL THE TONE OF YOUR SPEAKER

*Details of a novel unit to connect to your speaker to accentuate bass or treble at will*

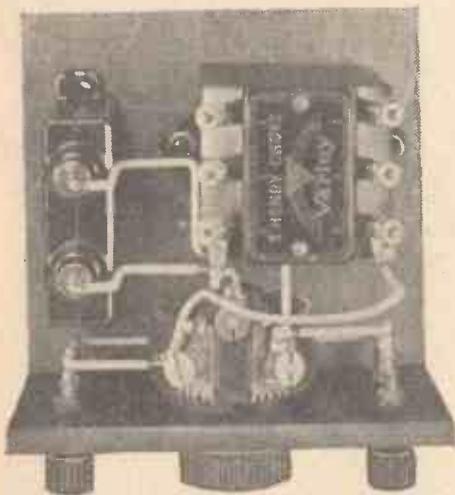
CAN you control the tone of your speaker? It is easy enough, of course, to fit a volume control either to the set itself or to the speaker so that the strength can be controlled, but many people do not realise how easy it is to alter the output arrangement so that the tone can be altered.

Now, you may want to alter the tone to a certain extent permanently. Perhaps you are dissatisfied with the natural tone of the speaker, and think that it would be an improvement if in some way it could be more powerful either at the high- or low-frequency end of the scale.

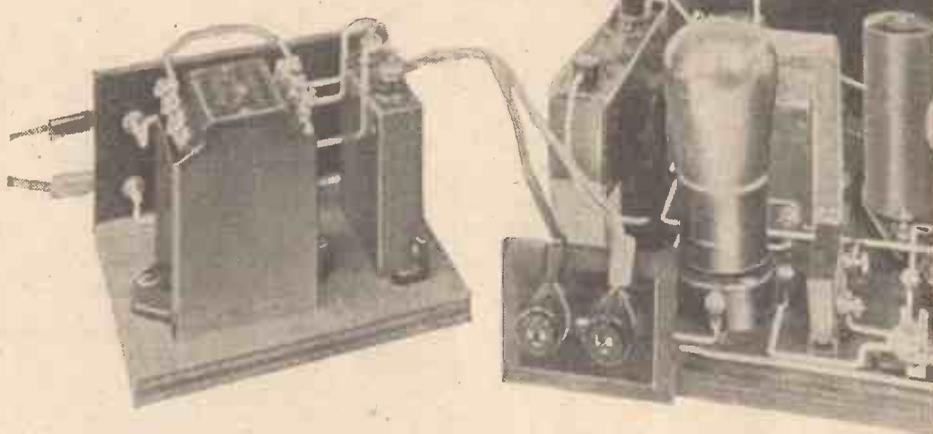
Or perhaps you would like to have a handy control near the speaker by means of which you could, at will, shift the tone from boominess to shrillness. In this way you could make the most of any particular broadcast item. On dance bands, for instance, you could add plenty of resonance to the bass, while on items such as piano and violin solos, you could alter the tone, generally towards greater accentuation of the higher end of the scale.

The little unit illustrated by the accompanying photographs gives you this handy tone control. It is extraordinarily simple to make up and, considering the benefit it gives, is very low in cost. It will be seen from the list of components that heavy duty parts are specified. It is an absolute waste of time to put unreliable chokes, condensers, and variable resistances in a unit of this kind.

How does it work? Glance at the circuit diagram which shows the connections of the special tapped three-henry choke, the .05-microfarad condenser, and the 50,000-ohm potentiometer.

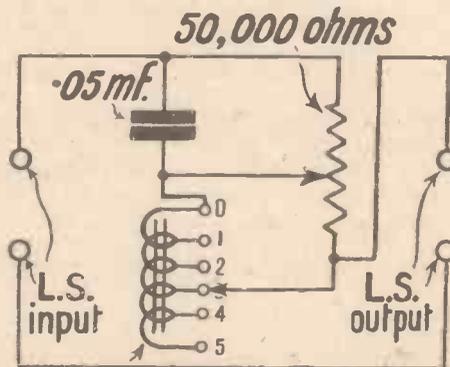


The construction of the unit requires only three components



The unit connected to the set speaker terminals

The idea is that the choke results in a high-note circuit, whereas the condenser produces an accentuation of the bass. The potentiometer is provided to control the amount by which either the choke or



3 henries

The circuit of the unit

condenser arrangement is brought into circuit.

Constructionally, the unit presents no difficulties at all because the choke and condenser are simply screwed to a small piece of ply-wood, forming the base of the unit, and the input and output terminals and potentiometer are mounted on a small strip of ebonite screwed at right-angles to the baseboard.

### COMPONENTS

- Baseboard 4 in. by 4½ in.
- Ebonite strip 4½ in. by 2½ in.
- Tapped special 3-henry choke (Varley).
- One 50,000-ohm potentiometer (Regentstat, Colvern, Clarostat).
- Four terminals, two marked "input" and two "output" (Belling-Lee, Igranic, Ealex).
- One .05 fixed condenser (T.C.C., Dubilier, Lissen).

Make sure to connect up the choke correctly. It will be seen that the terminal 0 is connected to one side of the fixed

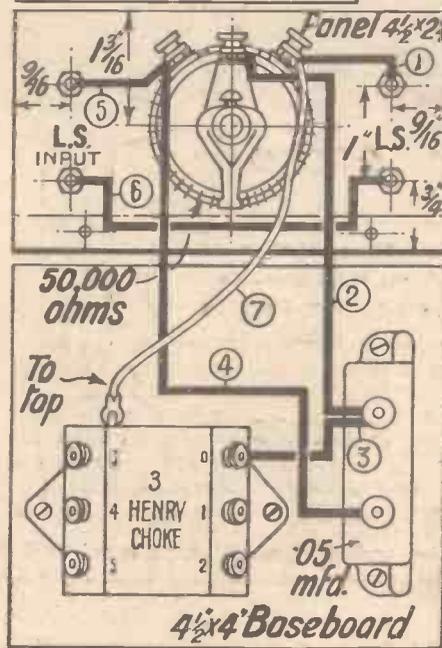
condenser and to the moving arm of the potentiometer. A tapping is provided from one side of the potentiometer winding, and the other end of this wire should have a spade tag soldered on to it so that it may be placed in any one of the five other terminals of the transformer.

Now for working. Simply connect the input side of the unit to the loud-speaker terminals of the set and connect the output terminals to the speaker itself. Note that this unit must not be used without some form of output circuit insulating it from the anode D.C. current.

Try each tapping on the choke in turn, varying the potentiometer at the same time and noting the tonal change possible.

It will be found that one setting gives the best standard of tone and the most satisfactory possible variation.

### BLUEPRINT N°A.W.269



The layout and wiring diagram. A full-size blueprint is available, price 6d.

# ANOTHER SPECIAL NUMBER NEXT WEEK

## A Pictorial Guide for the "Ether Searcher" Builder

**W**E have produced the set of the season. Before publishing a word about it, we took many opportunities of getting it tested by different people, and I give here just a few extracts from the test reports. A telegram received says: "Thanks for opportunity of testing out the '1931 Ether Searcher.' Selectivity marvellous."

### Stations All Round the Dial.

One hundred per cent. better than the best. Heartiest congratulations."

A Broxbourne, Herts, tester says: "I tested the '1931 Ether Searcher' a few days ago. There was

### No Interference from Mühlacker

when listening to the Regional. This speaks for itself. A novice friend also worked the set, and after five minutes' experience at the single-knob control he had brought in twenty-four stations quite clearly on the speaker, five of these being on the long waves."

A Brockley tester says: "The '1931 Ether Searcher' certainly ranks among the very best. Very few receivers, especially of the battery type, can separate such pairs of high-powered giants as, say, Rome and Stockholm, Langenberg and

Midland Regional. The 'Ether Searcher' does."

Another London, S.E., tester says: "What most impressed me when I tried the '1931 Ether Searcher' was the strength of the foreign stations. One might reasonably expect that some loss of strength would be experienced with this selectivity. Actually there *appears* to be a gain. The three tuned circuits, operated by a single knob, constitute the only satisfactory way of coping with the present ether congestion."

Alan Hunter, who designed the original "Ether Searcher" two years ago, has tested the "1931 Ether Searcher," and says: "With this set you can search the ether just as easily as in the halcyon days, when the original model was produced. To search the ether to-day you must have, at least, three tuned circuits. These are provided in the '1931 Ether Searcher' with a simplicity of construction and operation

### Never Before Equalled

in a three-valver."

Do you wonder at the fact that we have never put forward a set with greater confidence than we do this amazingly selective "three." We shall have a lot more

to say about it next week, when we shall give further constructional details and treat individually a number of special points, all simple but requiring to be observed.

Particularly, shall we make clear the order of assembly and fixing of the parts. This is a matter in which a new constructor sometimes makes trouble for himself, but if he will just follow our instructions and do the first things first, he will have no difficulty whatever.

A big and novel feature of next week's special issue will be the inclusion of a constructor's

### Large-scale Pictorial Layout

in which every component of the "1931 Ether Searcher" will be shown in position, and which will give, in addition, practical hints that will guide the amateur builder. This pictorial layout will measure about 16 in. by 11 in., and will be part of the issue itself, not loose.

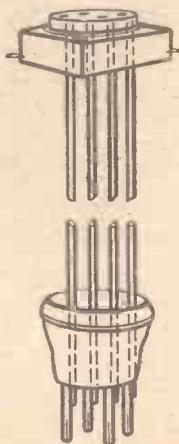
In many other ways, next week's issue will have special character and more than usual reader interest. Everyone keen on the new set must not miss it, and every other reader will find in next week's issue many valuable recreative and useful features.

## The Set of the Season.

## Start Building It!

### A HANDY DEVICE

**T**HE following device, which can be made at the cost of a few pence, will be found to be extremely useful in experimental work. A burnt-out or otherwise useless valve is broken and the base carefully "disembowelled" of all adhering glass. Holes are then bored close to the



Made out of an old valve base this novel device facilitates testing

pins and rigid metal supports soldered to the latter. Corresponding holes are made in a valve holder which is in turn soldered to the upper ends of the supports. To add to rigidity, melted paraffin wax should be poured into the valve holder, whilst cross strips of ebonite may be necessary to strengthen the rods.

Thus we have a handy method of placing a valve on "stilts," as it were. It may be more easily examined in working conditions: its filament and plate voltages checked and its anode current taken. Again, by making a break in the filament connections, we have a handy means of running one of the valves at a different voltage to the others—quite useful for experiment.

F. C. W.

### AROUND THE SHORT-WAVE DIAL

**H**AVE any readers ever tried using a frame aerial for short-wave reception? I tried using one some time ago and obtained some quite good results, too. The trouble is that on the very shortest wavelengths the frame has to be of very small dimensions, so that its high-frequency pick-up must remain relatively small. There are certainly some good possibilities in this direction and the reader who is keen on

experimenting on the short waves is certainly advised to build a small frame and try various arrangements. If the frame is efficiently constructed, the pick-up will be surprisingly large, except as mentioned before, on the very shortest wavelengths. For the bands from 30 metres upwards it should give quite good results.

Of the various methods of receiving on the short waves, the oscillating detector followed by two low-frequency stages has undoubtedly been the most popular in the past. The coming of the screen-grid valve altered the position somewhat. This type of valve is now being used as a high-frequency amplifier in various forms, it is being used as a detector in some receivers, and lastly, it is also coming into use as a resistance-capacity coupled low-frequency amplifier. Apart from the last two mentioned usages, the screen-grid valve, of course, is mostly used as a high-frequency amplifier. There are signs that the super-heterodyne receiver is coming back into popularity again and now that we have the screen-grid valve, it is possible to get enormous amplification from this type of receiver. A short-wave super-heterodyne receiver is probably the most powerful type of receiver available for ordinary amateur use to-day.

A new short-wave station has made its appearance during the last few weeks. This is WIXAZ, a 10-kilowatt relay station of WBZ at Springfield, Mass., U.S.A. The wavelength is about 32 metres.

MANDER BARNETT.

### WHY NOT—

take more care with the reaction control? To obtain good quality, one must remember never to force reaction. If one then requires more selectivity, add more tuned circuits, as is done in the new "Ether Searcher."

fit an anti-motor-boating unit? The condenser should have a value of 2 microfarads and should be capable of standing up to the mains voltage.

# ANNOUNCERS TELL THEIR STORIES

## SOME QUAINT BROADCASTERS

By DANIEL PRIOR AND CARL SCHIONNING, of the Copenhagen Station

THERE are two announcers at the Copenhagen station, and we share the service between us. In the minds of many Danish listeners we pass for a kind of "Siamese twins," not because we resemble each other (on the contrary, one of us is tall and lean and the other short and stout), but because listeners maintain that they can hardly tell who is who.

This can naturally occasionally be annoying, but at other times to our advantage, as, for instance, if one of us makes a mistake he can easily blame it on to the other; and often does!

### "Our Artistes"

But let me speak of our artistes. This is a little story from the early days. An elderly and jovial actor had been given a story to broadcast. He did not care for the story and complained, before broadcasting, saying jokingly and in a loud voice to the announcer that, nevertheless, he would do his best.

Well, he began, and the announcer went to the other end of the studio. The actor did his best, but when he had finished he forgot that the microphone was still



Carl Schionning, the other announcer at Copenhagen



Announcing from the Axelborg studio used by the Copenhagen station

"open." He turned round to the announcer and gave a sigh of relief, saying: "Thank goodness that that is over, such rot as it was!"

*A propos* of an "open" microphone. One afternoon we had two Swedish artistes who had recited Strindberg. The microphone was closed—at least, we thought so—but owing to some mistake in the control room the microphone was still switched on. At that time it was still the custom for the announcer to pay the artistes their fees. The result was that all the listeners heard how much the artistes received for their services, and could hear the actors expressing their pleasure!

### A Nervous Actor

It can happen that even the most experienced actors become nervous in front of the microphone. One of our best-known Danish actors, let us call him "Mr. H.", one evening during the broadcasting of a play suddenly forgot what he ought to say. When the play was over, I enquired how he lost his cue. He would never confess that he was at fault, and he made the excuse that the lighting was to blame and that he had the greatest difficulty in reading his part. A few days later a particularly bright lamp was placed over the microphone, and "Mr. H." had to broadcast again. Again he bungled, so that the other actors very nearly lost their cues. Afterwards he excused himself by saying that it was the fault of "that confounded carpet," which he nearly stumbled over and which distracted his attention! But then I suppose all artistes have their faults!

One evening we had a well-known professor who came to give a lecture. This man was unusually nervous about the microphone, and he seemed terrified when being shown round the studio. But at last we succeeded in reassuring the professor. We shut him in the studio and went into the announcer's listening cabinet. The lecture began and we could distinctly notice that he grew more and more nervous. Towards the close of the lecture his voice positively shook.

At last he finished, and we went in to see

the professor and take leave of him, but—what a sight! We had left him like a smart elderly gentleman wearing evening dress and a prominent pair of gold spectacles; but after the broadcast we found him with his trousers hanging down loose and wearing only an under-vest. His clothes lay scattered about the studio—all except his gold spectacles. He swore that this should be the last time that he would broadcast—and he kept his word!

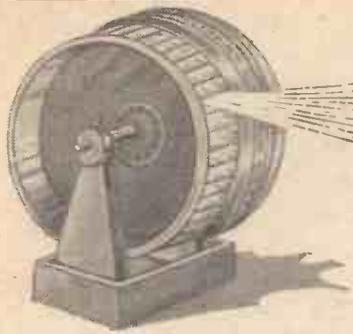


Daniel Prior, one of Copenhagen's announcers

A young lady who broadcast recently was little acquainted with the mysteries of wireless, but still she knew that we had just opened up our short-wave transmitter. At home she only had a crystal set; but in all seriousness and with a happy smile she said: "Yes, and I must certainly say that since you opened that—what do you call it?—oh, yes, short-wave station, we hear far clearer and more distinctly at home."

We put that one to the engineers!

Let "Amateur Wireless" solve your problems



*A new Television System, which is based on already well-known principles, has been developed by the "His Master's Voice" engineers, who have set out to attain definite entertainment value. Below is a description of the apparatus and the results obtained.*

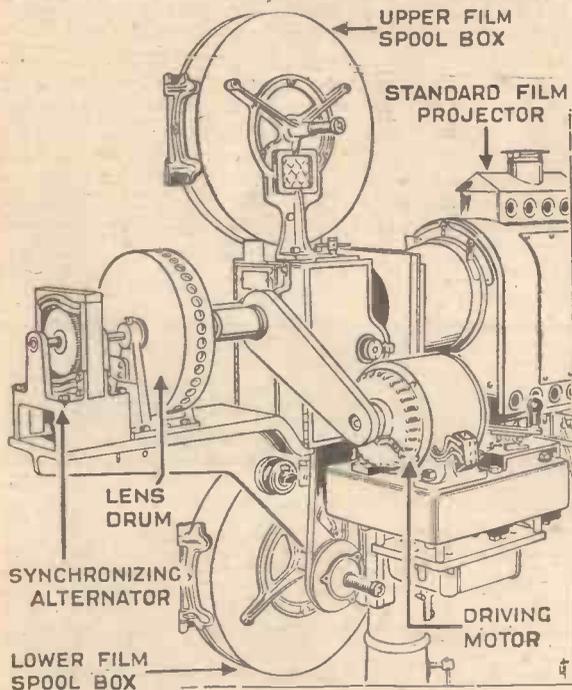
**T**ELEVISION on an entertainment basis; that was the guiding thought of the H.M.V. engineers when they started to tackle the many problems of transmitting vision by electrical means. A few days ago we saw the first fruits of this H.M.V. research, when a select party was invited

To explain the general principles of H.M.V. television we must refer to the make-up of a picture. Any printed illustration consists of hundreds of small dots, varying both in size and blackness. The larger the number of these dots in a given area the more detailed is the picture. Reducing the number of dots has the effect of reducing the picture detail.

tively narrow frequency channels allotted to broadcasting.

H.M.V. rightly state that this policy has prevented the perfection of a picture, thus forcing the all-important question of entertainment value into the background.

"Without entertainment value," contend H.M.V., "television must fail as a popular commercial proposition." For the time being, H.M.V. has concentrated on the perfection of the television image, leaving possible commercialisation until further research has shown the way.



The H.M.V. transmitter for televising films: a lens drum is used for breaking up the image, the light falling on photo-electric cells

**The Principle Used**

So much for still pictures; when we are dealing with moving objects the principle known as persistence of vision is involved. The eye tends to retain an image of the original object for an appreciable time after it has been removed. To give the illusion of a continuously moving picture, twelve pictures per second must be passed before the eye. If the number of pictures per second is reduced a flicker is noticed.

In transmitting a picture in which there may be as many as 10,000 dots, each of these dots must be reproduced twelve times per second to give the transmitted picture the illusion of movement; 120,000 separate signals would therefore have to be transmitted per second, and even then the picture would be lacking in fine detail.

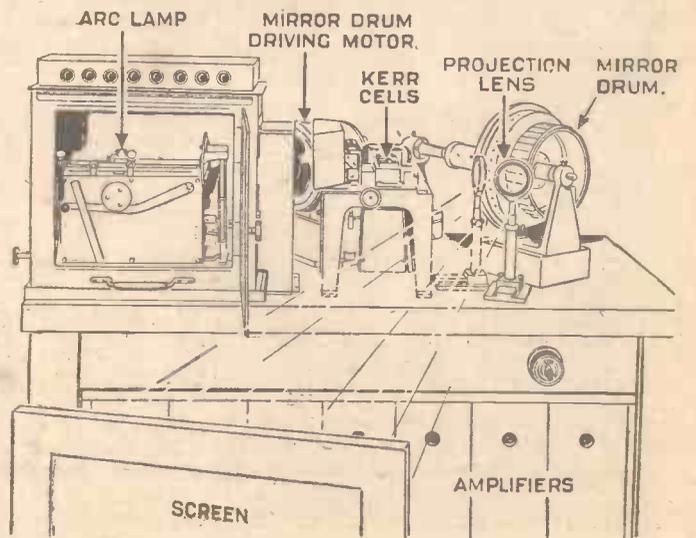
The Gramophone Company points out that in television systems developed up to the present there has been a tendency to reduce the number of signals per second required for television. By so doing it has been recognized that detail would be lost, but the object has been to restrict the total number of signals per second so that a television image could be broadcast within the compara-

**Arc-lamp Lighting**

In the H.M.V. television system a large number of picture elements per unit area of the picture are involved. And to get sufficient illumination at the receiving end a powerful arc-lamp is modulated by a Kerr cell arrangement.

It has not been found possible to obtain sufficient illumination from the neon lamps that have so far been widely used in television receivers. The neon lamp may be practicable for an image viewed by a single person, but there is not sufficient illumination with this device to project an image on to a screen. H.M.V. emphasizes the fact that there is nothing new in the fundamental principles of their system. But the mechanical and electrical development is

*(Continued on page 110)*



Here is the receiver, the image being reflected on to a translucent screen from a mirror drum

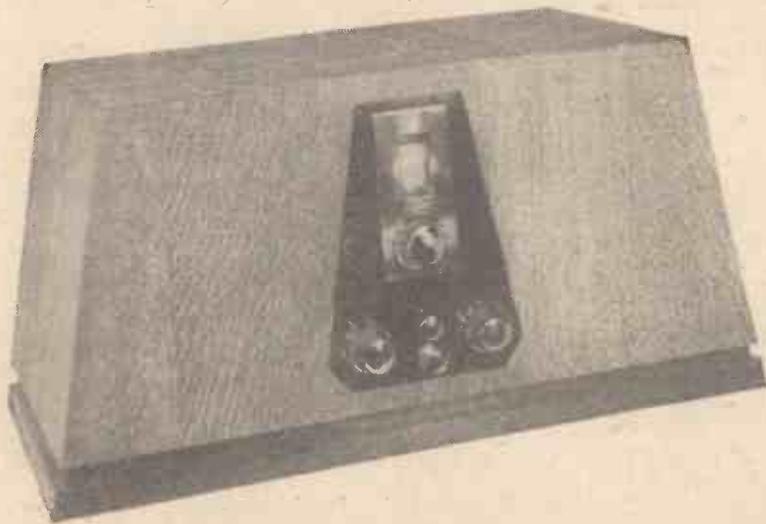
by the Gramophone Company to see a television demonstration at the Hayes laboratories.

What we saw was television developed to a sufficient stage of perfection to be called an entertainment. For some minutes we viewed a variety of scenes and actions of extraordinary clearness. We were reminded of a home cinematograph. What we saw was not a simple screen projection, but the result of a complicated sequence involving all the processes of television. The definition was such that the numbers on trams in a London street scene could be easily read. These pictures were built up by the television receiver on a screen 24 inches by 20 inches and a large number of people could view the pictures with comfort.

# Mullard

## VALVES FOR THE 1931

### "ETHER SEARCHER"



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BUY YOUR RADIO WHERE YOU



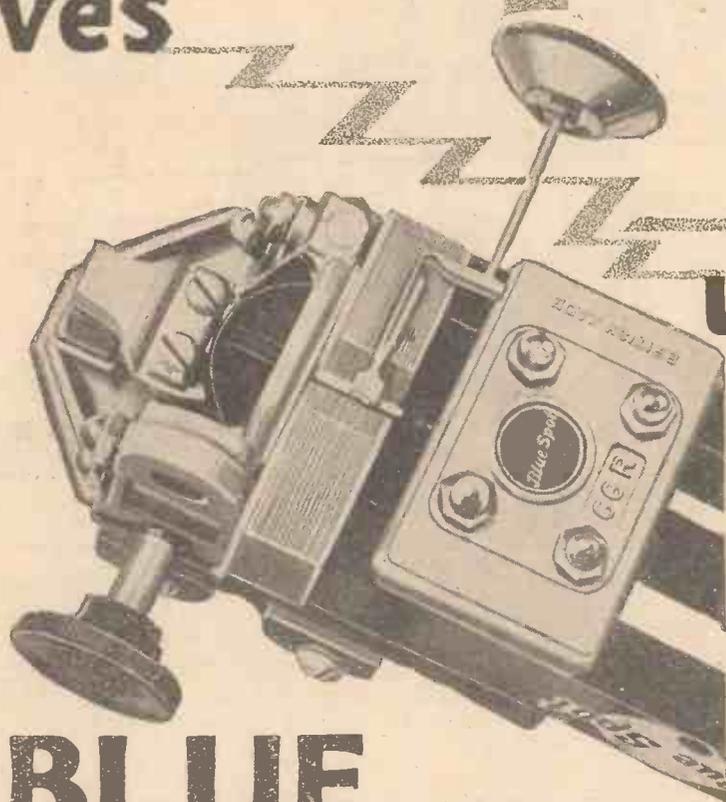
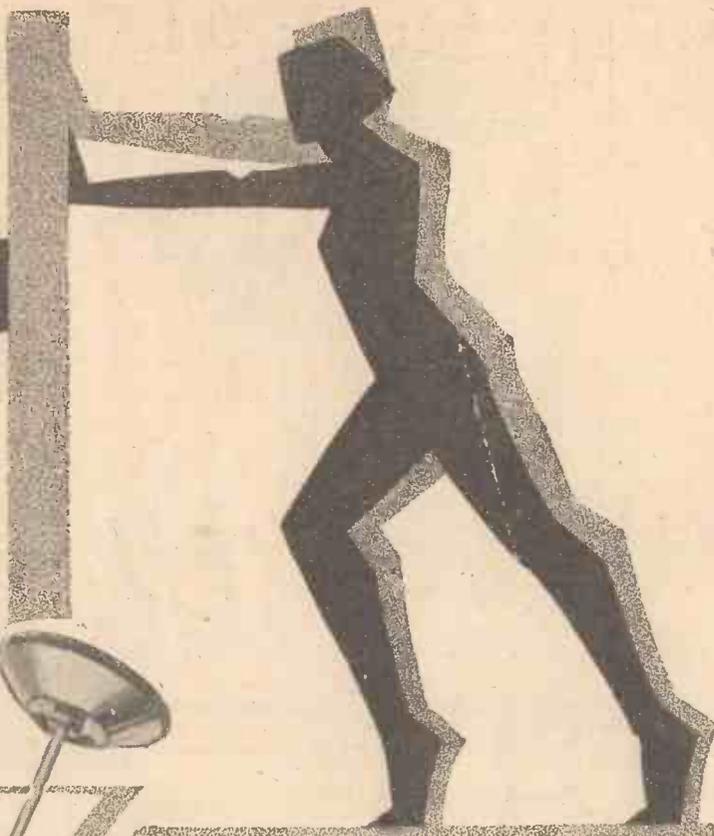
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P103

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# Oh Your Wavelength!

## CONFIRMATION

A WEEK or two ago I mentioned that my Stenode showed that the London Regional, the Midland Regional, and the London National were all indulging to a greater or less extent in wavelength wobble. What happens during the reception of Stuttgart or Graz is that normally either station is received completely free from London, but there are occasions when "Raucous Reg." wanders towards the wavelength of one or other of his neighbours and comes through for a few seconds as a strong interfering signal. As I mentioned, I believe that the London Regional was, owing to wavelength wobble, in a large measure responsible for the interference from Stuttgart complained of by users of sets of average selectivity. The fact that London does wobble is confirmed by an examination of the November report of the Brussels Laboratory, which, as you know, checks daily the wavelength of nearly every station in Europe. Look at that report and you will see, first of all, that no two consecutive measurements of the London Regional wavelength are precisely the same and, secondly, that there is an average error of 200 cycles with a maximum deviation of 700 cycles. This is not bad, according to present-day standards, but much closer working is required if high-powered stations are not to interfere with one another when operating on a wavelength allocation based on a 9-kilocycle separation.

## SOME RESULTS

YOU can see, if you think for a moment, just what happens if two stations which are wavelength neighbours both wobble a little in the course of their transmissions. Let us take an imaginary pair, calling them A and B, and taking it that each deviates to the extent of 200 cycles. At the beginning of the transmission we will start them fair by presuming that each is precisely on its wavelength. They are then separated by the full 9 kilocycles of the Prague Plan. As time goes on each swings a little above and a little below its proper frequency. Sooner or later it is bound to happen that one of them is 200 cycles below its standard frequency, whilst the other is 200 cycles above.

## REDUCED SEPARATION

THE separation between the two stations then becomes only 8.6 kilocycles, and if both are fairly powerful they will cause mutual interference on receiving sets designed to effect something approximating to a 9-kilocycle separation. Further, if a heterodyne whistle exists between them its note will be observed to go slightly up and down in pitch. And this is exactly what you do find if two wobbly stations are heterodyning one another. The matter is one of extreme importance, and I do hope that at the next conference of broadcasting authorities an effort will be made to bring in compulsory crystal

control for, at any rate, all main stations.

## A NEW NUISANCE

MOST of us who wander about Europe on occasional evenings (and what valve man is there who doesn't?) have been blessing the decrease in spark signal interference that has been noticeable on the broadcast band for some little time. This is an excellent thing, and it is a cheering thought that in about two years sparks should be things of the past. But, as is so often the case, our rejoicings are tempered by a chastening experience. Let me refer you once more to the Brussels Laboratory report and ask you to look in it at the number of little circles that there are surmounted by a T. That T stands for telegraphy and often, as you will observe, this telegraphy is pretty well on top of a broadcast transmission. Night after night, for example, there has been commercial telegraphy within 2 kilocycles of Cork, and many other stations have suffered in the same way. One advantage of tonic-train or interrupted continuous-wave telegraphy is that it does not give the broad-tuned interference associated with spark signals. It is confined, in other words, to a definite wavelength. But if that wavelength is within a kilocycle or two of a broadcast transmission the interference is such as to make the transmission definitely not worth listening to as an entertainment.

## A CASE IN POINT

THE other night, when the Swedish stations were giving *Carmen* from the Stockholm Royal Opera House, I found Stockholm itself fading rather badly and said to myself: "Well, never mind, Motala is sure to be top-hole." So far as volume was concerned, Motala was splendid; but there was an I.C.W. morse signal not merely near Motala's wavelength, but bang on it. The great majority of these morse signals, whatever system is employed, are using wavelengths definitely reserved for broadcasting under the Washington Agreement, and it is high time that the authorities in various countries took steps to end such unwarrantable interference with broadcasting.

## CALIBRATION

MOST people nowadays like to calibrate their sets in some way so that they can pick up, without any loss of time, such stations as they require. Some calibration charts take the form of carefully drawn graphs; a less ambitious method is to make a list of receivable stations with their condenser settings. In either case the whole thing may be somewhat thrown out of gear if the valve in the calibrated circuit is changed or if some minor alteration is made in the wiring of the components.

## A USEFUL HINT

THERE is a way out of the difficulty which is both simple and effective. I have been using it myself for a long while

now, and I can strongly recommend it. In parallel with the tuning condenser of the calibrated circuit always place a midget variable condenser. When you make your calibration, set this exactly at the half-way mark on its scale. Now, suppose that you substitute a new valve, which is pretty certain to have a slightly different inter-electrode capacity amongst other things. You will find that the tuning is slightly different all over the scale. But you can bring it back again to agree with your calibration chart with the aid of the midget condenser. Take a station somewhere in the middle regions of the broadcast band—Toulouse, say, or Hamburg, or Frankfurt—and set the dial of the main tuning condenser exactly at the reading recorded in the chart. Now tune in the station by means of the midget condenser. This having been done, you will find that your recorded settings of the main condenser for all stations are nearly, if not exactly, correct once more. If the midget has a locking nut, clamp it up and leave it alone until the next change is made.

## REMEDYING A FAULT

RECENTLY, by one of these annoying chances which do occur at times, my receiver on which I do my normal listening decided to break down. The signal simply vanished, and although I tried all sorts of dodges, like altering switches, to see that the contacts were O.K., none of the usual remedies appeared to make any difference whatever. The set remained ominously silent, while my wife danced around—well, you know the kind of thing she would say! Here was I, the great "Thermion," and could not put a set right.

## DRASTIC MEASURES

IN despair I tore the back of the set off, and poked about inside. The valves were lighting all right, and they had to be assumed satisfactory for the time being. On the principle of push everything you can see, and pull everything else, I dropped upon some fault, when I was rewarded by a burst of speech from the speaker. I had no idea what it was, and therefore I kept my hands in the position which had caused the revival of the noise. The fun of it was that shortly after having relaxed my grip, the set continued to function quite happily, and I ruefully surveyed my cramped fingers.

## WANDERING VOLTAGE

ON looking into the cause, I found that there was a break in the potentiometer controlling the voltage on the screen-grid—an A.C/S. Apparently the voltage on this valve had wandered about whither it listed, and I have observed before that if the screen voltage of an S.G. valve is allowed to float about unattended it often has the effect of polarising the valve completely and prevents the set from functioning. Anyhow, there we are.

## On Your Wavelength! (continued)

### FILLING THE ETHER

THE German broadcasting authorities have definitely decided to replace their existing system by nine high-powered transmitters, each rated at 60 kilowatts—similar to Mühlacher, the station which has recently made its presence felt in no uncertain fashion over here. The second station, Heilsberg, has already started experimental transmissions, whilst the conversion of Langenberg is next on the list, though it is not expected to come into full power until next autumn. The reason given by the German Reichpost for the adoption of the new scheme is the "building of new high-powered stations in neighbouring countries." Meanwhile our own northern station at Slaithwaite will be on the ether very shortly, whilst the new Scottish and West Regional stations are under way. We seem to be moving in a vicious circle, and I only hope that improvements in selective reception, such as the Stenode Radiostat, will manage to keep pace with all these developments at the transmitting end.

### NOT SUCCESSFUL

THE recent one-day experiment when the London Regional swapped wavelengths with Graz did not pan out successfully. As I anticipated, many others with sets of only moderate selectivity found matters worse than ever, since they were bothered by interference not only from Stuttgart, but also from Strasbourg and Barcelona. The unfortunate Graz itself appears to have had a very poor time of it. Austrian listeners found that both the London Regional and Stuttgart caused interference, and the result was very far from jolly. Myself, I never expected it to have a successful issue, for I am quite sure that no pair of super-power stations can work satisfactorily on neighbouring wavelengths if reception is to be conducted with receiving sets of normal pattern and if the modulation of one of them, at any rate, is very deep. It is, I believe, the deep modulation on the London Regional's part that is responsible for a very large part of the trouble. The Stenode shows that it is so deep that it affects the frequency at intervals. Loud musical passages and certain speech sounds definitely do so.

### WHY DO THEY DO IT?

IT is difficult to make out why the B.B.C. engineers aim at very deep modulation of their high-power transmissions. The reason, I suppose, is that it gives a longer range and therefore a bigger service area, but against this must be set the very important fact that deep modulation absolutely ruins quality at moderate range. The whole of London lies within a short radius of Brookmans Park and the remainder of the area covered by a twenty-mile circle is thickly populated. That is to say, by far the largest number of listeners in the service area are situated within twenty miles of Brookmans Park. One might think, therefore, that the first consideration would be to give reception of good quality to these. Apparently,

though, despite all the B.B.C.'s pronouncements about long-distance listening, it is those on the outside fringes of the service area who are most considered and the rest have to suffer. What it actually comes to is that if you use the high-frequency stage which is necessary in order to obtain adequate selectivity, deep modulation puts either the ordinary leaky-grid-condenser or anode-bend methods of rectification out of court where good quality is desired, since neither of these can deal with the terrific peaks that frequently occur.

### IF YOU WANT QUALITY

FOR quality you must use either power grid detection or push-pull detection. Hence we come to the astonishing fact that, so far from making reception of good quality easier and cheaper, to obtain high power necessitates the use of more elaborate receiving gear. Further, the high-tension current consumption of either push-pull or power rectification is much greater than that of other methods. It follows, therefore, that upkeep costs are greater. Another amazing result of the present system of broadcasting is that unless the set is converted to one of the detection methods mentioned, less volume is now available from the loud-speaker than previously. What I mean is that if you want to avoid overloading when the peaks occur you must reduce your normal loud-speaker volume. Funny, isn't it?

### QUEER IDEAS

I HAVE given you before some lovely instances of what the lay journalist can do when he is turned on to wireless. Here is one of the best that I have ever come across which occurred the other day in a morning paper. There was a note on the possibility of atmospherics being caused by the movements of Mars and Venus. Its opening sentence ran: "Listeners who hear the shrieks and howls of atmospherics—" Well, I have heard a good many atmospherics of different brands, but I don't ever remember having come across the banshee variety which shrieked and howled. The truth is that there are still people who regard the catcalls produced either by themselves or by the local ham-handed Henry as atmospherics.

### YOU SHOULD KNOW—

that the position of the speaker has a bearing on the quality of reproduction. Different positions in the room should be tried before finally fixing the loud-speaker. Speakers that appear to be deficient in bass can often be improved by mounting behind a baffle board.

that it is a great mistake to have the same grid-bias battery in operation for more than six months. Usually a falling-off in quality is the first symptom to indicate that the battery requires renewal.

that the Italian stations now open their transmissions by playing a special gramophone record giving a carillon of bells to the accompaniment of organ and orchestra.

### A DANGEROUS BELIEF

AND, talking of howling, no small part of what there is now is produced by people who genuinely believe that their sets cannot radiate. No doubt many readers have come across such cases. As a rule, you find that the offender is the last person in the world who would willingly cause distress to his wireless neighbours. Often he possesses an old-fashioned three- or four-valve set with a triode coupled by the tuned plate method as high-frequency amplifier. Reaction is arranged between the plate and grid of the detector, and he really believes that he can tune by the squeal without causing a sound to reach neighbouring aerials. Actually, of course, this belief is utterly erroneous. The inter-electrode capacity of triodes is quite sufficient to pass oscillations back to the aerial, apart from the energy conveyed by cross-coupling between the coils of ancient sets with little or no screening. A modern set, well screened and using an up-to-date screen-grid valve as high-frequency amplifier, can be quite innocuous, though I am not going to say that it always is. On the whole, I think it is best to make the little test suggested before you indulge in tuning by the squeal with any kind of receiving set.

### MAKE A NOTE

THE new Königsberg transmitter at Heilsberg did not apparently come on to the air some weeks ago with the whole of the 75 kilowatts with which he was billed to make his debut. As a matter of fact, he remained over a considerable period little, if any, stronger than the original Königsberg station. Just lately, though, he seems to have got into his stride, and if you have not previously tried for him I would recommend your doing so now. I don't think that he is yet using his full power. Eventually he will go up to 120 kilowatts, and he ought then to be a pretty useful kind of signal. Some readers may find him rather too near the National in wavelength, but with a selective set or with the aid of a good wave-trap he ought to be receivable. Königsberg generally puts on a good programme, and the transmission is well worth your attention.

### LONG-DISTANCE CONDITIONS

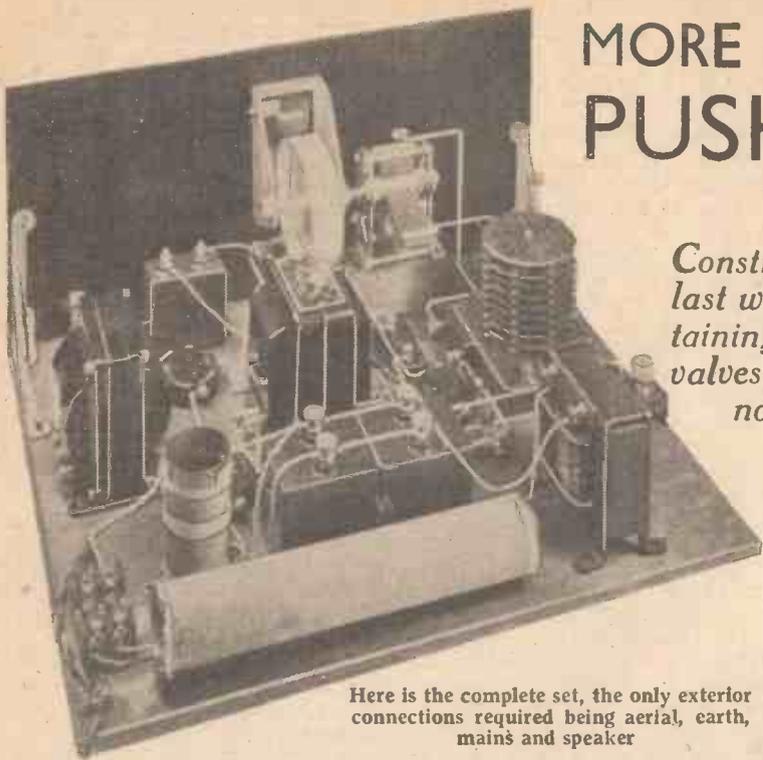
AT the time of writing, long-distance conditions are extraordinarily good. Fading, which was such a nuisance on the medium waveband at the end of 1930, is now far less severe and there are many stations that one can hold for half an hour or more on end without noticing trouble from this source. Amongst the best of the foreigners at the moment are Budapest, Vienna, Milan, Prague, Langenberg, Lyons Doua, Rome, Stockholm, Kattowitz, Frankfurt, Toulouse, Hamburg, Barcelona (E.A.J.1), Strasbourg, Brussels (No. 2), Breslau, Gothenburg, Bordeaux, Lafayette, Turin, Heilsberg, Bratislava, Hörby, and Nürnberg. There is a pretty good list for you. Go in and get 'em.

THERMION

# MORE ABOUT THE PUSH-PULL "TWO" FOR D.C. MAINS

*Constructional details of this receiver were given last week. It incorporates a novel method of obtaining all current from the mains and push-pull valves in the output stage. Here are some further notes together with operating instructions.*

By J. H. REYNER, B.Sc., A.M.I.E.E.



Here is the complete set, the only exterior connections required being aerial, earth, mains and speaker

**A** MOST important point in the "Push-pull" Two for D.C. mains which was described in last week's issue, is to see that the resistances are correct for the voltage of the mains. A table was given last week showing the values of resistance for different voltages ranging from 200 to 250 volts. As I explained, this is a better method than the addition of an extra variable resistance, since it enables the greatest possible use to be made of the available voltage. Unless the reader has some means of checking the resistance for himself, it is advisable to buy these resistances from a reliable manufacturer who can guarantee their accuracy and their current-carrying capacity.

If any reader wishes to wind suitable resistances for himself, however, this can be done quite easily. The wire may be wound on a hard wood or paxolin former with 34-gauge Eureka. Either double-silk-covered or enamelled wire may be employed, as this wire will carry the .25 amp. necessary without becoming hotter than the temperature of boiling water. A good hard wood is, therefore, quite satisfactory for the former, but ebonite should not be used as it gives out an objectionable smell when it gets slightly warm. Thirty-four-gauge Eureka wire has a resistance of  $10\frac{1}{2}$  ohms per yard, from which the actual length necessary to obtain the required

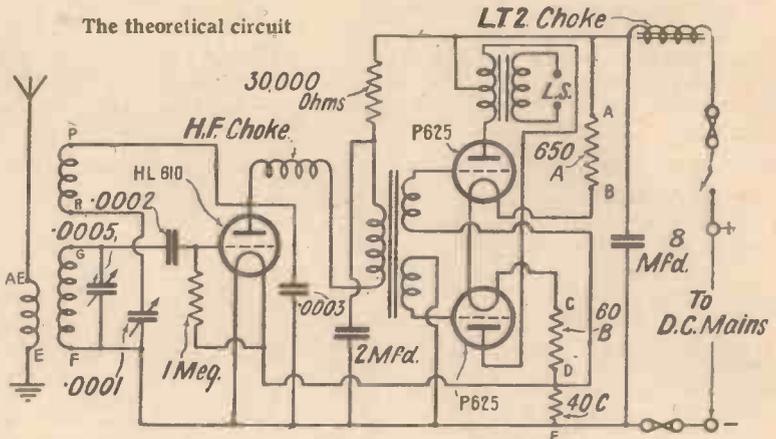
resistance can always be calculated. As far as the operation of the receiver is concerned, it behaves in the same manner as any ordinary set. It must, of course, be remembered that it will only operate when the positive main is connected to the H.T. positive side of the set. As most plugs or lamp adaptors are reversible there is an even chance that the plug will be inserted in the socket in the wrong direction. Therefore, when the set is connected up and switched on and no sound is produced, the plug should be removed from its socket and inserted the other way round. There will probably be a faint hum when the set is operating which will be drowned by the signals as soon as the set is tuned in. This will give an indication at once as to whether the set is correctly connected. In the case of any further difficulty a pole finder or a voltmeter may be used, but this is hardly necessary under ordinary circumstances.

The hum which results from a D.C. set is

always a variable factor depending entirely upon local conditions. The arrangements provided in this receiver are satisfactory for all average supplies, and, in fact, the set was tested on three different supplies with satisfactory results in each case. The push-pull output stage tends to eliminate any hum, even though the filaments are directly heated by the mains, and the weakest link is the detector valve, which only has a 100-milliamp filament. However, in practice the system is found to be quite successful, and no hum was introduced on the detector stage loud enough to cause any interference with reception.

### The Earthed Main

In my experience the difficulties with D.C. mains arise from the fact that neither



of the mains is actually earthed. The system, of course, must be earthed at some point, but this point often does not coincide with either the positive or the negative main, but is usually in the neigh-

(Continued at the foot of next page)

### COMPONENTS REQUIRED FOR THE "PUSH-PULL 'TWO' FOR D.C. MAINS"

Ebonite panel, 16 in. by 8 in. (Becol, Trelleborg, Lissen, Keystone).  
Baseboard, 16 in. by 13 in. (Cameo, Eelex, Clarion, Pickett).  
Panel brackets (Peto-Scott, Bulgin, Read-Rad).  
.0005-mfd. variable condenser, with drum dial (Lotus, Polar, Formo, J.B., Burton, Lissen, Ormond).  
.0001-mfd. variable reaction condenser (Read-Rad, Lotus, Formo, Burton, Bulgin, Keystone).  
Mains switch, toggle type (Lyons, Bulgin).  
Dual-range coil (Watmel).

Three four-pin valve holders (Burton, Clix, W.B., Lotus, Benjamin, Wearite).  
One .0002-mfd. and one .0003-mfd. fixed condenser (Lissen, Dubilier, Read-Rad, T.C.C., Watmel, Atlas, Graham-Farish, Ormond).  
1-megohm grid leak (Dubilier, Lissen, Graham-Farish).  
Grid-leak holder (Lissen, Bulgin, Wearite, Graham-Farish).  
High-frequency choke (Telsen, Lissen, Wearite, Lewcos, British General, Watmel).  
Push-pull input transformer (Varley).

Push-pull output transformer (Ferranti, type OPM1C).  
Low-tension smoothing choke (Wearite, type LT2).  
Two 4-mfd. fixed condensers (T.C.C., Dubilier, Lissen, Ferranti).  
2-mfd. fixed condenser (T.C.C., Dubilier, Lissen, Ferranti).  
650-ohm resistance (Wearite).  
Dual resistance of 60 ohms and 40 ohms wound on same former (Wearite).  
Twin fuse for baseboard mounting (Bulgin).

Terminal block (Belling-Lee, Lissen, Junit).  
Two terminals, marked Aerial and Earth (Clix, Belling-Lee, Eelex).  
Length of red and black twin flex for mains (Lewcos).  
Mains adaptor (Bulgin).  
Connecting wire (Glazite).  
30,000-ohm spaghetti resistance (Bulgin, Burne-Jones).  
3 yards of No. 22 s.w.g. round-tinned copper wire and sleeving (Lewcos).  
Wood block for supporting condenser, 3 1/2 in. by 1 3/4 in. by 1 1/2 in.  
Cabinet (Eelex "Byldurone").

## For the Newcomer to Wireless : FINDING THE PLATE VOLTAGE

I AM using a first-stage low-frequency valve just now which doesn't seem to be working as it should.

How's that?

The makers show that with a plate voltage of 100 it requires a negative bias of  $4\frac{1}{2}$ .

And you find?

If I connect it to the 100-volt tapping of my high-tension battery and give it  $4\frac{1}{2}$  volts negative grid-bias it simply goes out of action, passing no signals at all. Can you tell me what is wrong?

Why, you are not giving it 100 volts on the plate.

But I've just told you that I am.

You are connecting its plate circuit to the 100-volt tapping, I admit; but that's a very different thing from putting 100 volts on to the plate itself.

Please explain.

In the plate circuit of any valve there must be resistance, for to couple it to the next you are obliged to have an anode resistance, or the windings of a choke, or the primary of a transformer.

I hadn't thought of that.

And where there is a resistance, volts

must be dropped in it as current passes through. It follows that in no wireless circuit is the actual plate voltage exactly equal to that of the H.T.B. tapping concerned.

I begin to see now. This valve is actually resistance-coupled.

What is the value of the resistance?

Fifty thousand ohms.

Then, at a rough guess with a valve of pretty low impedance you are probably dropping about 60 of your 100 volts in the anode resistance.

How can one measure the real plate voltage? Is a voltmeter any use?

Not as a rule, for it may give you an inaccurate reading owing to its comparatively low resistance.

Then what can one do?

You can measure the voltage quite easily with a milliammeter.

Milliammeters don't measure volts.

True, but by Ohm's law volts equal resistance multiplied by current. In the circuit you know the value of the resistance and you can measure the current flowing through it. Thus it is easy to find the volts dropped in it.

Suppose, for example, that a milliammeter placed between the H.T. positive lead of a circuit and the appropriate battery tapping registers half a milliampere. Then the calculation is .0005 ampere multiplied by 50,000 ohms, or 25 volts.

Then those are the volts dropped in the resistance?

Yes. And to find the actual plate volts you simply subtract this amount from the battery volts for the tapping concerned.

I see. Then, if the 100-volt tapping is in use, the actual plate volts would be 100—25, or 75.

That's it, exactly. Making use of this rule you can so arrange the value of the resistance that you get a fair proportion of the battery voltage on to the plate of a valve that needs a high anode potential. Don't forget, though, that where resistance coupling is used, you may often apply a rather higher negative grid-bias than the makers' figures would suggest, since the curves on which they are based are taken as a rule with negligible resistance in the plate circuit.

### "MORE ABOUT THE D.C. PUSH-PULL 'TWO'"

(Continued from preceding page)

bourhood of one of them. In consequence of this, induction effects sometimes arise which are very difficult to cure. Fortunately such cases are only experienced occasionally, and once again the push-pull output used in this receiver tends to minimise any such ill effect.

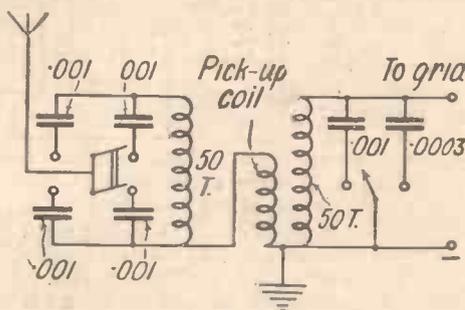
#### The Output

The output stage, of course, must be correctly matched to the loud-speaker. This is more particularly important if a moving-coil speaker is being used. A moving-iron speaker has a very variable impedance, rising from quite a low value up to a large value at the higher frequencies, and any attempt at matching the speaker impedance to the valve is, therefore, in the nature of a compromise. A moving-coil speaker, on the other hand, has a much more constant impedance, but here the effect of matching is very easily noticed. One can definitely notice the differences in signal strength when changing the output transformer ratio. While after a little practice the optimum condition for best undistorted output (this does not coincide with the maximum noise) will easily be found. On the whole, the Ferranti arrangement, giving ratios of 1-, 1.6-, and 2.7-1, enables satisfactory matching to be carried out, although one sometimes feels the need for an intermediate ratio.

Apart from these points there is little that one can say. The tuning coil adopted has an entirely separate primary winding, as was mentioned last week, and this is essential from the point of view of safety. This particular coil is capable of giving quite selective results without any serious loss of signal strength.

## "REG." OR "NAT."— By the FLICK of a SWITCH

THOUGH many women love playing about with tuning controls, the majority regard wireless solely as a medium for entertainment and demand that the set shall always be in such a condition that they can switch it on whenever they like. To such, a set which will enable them to select either of two twin regional stations with no more trouble than flicking over a couple of switches will have a strong appeal.



The circuit of the selector described here

Such a tuning arrangement is easily arranged. The one I have devised has three push-pull switches only on the panel and shows "On and Off" on one and, on the other two, "Reg. In," "Nat. Out." It is perfectly simple for the most uninstructed person to turn on either one or the other programme.

The arrangement, which was devised for a crystal detector set in London, has since been used in various parts of the country to separate the London Regional from the

local station, and has been applied to valve detectors with complete success. The diagram shows the connections.

The condensers used are of the semi-variable, Formodensor type and, once set, do not require touching again unless the station changes its wavelength. The aerial switch is a Lissen push-pull five-point wired as a double-pole, double-throw, change-over. The main tuning change switch is any ordinary push-pull two-way.

#### How It Works

The method of setting the tuning is this. First of all pull out the aerial switch and push in the main tuning switch. Now tune in one of the wanted stations on the main tuning, using the larger tuning condenser for the higher wavelength. When the station is at maximum strength, tune it out on the wavetrap, which is brought into use by the aerial switch. For the other station reverse the process, having the aerial switch in and the main switch out. This done, we are in a happy state and can leave the set to the operation of the family with perfect faith that nothing can go wrong. Both switches out brings in one station and both switches in brings in the other.

The wavetrap is a complication, but really is necessary when using a crystal detector or a valve detector without H.F. amplification. No attempt has yet been made to adapt the system to H.F. tuning, but this is quite possible. The switches could, of course, be "ganged" so that one knob will control them all. — 5YM.

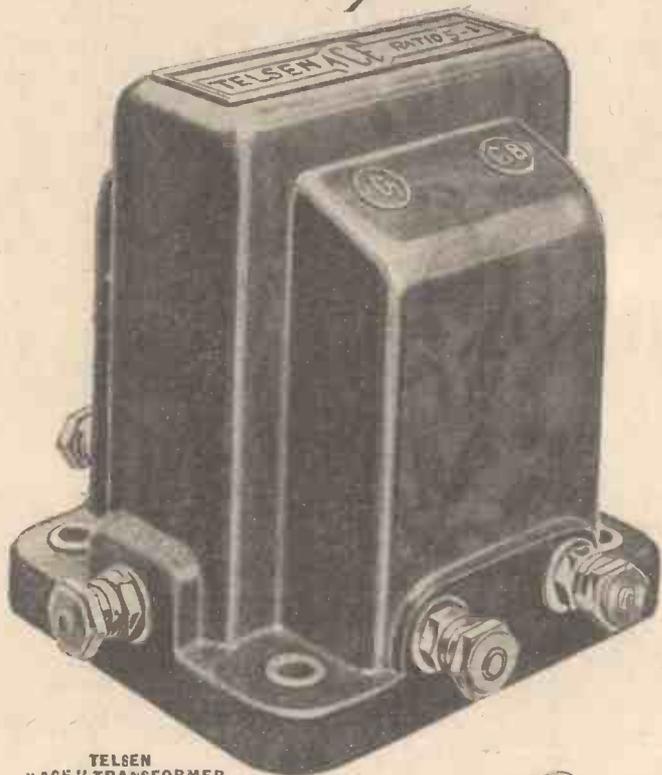
# The 1931 Ether Searcher

DESIGNED BY  
**J. SIEGER**

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**TELSEN "ACE" TRANSFORMER**  
Specially selected for the 1931 Ether Searcher. Made in ratios of 3-1 and 5-1  
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Specially selected for the 1931 Ether Searcher.  
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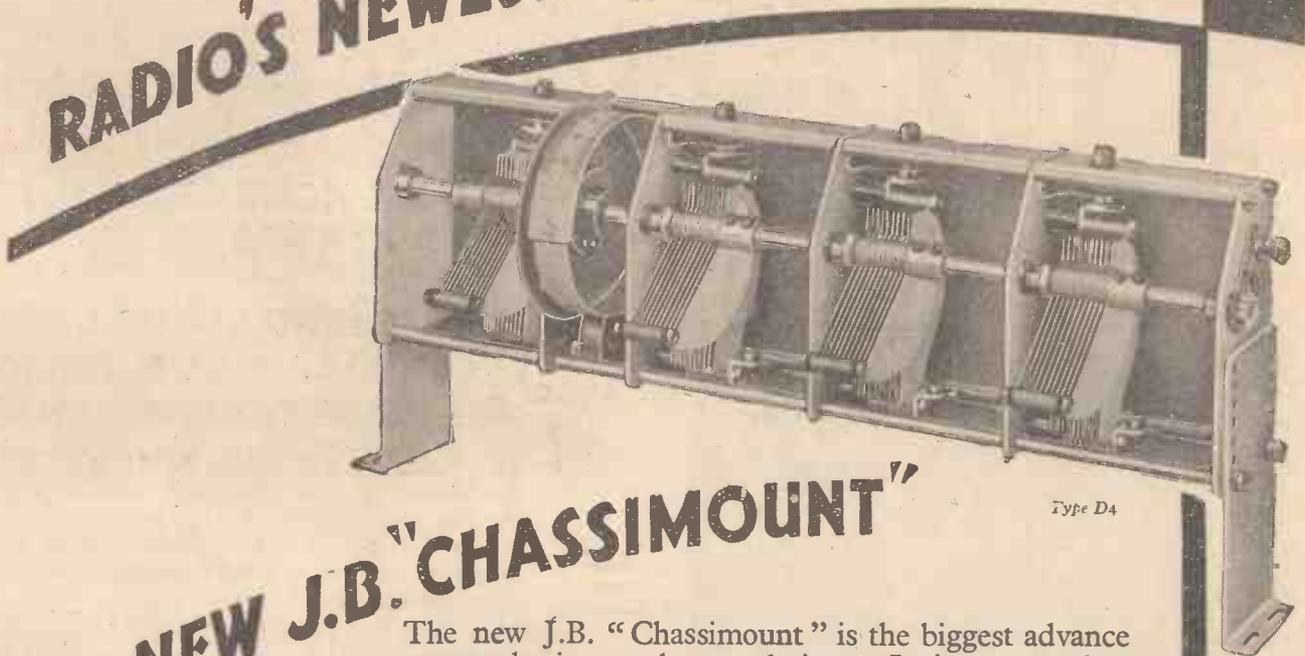


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Specially selected for the 1931 Ether Searcher. Designed to cover the whole wave-band range from 18 to 4,000 metres. Extremely low self-capacity, shrouded in genuine Bakelite. Inductance 150,000 microhenries. Resistance 400 ohms. Price 2/6 each.

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The new J.B. "Chassimount" is the biggest advance yet made in condenser design. It is a complete breakaway, throws open new fields, and will be the basis of this year's popular circuits.

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**TYPE D.3**  
**SPECIFIED**  
*for*  
**Mr. J. SIEGER'S**  
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**SEARCHER**  
*Your dealer can supply immediately*

J.B. "CHASSIMOUNT" GANG CONDENSERS (with drum drive)

Type D2	2 stage	.0005	26/6
" D3	3 "	"	35/-
" D4	4 "	"	42/6
" D5	5 "	"	50/-
" D6	6 "	"	57/6

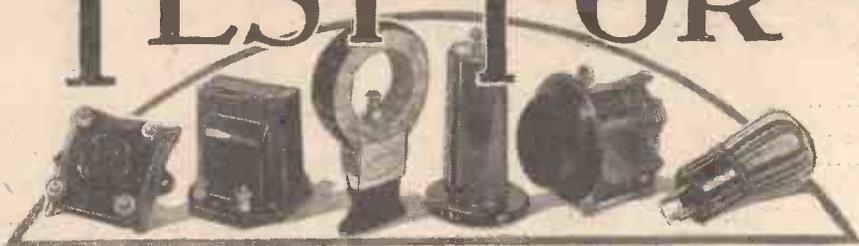


PRECISION

INSTRUMENTS

# WE TEST FOR YOU

A weekly review of new components



and tests of apparatus.

Conducted by our Technical Editor: J. H. REYNER, B.Sc., A.M.I.E.E.

## Lissen Transformer

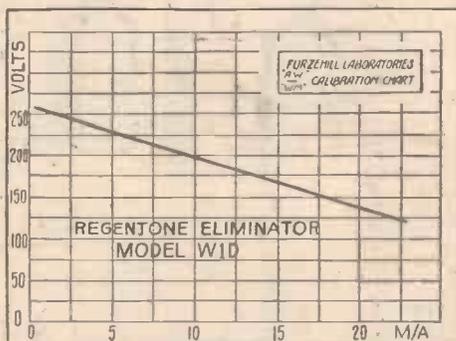
AN interesting component tested this week is a Lissen Torex transformer. This component sells at the remarkably low price of 5s. 6d. The base measures 3 1/2 in. by 2 in., the height being also 2 in. There is room in the case for a reasonably good core and the tests tended to show that again the instrument was up to its job.

One of the simplest indications of the probable performance of a transformer is the measurement of its primary inductance, although this does not tell us everything, by a long way. In this case the inductance was 10.8 henries with zero D.C. current, and this fell to 7.8 with 5 milliamps flowing. Thus the saturation with a small current is not marked, and, of course, it can be avoided altogether if one uses a parallel-feed system. Ten henries is a little low, and therefore the bass reproduction must inevitably suffer to some extent.

It is a mistake, however, to insist upon adequate bass reproduction under all conditions. There are many cases where one

technique has resulted in a simplification of this class of instrument, but, for all that, we were agreeably surprised by the new Regentone A.C. H.T. eliminator, which was sent in for test this week.

In the first place, the size is commendably small. The unit occupies only 7 in. by 4 3/8 in. by 3 in. high, yet within this small compass we have a double-wave H.T.



Characteristic output curve of the new Regentone H.T. eliminator

eliminator capable of giving from 150 to 200 volts, depending on the load. Some of the reduction in size is accomplished by the use of the voltage-doubling circuit popularised by the Westinghouse metal rectifier people, but there is no scamping of the components, which are all well up to their job.

Three louvres are provided at each side for ventilation, and at the end is a small bakelite moulding with four sockets corresponding to the negative and the three positive H.T. taps.



New Regentone eliminator

There are three tappings on the eliminator, one for the full voltage, and the others for giving about 60 and 80, for the detector and screen-grid respectively. This

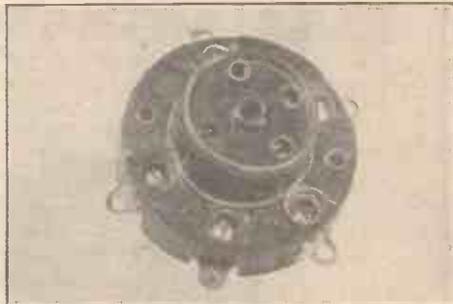
has become general, and is quite a convenient arrangement. No provision is made for varying the voltages.

The next test was to find out in actual figures what the eliminator would deliver, and the accompanying curve makes this quite clear. With no load at all the voltage is 250 on the full tap, and this falls to 135 at 20 milliamps

All three taps were then brought into use. Fifteen milliamps were taken from the power tap, 4 milliamps from the detector tap, and 2 milliamps from the 80-volts tap to represent the normal screen current in a typical set. Under these conditions the voltages were found to be 135, 65, and 80 respectively, which shows that the instrument has been very nicely designed for the average type of set in use to-day. All told, we were attracted by this instrument, particularly as it sells at only £3 7s. 6d. complete.

## W. B. Valve Holder

THE new W. B. valve holder is encased in a neat brown moulding, and has a

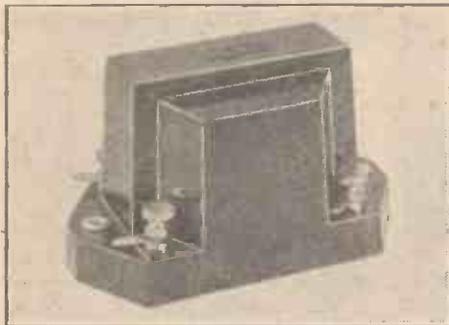


W. B. valve holder

good spring contact underneath, so that it is equally suitable for valves having solid pins.

The particular model sent in for test this week is intended for mounting underneath a panel or baseboard. The terminals are mounted the reverse way, having been countersunk well below the moulding, and the heads being on the underside of the valve holder. This model will commend itself to many readers who wish to carry out sub-baseboard wiring, or otherwise mount the valve holder on the underside. The price is the same as the standard model, and it is a component to be remembered by the enthusiastic constructor.

LET "A.W." SOLVE YOUR WIRELESS PROBLEMS.



Lissen Torex transformer

requires a definitely inexpensive receiver. In such cases the speaker itself will not reproduce the lowest frequencies, and it is an uneconomic arrangement to use a transformer capable of superlative performance.

Certainly, on a practical test we found this Lissen transformer behaved quite well. In comparison with other transformers, considered to be of a similar calibre, the quality was rather better. It has a step-up ratio of 5-1, and certainly gave both good signals and best quality.

## New Regentone Eliminator

ONE is inclined to associate the words "battery eliminator" with large and bulky pieces of apparatus, usually provided with multitudinous knobs and terminals. Certainly, the general improvement in

**RECEIVED ON THE SPEAKER—**

Station	Dial	Station	Dial
KAUNAS .....	87.5	BUDAPEST .....	95
HUIZEN .....	84	SUNDSVALL .....	94
LAHTI .....	80	MUNICH .....	93
RADIO PARIS .....	77	RIGA .....	91.5
KÖNIGSWUSTERHAUSEN	70	VIENNA .....	90.5
DAVENTRY .....	67	MILAN .....	88.5
EFFEL TOWER .....	59	PRAGUE .....	87
MOTALA .....	50	MIDLAND REGIONAL	85
KALUNDBORG .....	37	LANGENBERG .....	83.5
OSLO .....	29	LYONS .....	81
LENINGRAD .....	18	ROME .....	78



**H**ERE is the Ether Searcher for 1931—a new set designed along new lines to suit the new conditions. With the continual increase of power of the European stations and the advancement of the Regional Scheme, radio conditions are considerably different from those of last year.

It is for this reason that the 1931 Ether Searcher has been produced with its great feature of selectivity. This has been obtained by the use of what is known as band-pass tuning. With this new set you really will get the knife-edge tuning so necessary when station-hunting.

With band-pass tuning there is the advantage of tuning two separate circuits simultaneously, forming a double-hump tuning curve. If the value of the coupling condenser between the two band-pass circuits is well chosen, then the whole of the transmission is tuned in with the side bands, resulting in better quality of reproduction than would be obtained from two ordinary tuned circuits.

This means that more stations can

# The "1931 ETHER

**A SET GUARANTEED TO MEET  
DESIGNED BY**

be separated than would be the case if an ordinary two-circuit screen-grid "three" arrangement were employed. The incorporation of the extra tuned circuit has in no way increased the difficulty of handling the set, because all condensers and coils are ganged and tuning is done by means of one knob.

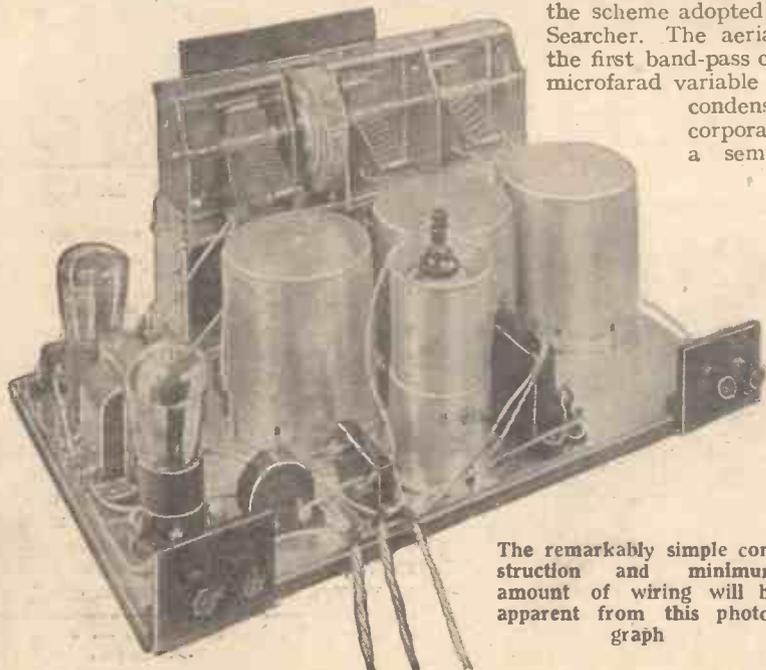
**The Circuit**

The circuit diagram will at once show the scheme adopted in the 1931 Ether Searcher. The aerial is connected to the first band-pass coil through a .0003 microfarad variable condenser. This condenser is usually incorporated in the form of a semi-fixed condenser

mounted inside the set. Its most useful position is obviously on the panel. It can thus be used as an extra control so that it is possible to keep the aerial circuit in tune. The band-pass coils are coupled together by a .01-microfarad fixed condenser.

In order to reduce the damping of the screen-grid valve across the coil, the grid of the valve is tapped down, and bias is applied to the grid through a 2-megohm leak. The coupling between the screen-grid valve and the next tuned circuit is by the usual H.F. choke feed. Here again the detector valve damping is reduced by tapping the grid down on this coil, and so still more increase the selectivity.

The capacity-reaction is controlled by a



The remarkably simple construction and minimum amount of wiring will be apparent from this photograph

**HERE ARE THE COMPONENTS REQUIRED**

- Ebonite panel, 8 in. by 6 in. (Becol, Trelleborg).
- 3-gang .0005-mfd. variable condenser with drum dial (J.B. "Chassimcut").
- .0003-mfd. variable series aerial condenser (Readi-Rad, Brookmans type, Lotus).
- .0001-mfd. variable reaction condenser (Readi-Rad, Brookmans type, Bulgin, Lissen, Lotus, Burton).
- Set of three matched coils with ganging switch (two Colvern type TGSC, and one type TGSR).
- Low-frequency transformer (Telsen, 5-1 Ace, Lissen, Varley, Ferranti, R.I., Burton).
- On-off filament switch (Bulgin, junior, Lissen, H. & B., Benjamin, Readi-Rad).
- .01-mfd. fixed condenser (T.C.C. flat type, Lissen, Dubilier, Watmel, Atlas).

- .0002-mfd. fixed condenser (Lissen, Dubilier, Watmel, Ferranti).
- Three valve-holder (Benjamin, W.B., Clix).
- .0002-mfd. fixed condenser (T.C.C., Dubilier, Watmel, Ferranti).
- .0003-mfd. fixed condenser (T.C.C., Dubilier, Watmel, Ferranti).
- 1-mfd. fixed condenser (Dubilier, Filta).
- Two 2-megohm grid-leak resistors (Dubilier, Watmel, Ferranti).
- Grid-leak clips (Ferranti).
- Three coil screens (Dubilier, Watmel, Ferranti).
- S.G. valve screen (Dubilier, Watmel, Ferranti).
- High-frequency choke (Readi-Rad, Lissen, Tunewell, Lewcos, Burton).



**—WITH ONE-KNOB CONTROL**

Station	Dial	Station	Dial
STOCKHOLM .....	77	BRUSSELS No. 2 .....	56
BELGRADE .....	76	GRENOBLE .....	52
BERLIN .....	74	GOTEBORG .....	51.5
DUBLIN .....	73	BORDEAUX-LAFAYETTE .	47.5
KATOWICE.....	72	HILVERSUM .....	44
BUCHAREST .....	69	TURIN .....	43.5
FRANKFURT .....	68	BRATISLAVA.....	37.5
TOULOUSE .....	66.5	MORAVSKA-OSTRAVA ...	31.5
HAMBURG .....	63.5	LONDON NAT.....	30
LONDON REG.....	60	GLEIWITZ .....	28
BARCELONA .....	57.5	HORBY .....	26.5

# ETHER SEARCHER

MEET PRESENT-DAY CONDITIONS

BY J. SIEGER.

.0001 variable condenser and excess H.F. currents are by-passed from the anode of the detector valve to earth by a .0002 by-pass condenser. The rest of the circuit is a perfectly straightforward low-frequency transformer-coupled arrangement.

**Simple to Build**

The panel layout is simple and easy to follow. The main tuning control is the middle knob on the panel. That on the extreme left is a series aerial condenser, and that on the right the reaction condenser. Just below the tuning knob is the wave-change switch, while below this is the low-tension on-off switch.

The first procedure in construction is to drill the panel. This should be done by

first detaching the wiring diagram from the supplementary pages and then using it as a template. There is very little panel drilling to be done, but the hole for the condenser drum must be cut. The components can be mounted, including the drum-dial escutcheon plate. The panel can then be screwed to the baseboard.

Place the aluminium foil on the baseboard and, using the free full-sized wiring diagram as a template, the components can be screwed in position. This will be sufficient to hold the foil in place and keep it flat.

The fixing of the coils requires special mention. One of the three coils is different from the others in that it has four sections of windings on the long-wave section

instead of three, this extra winding being for reaction. So be careful when placing the coils. With each coil is supplied a small connecting link, these links fitting into slots provided in the switch rods.

Working from the back of the set, join all three coils together by means of the links, taking care that the coil with the reaction winding is on the extreme left. An important point to remember here is to see that all switches are "open," that is, with the ebonite switch bars flat and the contacts apart. Make sure that the coils fit centrally in the screening box lids.

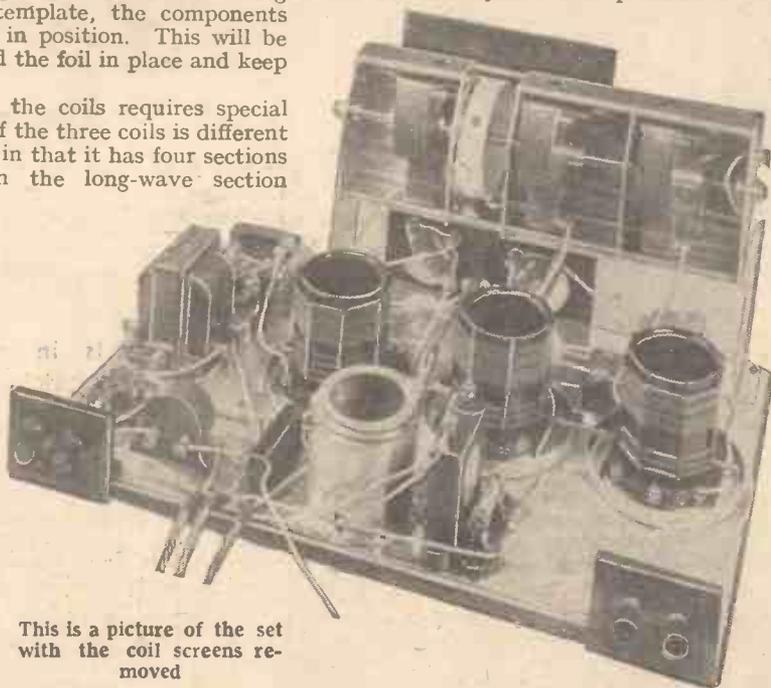
The wires should be put on in the sequence of numbering—that is, wire No. 1 goes on first, wire No. 2 next, and so on to No. 31. It will be noticed that there are six wires connected to the metal base. These are fixed by screwing them under the various components. Scrape the metal clean first. The wire lengths are given in full size on the plan. Where wires are of the same length, only one has been drawn.

There is only the L.T. positive flex to

**HOW TO BUILD THE "ETHER SEARCHER"**

Condenser (T.C.C. SP, Watzel, Atlas).  
 Terminals (Telsen, Lotus, ...).  
 Condenser (Lissen, ...).  
 Condenser (Lissen, ...).  
 Condenser (Lissen, T.C.C., ...).  
 Grid-leads (Lissen, ...).  
 (Bulgin, Wearite, ...).  
 (H. & B., Readi- ...).  
 (H. & B., ...).  
 (Telsen, Varley, ...).  
 (Bulgin, Severign, ...).  
 (Bulgin, ...).

Aluminium foil sheet, 15 3/4 in. by 9 1/2 in. (Readi-Rad, H. & B., Parex).  
 Two terminal blocks (Junit).  
 Four terminals, marked L.S. +, L.S. -, A., E. (Belling-Lee, junior, Clix, Eelex, Burton).  
 Seven wander plugs, marked H.T. +3, H.T. +2, H.T. +1, H.T. -, G.B. +, G.B. -1, G.B. +2 (Belling-Lee, Eelex, Clix).  
 Two spade terminals, marked L.T. +, L.T. - (Belling-Lee, Eelex, Clix).  
 Insulated sleeving (Lewcos, H. & B.).  
 Cabinet (Clarion, Camco, H. & B., Readi-Rad).  
 2-volt accumulator (C.A.V. 2AG11).  
 120-volt high-tension battery (Fuller, "Sparta").  
 16-volt grid-bias battery (Fuller, "Sparta").



This is a picture of the set with the coil screens removed

“THE ‘1931 ETHER SEARCHER’” (Continued from preceding page)

connect to the filament switch, and the wavelength switch rod can be fixed. With the switches turned so that all contacts are open, fix the small lever so that it slopes towards the panel. The screw on this can then be tightened. It is only necessary now to pass the rod through the hole in the panel and screw it into the lever. By pushing and pulling the rod, all switch contacts should open and close easily.

There remain now only the gang condenser and screen-grid valve screen to fix into place. The condenser is an easy component to fix.

Take care to place it on the baseboard so that the small spindle slides easily into the hole on the panel. The condenser can then be screwed down with four screws and the knob fixed to the spindle. The

fixing of the screen-grid valve screen is simple, for there are four slots which fit easily over the four wires of the valve holder.

Checking

Check all the wiring very carefully before you attempt to put the set into operation. Checking is quite simple if you take each wire in turn, ticking it off on the print as it is passed as O.K. Probably many readers will have finished this set before next week's articles will have appeared, and will want to

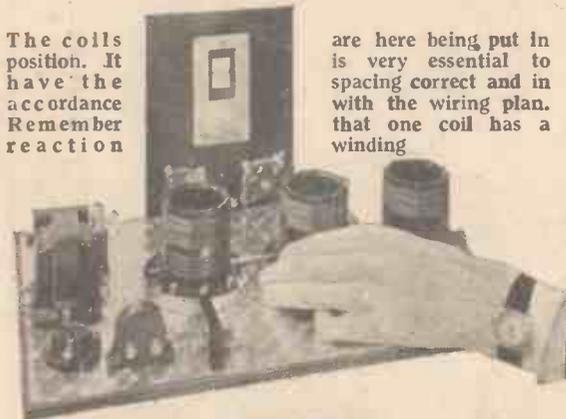
know the valves to use. These are PM12 screened grid, PM2DX detector and PM2A Power. Particulars of other valves suitable for this set will be given in a subsequent issue. Checking will be described in greater detail next week, when, also, batteries will be considered, and help in operating hints will be given to assist you in getting the very best from the “1931 Ether Searcher.”

**FOUR SIMPLE STEPS IN CONSTRUCTION:** Here is the baseboard with the ganged condenser in position, and the panel mounted at right angles. The board is covered with its metal foil covering



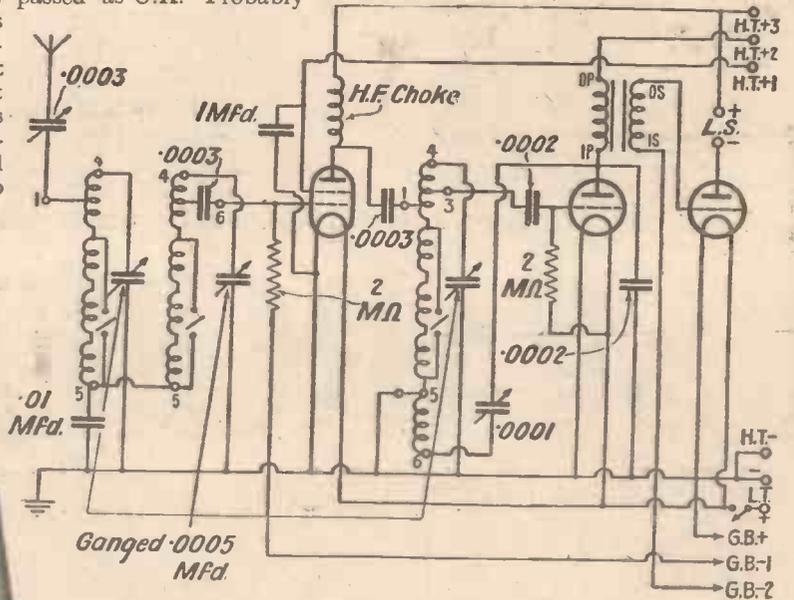
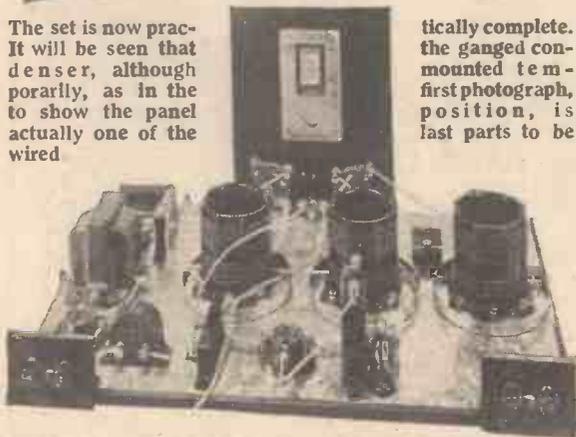
The coils position. It have the accordance Remember reaction

are here being put in is very essential to spacing correct and in with the wiring plan. that one coil has a winding



The set is now practically complete. It will be seen that denger, although porarily, as in the to show the panel actually one of the wired

tically complete. the ganged comounted tem-first photograph, position, is last parts to be wired



This is the theoretical circuit of the “Ether Searcher.” This clearly shows how the band-pass circuits are arranged

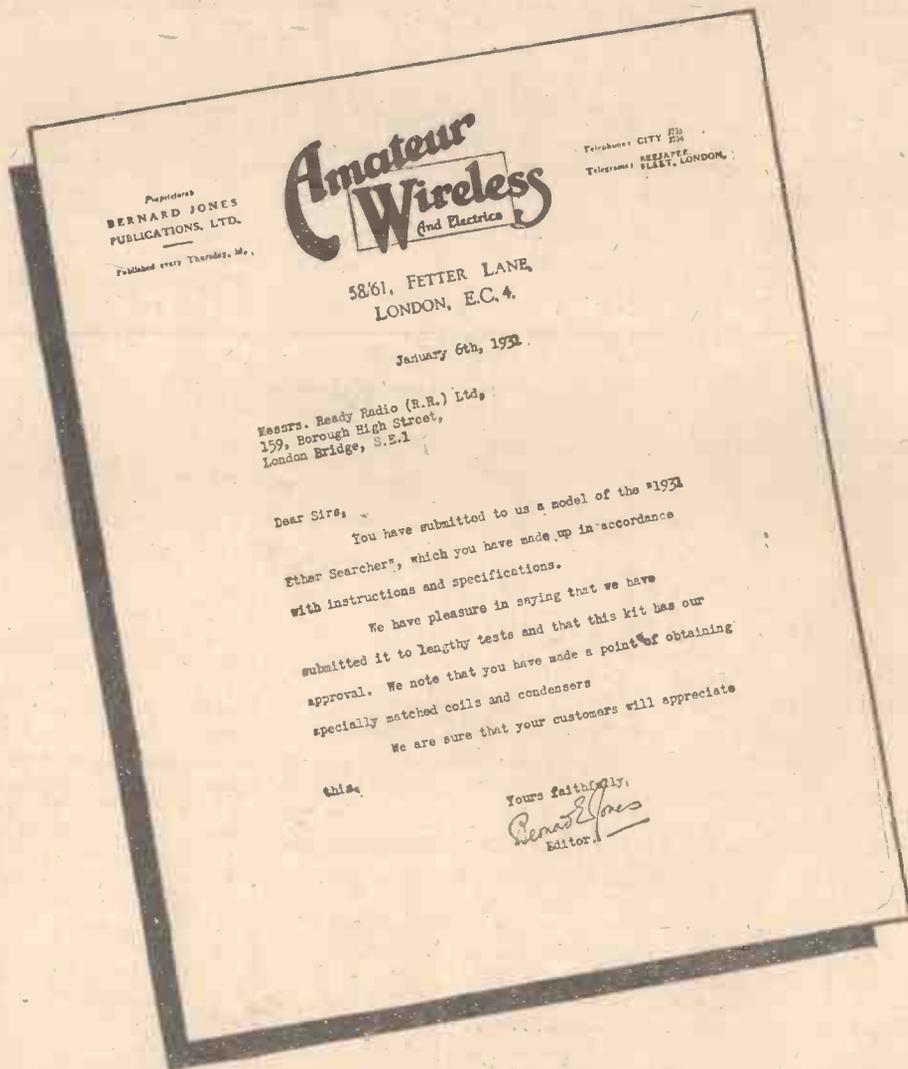


Here is the “Ether Searcher” quite ready for working, in its special cabinet

WHY YOU SHOULD BUILD THE “ETHER SEARCHER”

- It is in every sense a set to suit present-day conditions.
- It is amazingly selective—due to the special band-pass circuit.
- It is cheap to build, and economical to run.
- It has one-knob control and therefore requires no tuning skill.
- It will give satisfaction with an indoor or outdoor aerial.
- It can be worked from batteries or an eliminator.
- It will bring in fifty stations on the loud-speaker.

**THE READY RADIO**  
**1931 ETHER SEARCHER**  
**MATCHED KIT**  
**Officially Approved by**  
**“AMATEUR WIRELESS”**



**2,000**  
**Ready Radio**  
**Matched Kits**  
**are ready for**  
**IMMEDIATE**  
**DISPATCH**

**COMPLETE PRICE LISTS ON PAGES 109, 111, and 113**

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## SETS OF DISTINCTION

# The FERRANTI A.C. THREE

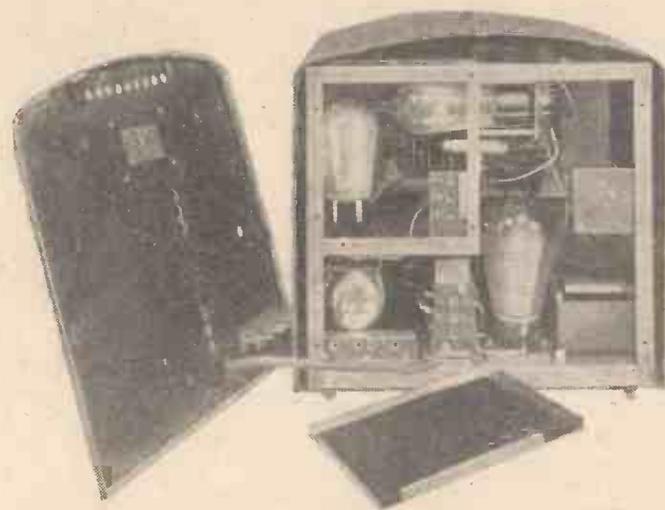
Makers: Ferranti Limited

Price: £25



**C**APABLE of providing considerable volume of exceptional quality, the Ferranti three-valver for A.C. mains is an outstanding example of the best British radio practice. The cabinet, made of metal, is finished in blue, brown, or grey rexine, a material both attractive and durable. As can be seen, there is no panel in the usual sense, the numerous controls being mounted in convenient positions on the front of the container.

In my opinion, the outstanding control is the wave-change switch, located at the centre below the aperture of the tuning scale. Switched to the left, this knob brings into play the medium-wave coils, and to the right the long waves. But this



A feature of the Ferranti A.C. Three is that it is impossible to remove the back without disconnecting the mains supply

knob does more than merely switch over from one set of coils to another; it actuates part of the dial mechanism, so that during reception on either of the two wavelength ranges, the unwanted calibration is covered up.

Altogether, there are five knobs on the front of this Ferranti set. That may seem rather a large number, but during tests I found the operation extremely easy. I might remark that the makers have omitted no necessary control in order to achieve apparent simplicity.

The simplicity of operation of the "Ferranti A.C. Three" can only be appreciated

by handling the set. No single control is critical in its action. On the immediate right and left of the centre wave-change switch are two larger knobs for tuning. The right knob works a two-gang condenser and the left knob is really a trimmer, needing very little attention during the logging of stations.

On the extreme left is the pre-detector volume control, which, being a series aerial condenser, also works as a selectivity control. On the extreme right is the reaction control; one of the smoothest I have come across.

The circuit of the "Ferranti A.C. Three" comprises a stage of high-frequency amplification, a detector, and a transformer-coupled super-power valve. The high-frequency valve is an MS<sub>4</sub> and the detector an MHL<sub>4</sub>, both 4-volt indirectly-heated A.C. types of high efficiency. The power valve is a P625, directly heated at 6 volts.

For converting the A.C. into direct current for the anode supply, a U10 rectifying valve is employed. I should explain that this set is suitable only for A.C. supplies. Tappings provide for input voltages between 200 and 250 volts, having a periodicity of 50 cycles and upwards. This applies to the standard model, but for those with 100-to-130 volts supplies of 40 cycles and upwards this set can be supplied with a special mains transformer, type P11, at an extra charge of 42s. 6d. The set cannot be used on direct-current mains or with batteries. On the A.C. supply the running cost is low, less than 30-watts being consumed.

Due to the inclusion of a tapped output transformer, this set is suitable for high- or low-resistance loud-speakers. I ought to say that the "Ferranti A.C. Three" is worthy of the very best moving-coil loud-speaker available. The quality was really superb when I tested the set with the new Ferranti permanent-magnet moving-coil.

As a gramophone amplifier, I have derived considerable pleasure from this set. With an external volume control and a good pick-up, the "Ferranti A.C. Three"

makes an excellent two-valve gramophone amplifier.

During an evening's test I gathered a good idea of the selectivity of this set when worked under regional reception conditions. The London National 261-metre station spread to 275 and 250 metres, an overall spread of 25 metres. The London Regional 356-metres could be heard up to 385 metres and down to 335 metres, a 50-metre spread. The set has good average selectivity when the volume-cum-selectivity control is fairly well advanced. That is to say, the necessary sharp tuning is obtained without loss of volume on distant stations.

### A Sensitive Set

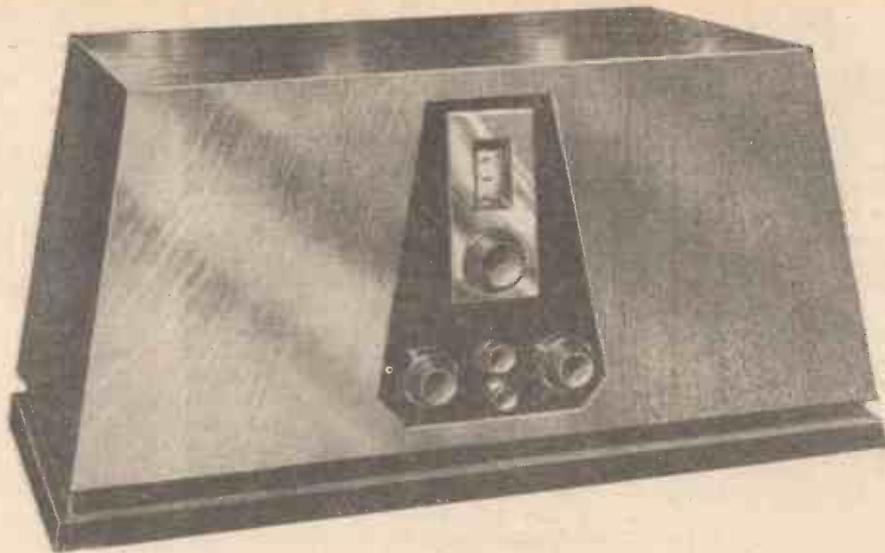
As regards sensitivity, I was able to get twenty-four stations on the medium-wave-length band at varying degrees of strength and quality. On the long waves eight different stations were logged. Huizen (1,875 metres) and Radio Paris (1,725 metres) were very good. Zeesen (1,635 metres) suffered some interference from Daventry (1,554 metres); but Eiffel Tower (1,445 metres) and Motala (1,348 metres) were clear. Kalundborg (1,135 metres) was exceptionally good and Oslo (1,071 metres) would have been good but for heterodynes.

Outstanding stations received on the medium-wavelength band were Budapest (550 metres), Vienna (517), Rome (441), Katowice (408), Toulouse (385), Bordeaux (304), Rennes (272), and Leipzig (253). I was impressed with the fact that the wavelength calibrations for both medium- and long-wavelength bands were extremely accurate. Because of this I had no difficulty in logging dozens of stations.

One final point I should like to mention about this Ferranti set, and that is the safety fuse device incorporated in the back of the metal container. By this means it is impossible to move the back without disconnecting the mains supply to the set. The "Ferranti A.C. Three" complies entirely with the recommendations of the Institution of Electrical Engineers. More than that, it meets the needs of listeners requiring a really first-class instrument for present-day broadcast reception.

SET TESTER.

Broadcast dance music is the subject of adverse criticism from the West of Scotland. Complaint is made that Glasgow listeners have had to be content with Tuesday, Thursday, and Saturday evenings for programmes of this nature, while Londoners have a choice of programmes of dance music every night in the week until midnight.



## Every component in the Ready Radio 1931 Ether Searcher Kit is guaranteed **ACCURATELY MATCHED**

Ready Radio experts were so impressed by the wonderful performance of Mr. Sieger's 1931 Ether Searcher that we are sure thousands of constructors will want to build it at once. There will consequently be an overwhelming demand for the necessary Components. There will be delay and difficulty in obtaining the parts you want unless you order from Ready Radio.

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Build this wonderful receiver. You will be amazed at its efficiency. All Ready Radio Kits are obtainable for cash or by easy payments.



*The Ready Radio Matched Kit of Parts was personally tested at the "Amateur Wireless" Laboratories by the designer of the 1931 Ether Searcher — Mr. J. Sieger.*

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### 2,000 READY RADIO KITS ready for immediate dispatch

See pages 107, 111 and 113 for full details

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# H.F. OR BAND-PASS?

By J. H. REYNER, B.Sc., A.M.I.E.E.

A GOOD screen-grid stage to-day will enable a large selection of foreign stations to be tuned in, if other conditions permit. If we consider a receiver tested well away from a strong station, it will probably produce a performance which will satisfy the most critical listener. Unfortunately, with the tendencies to-day to erect large stations operating on 50 kilowatts and upwards, the problem of shepherding these transmissions into select corners of the dial becomes troublesome.

The remedy lies in the introduction of a further tuned circuit, which may be done in two ways. The first, and perhaps most obvious, solution is to add an extra stage of H.F. Many readers who have tried this, however, will have been disappointed with the result. The reasons are manifold. In the first place, an extra H.F. valve introduces extra damping; so that the gain in selectivity from the extra tuning stage is not as marked as one might expect from a cursory inspection.

Secondly, there is the question of shock excitation. The ordinary process of tuning can never reduce the strength of an unwanted signal. It can only increase the response of the set to the desired station. Hence a strong local signal will produce a voltage on the first valve, irrespective of

whether the set is tuned to it or not. This gives the well-known "background" of the local station, often extending over most of the dial.

The defect is aggravated if an H.F. stage is used, because the overall amplification is considerably increased. This means that the background of the interfering station becomes much noisier than before, although perhaps the desired station is increased in strength to a greater extent. This increase in the background is rendered all the more troublesome if one's receiver possesses any components which tend to obey a square law. Despite our claims for linear rectification and straight-line L.F. amplification, it is an undoubted fact that most receivers are appreciably more sensitive to a strong signal than to a weak one.

## The Band-pass Filter

The alternative, of course, is the use of a band-pass filter. This consists essentially of an additional tuning circuit, usually in the aerial system, so that the signal has two selecting processes to undergo before it reaches the first valve. This in itself gives increased selectivity, but there is the further advantage that the shock effect is reduced. The aerial is connected to the first circuit only and is isolated from the

second. Hence the first circuit absorbs the shock and only passes on to the second circuit the true signals, to which both circuits are tuned. This is a simple way of looking at the action, the effect being a very marked reduction in background.

There is, of course, the theoretical advantage, with a band-pass filter, of flat-topped tuning. I have explained this in various articles from time to time. Owing to the fact that there is an appreciable coupling between the circuits, whereas in the case of an H.F. stage there is no such coupling, the tuning curve tends to become flat-topped or even double-humped, which prevents the loss of the top frequencies often experienced in a selective receiver. The principal advantage which will appeal to the practical user seems to me to lie in the additional and marked increase in selectivity, and the absence of the spread-over which is usually obtained, the background of the local station being confined to a few degrees instead of appearing over most of the dial.

Radio Normandie (Fécamp) has extended its activities by establishing studios at both Le Havre and at Rouen. Plans are under consideration for the erection of a new transmitting station.

## H.M.V. TELEVISION

(Continued from page 92)

certainly the result of very fine research work.

Before going into some of the details of the H.M.V. system let us gain some idea of the general sequence. We start, not with a living image, but with an ordinary commercial film. In this respect the system cannot be fairly compared with Baird television, for example, since it is obviously easier to scan a strip of film than a human being. Moreover, the transmission of film provides only second-hand vision, just as the broadcasting of gramophone records provides only second-hand sound. Still, judging by the excellence of the detail we saw, the H.M.V. system should be quite successful with live objects. And inasmuch as the system described is a laboratory work and not a commercial proposition, the use of film has obvious advantages.

We have already explained that to transmit a moving object of good detail a very large number of signals per second must be involved. In order to reduce the total number of signals per second without losing detail the picture is divided into five sections. Each section is scanned separately and the signals are transmitted along five separate channels. The total scanning of the five sections of the original film are re-assembled on the screen at the receiving end.

As we viewed the various scenes on the screen during the demonstration, we could see the vertical lines separating the five sections of the complete projection. It was interesting to see that, while the verti-

cal dividing lines were quite pronounced, the detail of the constituent sections was extraordinarily good. And there was absolutely no up-and-down movement of the picture during the whole demonstration. In fact the picture was most remarkable for its steadiness. The transmission of a cricket match scene was very successful.

The accompanying drawings give some idea of the H.M.V. television scheme. The film to be transmitted is first passed through a standard projector. The light from it is passed through a series of lenses mounted on a revolving drum. Every complete revolution of this drum scans the picture in five sections.

## BUILD THE ETHER SEARCHER THE BEST YET!

The light passed through the revolving lenses is thrown, in turn, on five photo-electric cells. As most readers know, the photo-electric cell gives a current variation in its output when the light falling upon it is varied. Each of the five cells takes care of a strip of the picture actually one-fifth of the total. The amplified output of the five cells can therefore be utilized at the receiving end to control the light source. By means of special amplifiers an overall amplification of nearly a million is achieved.

At the receiving end a device is needed to modulate or vary the powerful arc light. This device has to provide light variations from current variations, just the reverse of the photo-electric cell. The H.M.V. system employs Kerr cells to do this job.

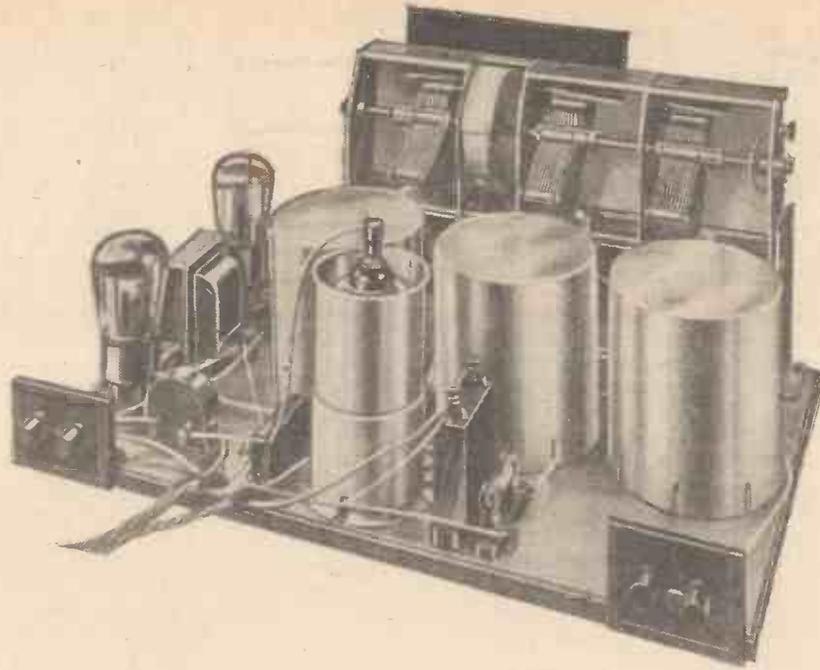
These special cells are arranged between the arc lamp and a revolving drum. On this drum are arranged highly-polished mirrors, which correspond exactly in speed and relative instantaneous position with the transmitter lenses.

The apparatus we saw demonstrated undoubtedly proved that with unlimited resources the transmission of film is absolutely practicable. Furthermore, that an image having sufficient detail to be of entertainment value requires a very much wider frequency channel than that allotted to a broadcasting station. The H.M.V. research workers have shown that the perfect reproduction of a television image is possible with existing systems. Whether further developments will enable the laboratory results to be interpreted as a commercial proposition is an open question. We cannot help feeling that if television is to come in our time it will be through the medium of such admirable research work as we have been privileged to witness at the Hayes laboratories. A. S. H.

## POLARITY FINDERS

WHEN the two leads are dipped into a saucer containing sulphuric acid (borrowed from an accumulator), bubbles are produced at the negative main only. If an ordinary photographic blueprint is slightly moistened with a weak salt solution, the negative terminal produces a dirty yellow stain. Ordinary pole-finding paper is made by soaking a piece of blotting-paper in a solution of turmeric in equal parts of water and methylated spirits; in testing, a brown stain appears at the negative pole.

B. A. R.



# Ready Radio Matched Kit

only **£5:14:6** complete

**FREE to every purchaser of a Ready Radio 1931 Ether Searcher**



A free Ready Radio Booklet containing constructional details, wiring diagram, notes on operation, tuning guide, and other useful information relating to the 1931 Ether Searcher, and one free Atlanta radio screwdriver, the most useful wireless tool ever introduced.

	£	s.	d.
1 Ebonite panel 8 in. by 6 in. (drilled to specification)	...	...	2 6
1 J.B. D3 chassis .0005-mfd. condensers	...	1 15	0
1 Readi-Rad .0003-mfd. Brookmans type condenser	...	3	6
1 Readi-Rad .0001-mfd. Brookmans type condenser	...	2	6
1 Set 3 <i>matched</i> Colvern coils with ganging switch	...	1 10	0
1 Readi-Rad on-off filament switch	...	...	10
1 T.C.C. fixed condenser .01 flat type	...	2	6
1 T.C.C. fixed condenser .0002 S.P.	...	2	4
1 Readi-Rad .0002 mfd. fixed condenser	...	...	10
1 Readi-Rad .0003-mfd. fixed condenser	...	...	10
1 Hydra 1-mfd. bakelite fixed condenser	...	2	2
3 Telsen 4-pin sprung valve holders	...	3	0
1 Telsen L.F. transformer "Ace" 5-1	...	8	6
1 Telsen H.F. choke	...	2	6
2 Readi-Rad 2-meg. grid leaks	...	1	8
1 Readi-Rad grid leak clip	...	...	6
1 Readi-Rad complete set of coil and valve screens for "1931 Ether Searcher"	...	7	6
1 aluminium foil base 16 in. by 10 in.	...	1	6
2 terminal blocks (2-terminal type)	...	...	6
4 Belling Lee "R" terminals as specified	...	1	0
7 Belling Lee wander plugs (4 H.T., 3 G.B.)	...	1	2
2 spade terminals	...	...	3
1 packet of Jiffilinx for wiring up	...	2	6
9 yards rubber covered flex, screws, etc.	...	...	11
		<b>£5</b>	<b>14 6</b>

**KIT A.**—Less valves and cabinet (as above). Price **£5 14s. 6d.**, or 12 equal monthly payments of 10s. 6d.

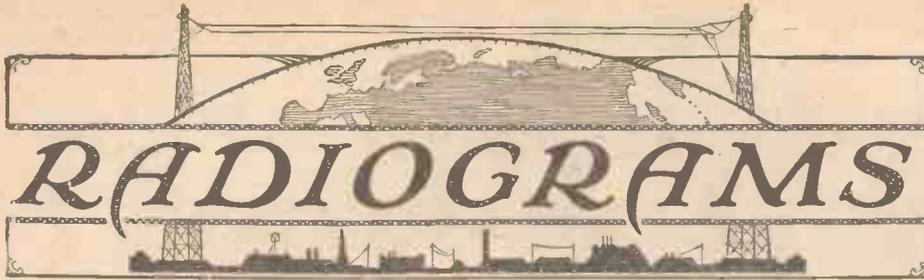
**KIT B.**—With valves less cabinet. Price **£7 13s. 6d.**, or 12 equal monthly payments of 14s.

**KIT C.**—With valves and cabinet. Price **£8 14s. 6d.**, or 12 equal monthly payments of 16s.

**EVERY KIT ACCURATELY MATCHED**

**SEE ALSO PAGES 107, 109, 113**

*Please Mention "A.W." When Corresponding with Advertisers*



THE Wireless Chorus has been responsible for many fine programmes of unaccompanied singing last year, and an early 1931 broadcast by them should not be missed by lovers of choral music. This broadcast is on January 22 (National) and will consist of Parry's "Songs of Farewell."

On February 5 (National) and February 7 (Regional) the B.B.C. will broadcast a comedy entitled *Dr. Abernethy—His Book*, by Alicia Ramsay and Rudolph de Cordova. The broadcast adaptation is by Dulcima Glasby.

Vaudeville on the National wavelengths on January 19 will be presented by Naunton Wayne, Claude Hulbert and Enid Trevor, the Four Fayre Sisters (concertina quartet), Doris Vane, and Dale Smith.

On January 31 the City of Birmingham Orchestra is to relay a concert of "Ball-room Music through the Ages." Beginning with three delicate old dance tunes by Dowland, Mr. Leslie Heward, who conducts the concert, will take listeners through the dances until they reach the present day with a modern work by Hely-Hutchinson entitled "The Young Idea."

"Aerbut and Gaertie," the famous Birmingham characters created by Graham Squiers, are holding a party on January 27, and the great "do" is to be broadcast to Midland Regional listeners. Many famous radio stars are invited to the party.

Not for the first time a feature presented originally in the Children's Hour is to be heard by adult listeners to the National programme. This consists of reminiscences of the plantations, entitled *Going South*, by Derek McCulloch, and it will be broadcast on January 24.

At a studio concert for Midland Regional on January 25, Mary Pollock will sing Wagner's "Dreams." The song forms the main love-theme in *Tristan and Isolde*.

Madame Karsavina will be heard in the "Yesterday and To-day" series on January 23. The famous Russian dancer is to give some of her reminiscences.

Dr. F. J. North returns to the Cardiff microphone on January 31, when he will give a talk entitled "An Admiral who made Glass and a Bishop who made Gunpowder." Dr. North has been successful in making geology interesting to the ordinary man and woman.

A concert will be given in the Cardiff studio on January 25, when the artiste will be Dora Labbette. The Museum concerts will be on Mondays from 1.25 to 2 p.m. and on Saturdays from noon till 12.45 p.m. The free midday concert on Wednesday will be at the Coal and Shipping Exchange from 1.15 to 2 p.m. A concert at the Patti Pavilion, Swansea, on January 27 will be a symphony one, the chief work to be performed being Brahms

"Symphony No. 4." This concert will be relayed until 9 p.m. The weekly concert at the City Hall, Cardiff, will be on January 31, and will be an operatic one.

A programme of music "From the Countryside" will be given by the Studio Orchestra on January 27. The programme ends with Percy Fletcher's "Woodland Pictures."

The Swansea Police Band comes again to the microphone for a West Regional broadcast on January 29. Several members of the band will give solos.

Northern listeners will hear a special relay of dance music on January 23, from 11 p.m. to 12 midnight, from Newcastle, where a charity ball has been organised in aid of the Lord Mayor's Holiday Camp Fund for Poor Children.

The Annual Gaelic Service from King's College Chapel of Aberdeen University will be relayed to the Scottish stations on January 25. The preacher will be the Rev. Dugald Macfarlane, D.D.

Dick Whittington is the pantomime at the Palace Theatre, Manchester, and excerpts will be relayed on January 24. The appearance of Fay Compton in the name part lends particular interest to this pantomime, which is one of the three to be broadcast during the next two months.

On January 22 both parts of the Hallé concert will be relayed. This concert is purely orchestral. Archie Camden is the soloist in Mozart's "Bassoon Concerto," and in addition to this the "Fifth Symphonies" of both Sibelius and Tchaikovsky will be played.

Leslie Williams is to sing in a concert by the Midland Studio Orchestra on January 28.

On February 8 Belfast listeners will hear a string orchestral concert with the Belfast Wireless Orchestra, conducted by E. Godfrey Brown.

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**SEE ALSO  
PAGES**

**107, 109, and  
111**



### "1930 Ether Searcher"

**SIR**,—I have made up the 1930 Ether Searcher and am very satisfied with the results on the medium broadcast band. No matter how I try, however, I do not seem to be able to get satisfactory results on the long waves. I can just hear Daventry 5XX and at different settings I can still bring in the two medium wave London stations. Does this suggest a faulty coil to you or is this a common experience with this receiver?—W. J. (Staines).

The trouble you are experiencing points to your using an unsuitable switch for wave-changing. We recommended a Bulgin switch for the purpose and this make of switch was actually used in our original receiver. If you have used another make it would seem that one of the leaves in your switch is in direct contact with the metal bush. Such a switch prevents changing over one of the coils from medium waves to long waves. If you will look into this matter you will no doubt discover the switch to be the cause of your trouble. Both switch leaves must be insulated from the metal bush, but the metal bush itself must be in good electrical contact with the metal panel.—ED.

### "Contrasts"

**SIR**,—I was rather surprised at Mr. Moseley's criticism of *Contrasts*. We heard it on the Saturday and rather liked it; we had been told by friends it was good. I think the songs, especially those sung by Miss Winter and Mr. Eisdell, the football commentary, and the price of eatables for the banquet, were much enjoyed.

Perhaps one or two items were not interesting beyond the fact that they were contrasts, but as one listener said, "It was something a little different." There was certainly variety about it.

Just another instance of the other listener's view: I should be sorry if the talks were scrapped; they are often quite as entertaining as vaudeville and other things.

Some people would like all music. I often think of what Mr. Moseley once wrote: "*Paté de foie gras* is good, but one does not want to make a meal of it."

A. M. H. (Coventry).

### Two Queries

**SIR**,—There are two hints which we are constantly being given in connection with set operation which I do not understand. Perhaps someone will kindly explain.

We are told not to use bias batteries for more than about six months because they are liable to run down. I have used a number of batteries and have never found one to run for less than eighteen months, many much longer. At present I have three in use, of Canadian make. These must have left the works about two years ago and they have been through the

tropics twice, which is not good for batteries. I have used them for eighteen months and two still show their rated voltages, but one is slightly down.

For the last valve in a set we are told to use high voltages with plenty of bias, even if we want only moderate volume for home use, otherwise the quality suffers. In one of my sets I use a power valve with moderate H.T. and bias. This valve has been biased according to the nine-tenths scale and does not show any needle movement and at the same time gives all the volume I want. If I change over to a super-power valve with higher H.T. and about three times as much bias, I cannot notice any improvement in quality, nor can others. Even this super-power valve is not passing anything like as much undistorted output as I am told I ought to use if I want the very best quality. BM/BB5J.

### U.S.A. Reception

**SIR**,—I read with interest Thermion's recent note regarding reception of U.S.A. broadcast-band stations, or, rather, the lack of such reception.

Saturday night last, arriving home late, I switched on to Radio Toulouse, which station was sending over "request" records. He finished somewhere around 1 o'clock. Swinging the dials, I heard a dance band which, when tuned in, proved to be WGY, announcer unmistakable. There was some static, but no fade whatever; signals about the strength of 5GB on a two-valver. A swing of the dials brought in another American, and altogether five were received at poor to fair strength, in the space of twenty minutes or so.—A. F. K. (Evesham).

### A Good List

**SIR**,—I feel I would very much like to tell you of the wonderful results I can obtain with your "Britain's Favourite Three," 1929. With the aid of a graph that was published in *AMATEUR WIRELESS*, I have been calibrating for a few weeks past.

I have a list of fifty-nine stations I have received—the majority are very powerful at times. There are still a few more I can't quite identify. For such a three-valver I think the performance is wonderful. I have built several others since this, but they are not in the same class.

Wishing *AMATEUR WIRELESS* the success it deserves. A. E. P. (Hove).

### "Britain's Favourite Three"

**SIR**,—In a recent issue I noticed one of your readers, G. W., Kent, is complaining of the volume control in his "Britain's Favourite Three." I built that set, which I am still using, and I had exactly the same trouble. It was not until I had tried five volume controls of different

makes that I got the right one—a Marconi. Now I would not part with the set, as it is perfect. H. C. B. (London. S.E.).

### Using D.C. Mains Sets

**SIR**,—I have been running my receiver from the D.C. mains for the past year or more and have never experienced trouble of any description. Just recently I decided to put up a new aerial. Whilst lowering the aerial I felt a slight electric shock but did not take much notice of it. A little later I learnt that the aerial coil in my receiver was burnt, and that the house fuses had blown. Fortunately I was able to replace the aerial coil but, having been put to some expense and not knowing why the coil became burnt out, I want to make sure of not having a repetition of the trouble. Can you suggest how my coil became burnt?—J. H. (London).

If the positive line of your D.C. mains is earthed and you have no condenser in series between your aerial lead-in wire and the aerial terminal or tuner of your set, when the aerial came in contact with the ground you put a dead short circuit across the mains through the aerial coil. This caused the coil to burn out and also caused the house fuses to blow. When using D.C. mains for H.T. supply it is necessary to interpose between the aerial and the receiver a fixed condenser which has a test voltage of at least double the voltage of the mains voltage. A fixed condenser having a similar test voltage should also be connected between the earth terminal of the receiver and the actual earth wire. These condensers prevent short-circuiting of the mains no matter which main is earthed.—ED.

For the site of its new high-power station, Radio Toulouse has purchased an estate comprising the historic Château of St. Aignan, at about twenty-four miles from Toulouse on the main road to Castres. The power of the transmitter is to be 60 kilowatts in the aerial.

## 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.

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.

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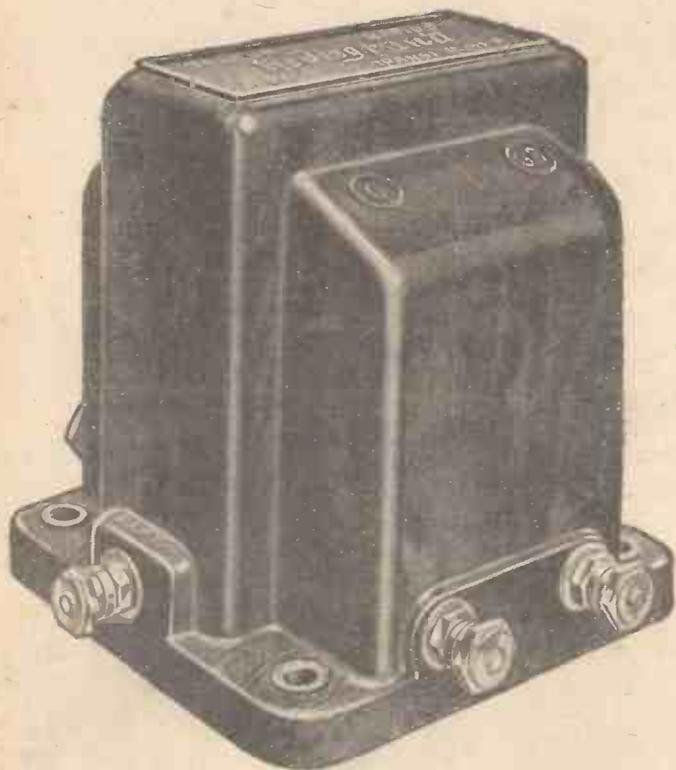
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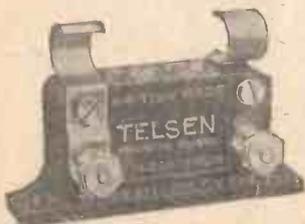
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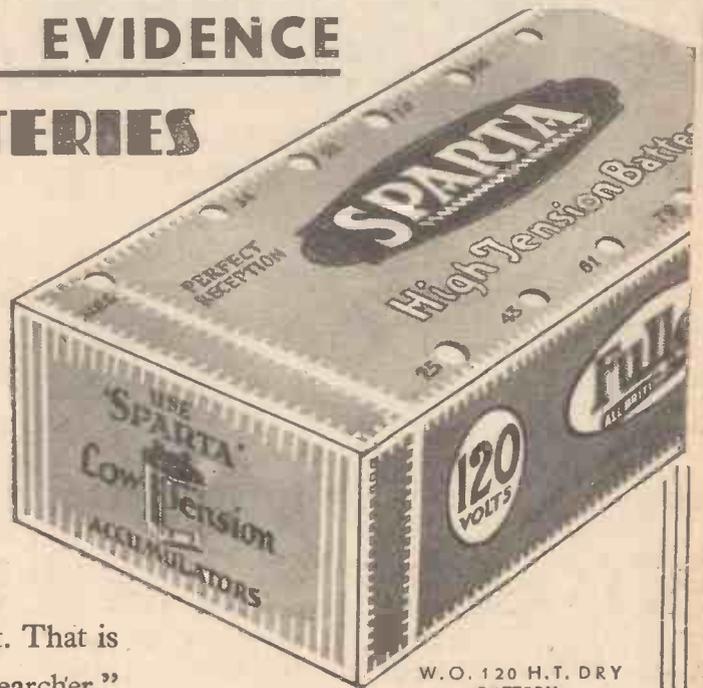
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4 Belling Lee Terminals marked LS+, LS-, A, E	1 0
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# What are the Sound Waves Saying?

THE sound waves do not often bring me Gluck. But I heard him the other night and enjoyed him immensely. Few of us realise how much we owe to Gluck, or rather how much Art owes to him. He was the great reformer of opera, and like all reformers had a bad time of it.

Like most composers of his day, he tried his luck in Vienna. He naturally went to the opera to hear what was being done. He became very dissatisfied with opera, and well he might, as it was fast becoming a ridiculous spectacle. What he said about it boiled down to a strong dislike of singers breaking off in the middle of a word to execute a succession of shakes and trills to show off their technique; Gluck wanted to have opera a real and living thing. He tried his luck in London, but he had to face the fact that Handel was having things all his way, which was not Gluck's way. In the end he set out for Paris where, according to Mozart's father, the fame of a man spread throughout the world. On his arrival he sought out a former friend, a literary man, named du Rollet, attaché to the French embassy. Du Rollet became enthusiastic and went to Marie Antoinette herself.

It was decided that Gluck should take the theme of Racine's *Iphigenia in Aulis* as

his subject and compose an opera at all convenient speed. I imagine that the little committee of three thought it a good plan to have Gluck's ideas of reform discussed in the Paris press; at any rate, that was the next move. They must have been a trifle surprised at the heat of the opposition. I have examined copies of what was written and I must say I was surprised at some of the statements. Gluck was laughed at, insulted, and derided.

The opera was soon finished. Then came the rehearsals. The band, used to the simplicities of Lully and Rameau, read Gluck's scores abominably and with a certain amount of contempt. But they had met the wrong man. Gluck dismissed several of them and things quietened down; the opera was a fine production and an immediate success. In a flash Gluck's name was spoken all over Paris.

## A Competition

And what of the opposition? You may be sure they were none too pleased. They held a council of war amongst themselves to consider what was to be done. There was certainly no one amongst them who would care to undertake a personal opposition by the composition of a rival work. They sent for the Italian composer Piccini, and

the discussions began afresh in the papers. At the outset the chances seemed about equal. Gluck was looked upon as being what we should call a modernist; Piccini stood for the old style. Gluck was thought to have a heavy weight on his side in the person of Marie Antoinette, but Piccini had Madame du Barri, the King's favourite and also a powerful personality. Gluck had the support of the Abbé Arnault who replied to the witticisms of Marmontel. Piccini had Laharpe who was, however, scarcely a match for du Rollet. It began with well-directed correspondence on both sides; then it advanced to bitter sarcasm and insults; later it progressed still further; light missiles were used and Gluck himself was struck with an egg of doubtful antiquity. It might have been a Parliamentary election rather than a fight over a point in Art. Thus far Gluck and Piccini had not met. Berton, the new director of opera, was mischievous enough to invite them to dinner. They met and, seemingly, liked each other. In the end they agreed to set *Iphigenia in Tauris* and see what happened. Gluck produced his version first. It was a huge success, so much so that Piccini could not be persuaded to produce his version. He did so two years later. It failed!

—WHITAKER-WILSON.

Mr. J. C. Orr, whose talks last year on events, persons, and phases of life in Old Belfast proved most interesting, will give a talk on February 3 on "Fifty Years Ago." This will be heard by Belfast listeners.

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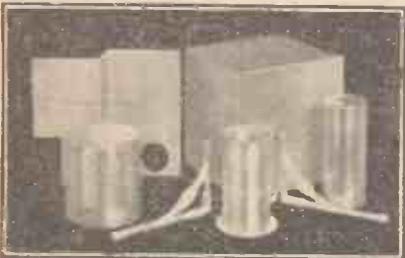
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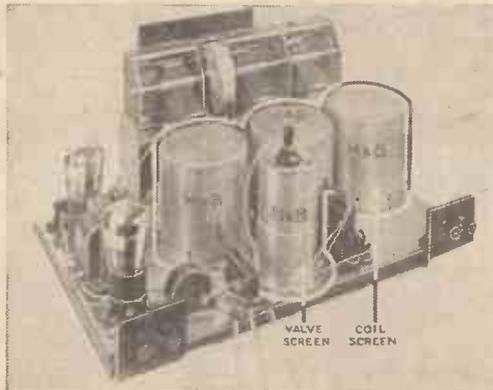


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# Postcard Radio Literature

## That New Speaker

**B**EFORE you decide on the type and make of the new speaker, write to the British Blue Spot Co. for a folder which has just been prepared describing the present range. There are speakers available to suit any set. **153**

## Home Recording

Are you interested in making your own records? It is quite easy to do so with your wireless set and using one of the home-recorder kits now on the market. I advise you to write to Cairns and Morrison, Ltd., for a new booklet describing the use of the Cairmor system. **154**

## Power Transformers

From Messrs. Edwards, of Chelmsford, I have just received some leaflets, giving particulars of power transformers suitable for various types of Westinghouse metal rectifiers and popular valve rectifiers. A wide range of power chokes is also made and these leaflets should be obtained by home constructors of mains apparatus. **155**

## Free Valve Charts

You should most certainly have the new Marconi valve chart which can be obtained free through my catalogue service from the Marconiphone Co., Ltd. This chart gives full details, characteristics and curves. **156**

## A Complete Catalogue

A really fine catalogue which should be in the hands of every man who has occasion to buy new components is that produced by the Henderson Wireless & Electrical Service. In its 112 pages are crowded lengthy details of leading current components. **157**

## Camco Cabinets

There is, of course, nothing which improves the appearance of a set so much as a new cabinet. There are cabinets to suit every type of set and speaker made by the Carrington Manufacturing Co., Ltd., and in a new Camco booklet just produced representative "boxes" of the Camco range are well illustrated. **158**

## For Moving-coil Users

The Star Engineering Co. has written to me to say they will be pleased to send to any moving-coil user a copy of a resistance table which is handy when matching a moving-coil speaker with the output stage of a set. **159**

## Astra Condensers

The Astra people have been making a name for themselves lately with some good variable condensers and slow-motion dials manufactured under Ormond licence. I am particularly impressed by the new differential condensers which should find a place in many sets. **160**

## A Fine Valve Catalogue

Such a large range of Mazda valves is now to be had by set users that a comprehensive catalogue giving curves and full details of each type of valve is very welcome. I have just received a copy of this latest catalogue and can thoroughly recommend it to all valve users. **161**

### GET THESE CATALOGUES FREE

Here "Observer" reviews the latest booklets and folders issued by well-known manufacturers. If you want copies of any or all of them **FREE OF CHARGE**, just send a postcard, giving the index numbers of the catalogues required (shown at the end of each paragraph), to "Postcard Radio Literature," "Amateur Wireless," 58-61 Fetter Lane, London, E.C.4. "Observer" will see that you get all the literature you desire.

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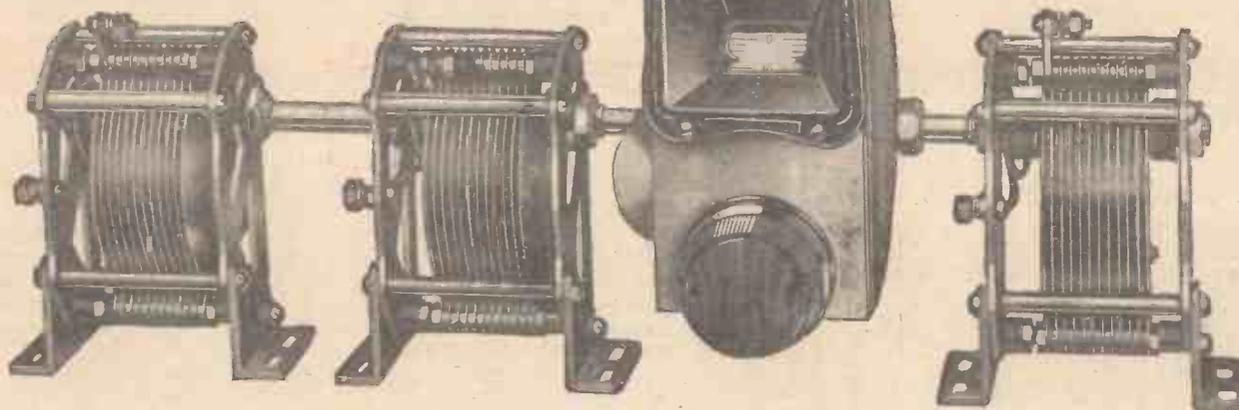
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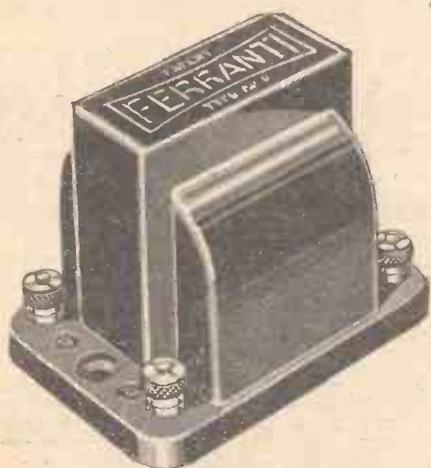
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L. A. C

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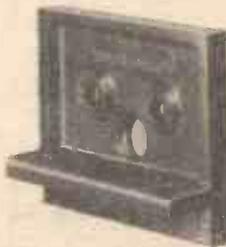
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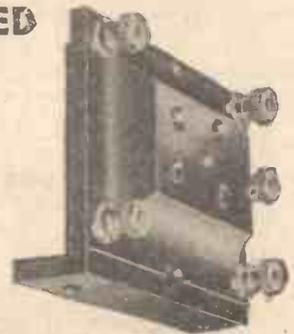
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Dope for linen, 6d. and 1/- per bottle, post 3d. Specially doped linen, 5/- per square yard, post 3d.

Write for free illustrated folder and improve your radio. Can be obtained from all dealers or direct from the actual manufacturers.

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THE combination of the finest speaker and the most selective three-valver of 1931, described in this issue, will give perfect radio reproduction. The New A.W. Linen Diaphragm Loud-speaker which proved such a remarkable sensation at the last Radio Exhibition, Olympia, has appealed to the amateur radio enthusiast to such an extent that it has been necessary to take over extra premises to cope with the enormous demand. The reproduction and tone of this speaker are far in advance of any yet designed and it is equal to, if not better than, the majority of moving-coil speakers.

Start the New Year well—by treating yourself to the finest loud-speaker yet designed. Any standard unit mounted free of charge. Every speaker tested and approved before delivery. Satisfaction guaranteed.

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Size 12in. by 12in. ...	15/6, post free.
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The "NIGHTINGALE" STRAIGHT THREE (Battery Operated) Size: 17 in. by 8 in. by 9 in. Less valves and batteries. Dual Range 200-2,000 metres ...

£4 : 15 : 0

Or 10/- Deposit and balance in 12 monthly payments of 8/-.



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Incorporating Westinghouse Metal Rectifier

Model A.C.2. In Bakelite Case, 30 milliamperes output at 150 volts. Four tappings, two fixed, two variable with grid bias 1 1/2 to 15 volts.

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Ask your local dealer for particulars or write direct to: BULLPHONE LTD., (Dept. A.W.), 38 Holywell Lane, London, E.C.2

## PULL DOWN THAT UNSIGHTLY OUTDOOR AERIAL AND MAST!

NO DANGER FROM STORMS  
NO TROUBLE TO FIX  
NO WAVE TRAPS  
REQUIRED

## GREATER SELECTIVITY VOLUME EFFICIENCY



The New R.C. Regional Aerial. Pat. No. 284571. An ADMIRALTY PATTERN AERIAL. Made of special Rubber-covered Flexible wire being weather proof and non-corrosive. Suitable for erecting indoors, under eaves, or any outside position. Size 14 ft. long, 4 in. dia. Rapid shortening device for smaller span. A permanent Aerial giving high conductivity, selectivity, and maximum volume. Price 6/-

The R.C. Collapsible Aerial. Pat. No. 284963. An ingenious aerial invention containing 55 ft. in one length of high conductive wire in 130 turns spirally wound and made to run along support cords. Can be erected and re-erected in a moment. Adaptable to any span up to 14 ft. Capacity can be altered at a touch thereby increasing selectivity. For indoor use. Price 2/-

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Same appearance and standard of performance as our well-known Low Impedance model as listed at £4:4:0.

YOUR NAME

YOUR ADDRESS

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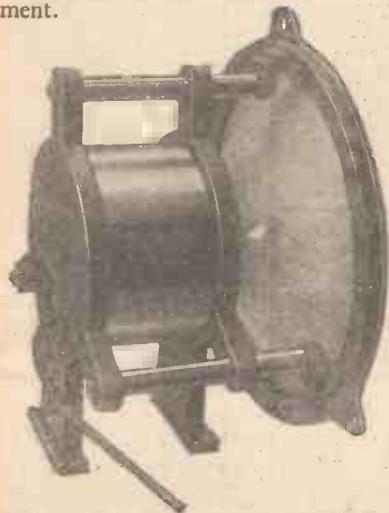
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N.P.L. test of the Model 101 (Domino) shows the Domino to have a flux density of 16,500 per sq. cm. **WITHIN** the air gap (about 20,000 to 35,000 lines per sq. cm. according to the old methods of measurements).

**A RECORD for a speaker made expressly for Home use.**

The enormous achievement will be appreciated when it is realised that the average moving coil Speaker, including so-called "supers," generally measures between 3,000 and 8,000 lines per sq. cm. by the same method of measurement.



### WHAT DOES THIS MEAN?

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—“The DOMINO” and the “1931 ETHER SEARCHER”

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(Described in this issue)

Kit 'A'	{Cash	£ 8:11:5	{Or 12 monthly	15/9
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Kit 'C'		£10:14:11		19/8

#### THE CHALLENGE THREE

(Described in "A.W." Nov. 8th, 1930)

Kit 'A'	{Cash	£6:6:7	{Or 12 monthly	11/7
Kit 'B'	{Price	£8:5:7	{payments of	15/2
Kit 'C'		£9:10:7		17/5

#### THE "LOFTIN-WHITE" A.C.2

Kit 'A'	{Cash	£ 7:16:6	{Or 12 monthly	14/4
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#### IMPORTANT NOTE

KIT "A" is less valves and cabinet. KIT "B" with valves less cabinet. KIT "C" with valves and cabinet. Any parts supplied separately.

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A.W. 17/1/31

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The Big British Wireless Monthly

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### THE CABINET FOR THE "ETHER SEARCHER"

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Price - 21/-



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**PILOT AIR CHROME SPEAKER** C.O.D. **57/6** Incorporating the famous Ultra "K" Chassis Air Chrome, 14" by 14". Oak

Pay the Postman. No extra charges.

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### SHORT-WAVE RECEIVER KIT OF PARTS



A RECEIVER designed for Home construction and capable of reception of S.W. programmes at Loud-speaker strength over vast distances and under adverse conditions. Simple to operate—only one tuning dial. Smooth reaction control and no unpleasant capacity effects. Wavelength range from 12.5 to 85 metres and from 250-550 metres. Coils for any between wavelengths up to 2,000 metres can be obtained. Receiver is built on a metal chassis which is ready drilled for assembly and includes all components, wires, screws, etc., needed to make up the complete receiver.

Kit complete without valves, **£10**

Constructional booklet with diagrams and details, **SIXPENCE**  
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The BENJAMIN ELECTRIC LTD.,  
Tariff Road, Tottenham, N.17.



**TAYLEX WET H.T. BATTERIES**  
New Prices: Jars 1/3. Sacs 1/2. Zincs 1 Od. Sample doz. 18 Volts complete with bands and electrolyte 4/1 post 9d. Sample unit 6d. Illus. booklet free. Bargain list free. **AMPLIFIERS, 3/7/- 3 VALVE ALL-STATION SET 55. A. TAYLOR, 57, Studley Road, Stockwell, LONDON.**

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# BROADCAST TELEPHONY

Broadcasting stations classified by country and in order of wavelengths. For the purpose of better comparison, the power indicated is aerial energy.

Metres	Kilo-cycles	Station and Call Sign	Power (K.w.)	Metres	Kilo-cycles	Station and Call Sign	Power (K.w.)	Metres	Kilo-cycles	Station and Call Sign	Power (K.w.)
<b>GREAT BRITAIN</b>											
25.53	11,751	Chelmsford (G6SW)	15.0	316	950	Marseilles (PTT)	1.5	416	721	Radio Maroc (Rabat)	10.0
200	1,500	Leeds	0.10	328.2	914	Grenoble (PTT)	1.2	1,250	240	Tunis Kasbah	0.0
242	1,238	Belfast	1.2	329.5	910.3	Poste Parisien	1.2	<b>NORWAY</b>			
261.3	1,148	London Nat.	68.0	345.2	869	Strasbourg (PTT)	12.0	285.5	1,275	Slavanger	0.5
288.5	1,040	Newcastle	1.2	370	810.5	Radio LL (Paris)	0.5	310.6	1,247	Kristiansand	0.5
288.5	1,040	Swansea	0.16	385	779	Radio Toulouse	15.0	364	824	Bergen	1.0
288.5	1,040	Stoke-on-Trent	0.16	447	671	Paris (PTT)	2.0	368	815	Frederiksstad	0.7
288.5	1,040	Sheffield	0.16	466	644	Lyons (PTT)	2.3	453.2	662	Porsgrund	1.5
288.5	1,040	Plymouth	0.16	1,445.7	207.5	Eiffel Tower	15.0	453.2	662	Nidaros	1.2
288.5	1,040	Liverpool	0.16	1,725	174	Radio Paris	17.0	1,077	278.5	Oslo	75.0
288.5	1,040	Hull	0.16	<b>GERMANY</b>							
288.5	1,040	Edinburgh	0.4	31.38	9,560	Zessen	15.0	<b>POLAND</b>			
288.5	1,040	Dundee	0.16	217	1,387	Konigsberg	1.7	234	1,283	Lodz	2.2
288.5	1,040	Bournemouth	1.2	218	1,373	Flensburg	0.6	244	1,229	Cracow	1.5
288.5	1,040	Bradford	0.16	227	1,319	Cologne	1.7	312.8	959	Wilno	0.5
301	995	Aberdeen	1.2	227	1,319	Münster	0.6	333.1	887.1	Poznan	1.9
309.9	968	Cardiff	1.2	227	1,319	Aachen	0.3	381	788	Lvov	2.2
356.3	842	London Reg.	45.0	232.2	1,293	Kiel	0.31	409.8	732	Katowice	16.0
376.4	797	Manchester	1.2	239	1,256	Nürnberg	2.3	1,411	212.5	Warsaw	14.0
398.9	752	Glasgow	1.2	240.4	1,217.2	Cassel	0.3	<b>PORTUGAL</b>			
479	626	Midland Reg.	88.0	253.4	1,184	Leipzig	2.3	240	1,250	Oporto (Teatro Apollo)	0.25
1,554	193	Daveytry (Nat.)	35.0	259.3	1,157	Gleiwitz	5.6	320	937.6	Lisbon (CTIAA)	0.25
<b>AUSTRIA</b>											
218.5	1,372	Salzburg	0.6	269.8	1,123	Augsburg	0.3	<b>ROMANIA</b>			
246	1,220	Linz	0.6	270.5	1,085	Heilsberg	75.0	304	761	Bucharest	16.0
283.6	1,058	Innsbruck	0.6	283.6	1,058	Magdeburg	0.6	<b>RUSSIA</b>			
352	851	Graz	9.5	283.6	1,058	Berlin (E)	0.6	427	702	Khar'kov	4.0
453	666	Klagenfurt	0.6	316.6	947.6	Bremen	0.3	720	1,16.6	Moscow (PTT)	20.0
517	581	Vienna	20.0	318.8	941.	Dresden	0.3	800	375	Kiev	20.0
<b>BELGIUM</b>											
206	1,456	Verviers	0.3	325	923	Breslau	1.7	824	364	Sverdlovsk	25.0
206	1,456	Antwerp	0.4	360	833	Mühlacker	75.0	870	344.8	Tiflis	15.0
216	1,391	Charleineau	0.25	372	806	Hamburg	1.7	937.5	320	Khar'kov (KV20)	25.0
243	1,235	Courtrai	0.1	390	770	Frankfurt	1.7	1,000	300	Leningrad	20.0
244.7	1,226	Ghent	0.25	418	716	Berlin	1.7	1,103	272	Moscow Popoff	40.0
246.3	1,223	Schaerbeek	0.5	452.1	662	Danzig	0.2	1,200	250	Khar'kov (KV4)	25.0
338.2	887	Velthem (Louvain)	12.0	473	635	Langenberg	17.0	1,304	230	Moscow (Trades Unions)	165.0
509	590	Brussels (No. 1)	1.2	533	563	Munich	1.7	1,380	217.5	Bakou	10.0
<b>BULGARIA</b>											
310	941	Sofia (Rodno Radio)	0.5	559.7	536	Kaiserslautern	1.0	1,481	202.5	Moscow (Kom)	20.0
<b>CZECHO-SLOVAKIA</b>											
263	1,139	Moravska Ostrava	11.0	566	530	Hanover	0.3	<b>SPAIN</b>			
279	1,076	Bratislava	14.0	570	527	Freiburg	0.35	251	1,193	Barcelona (EAJ15)	1.0
294	1,020	Kosice	2.5	1,035	183.5	Zessen	35.0	266.7	1,125	Barcelona (EAJ13)	10.0
342	878	Brunn (Brno)	3.0	1,035	183.5	Norddeich	10.0	349	860	Barcelona (EAJ1)	8.0
487	617	Prague (Praba)	5.5	<b>HOLLAND</b>							
<b>DENMARK</b>											
281	1,067	Copenhagen	1.0	31.28	9,599	Eindhoven (PCJ)	30.0	368	815	Seville (EAJ5)	1.5
1,153	260	Kalundborg	10.0	299	1,004	Huizen	8.5	425.7	704.7	Madrid (EAJ7)	2.0
<b>ESTONIA</b>											
205	1,013	Reval (Tallinn)	0.7	299	1,004	Radio Idzerda (The Hague)	0.6	460	652	San Sebastian (EAJ3)	0.5
<b>FINLAND</b>											
221	1,355	Helsinki	15.0	1,071	280	Scheveningen Haven	5.0	<b>SWEDEN</b>			
291	1,031	Viipuri	15.0	1,875	160	Hilversum	8.5	230.6	1,301	Malmö	0.75
1,706	167	Lahti	54.0	<b>HUNGARY</b>							
<b>FRANCE</b>											
172.5	1,739	St. Quentin	0.3	550	545	Budapest	23.0	257	1,166	Hörby	15.0
222.9	1,316	Pécomp	1.0	<b>ICELAND</b>							
235.1	1,275	Nimes	1.0	1,200	250	Reykjavik	16.0	302	990	Falun	0.65
237.2	1,262	Bordeaux sud Ouest	1.0	<b>IRISH FREE STATE</b>							
240.8	1,246	Béziers	0.6	224.4	1,337	Cork (IFS)	1.5	322	932	Göteborg	15.0
248.6	1,207.2	Juan-les-Pins	0.5	413	725	Dublin (2RN)	1.5	436	689	Stockholm	75.0
256	1,171	Toulouse (PTT)	1.0	<b>ITALY</b>							
265	1,130	Lille (PTT)	15.0	25.4 and 80	Rome (3RO)	9.0	296.1	1,013	Turin (Torino)	8.5	
272	1,103	Rennes	1.2	313.2	958	Genoa (Genova)	1.5	332	905	Naples (Napoli)	1.7
286	1,040	Montpellier	2.0	441	680	Rome (Roma)	75.0	453	662	Bolzano (IBZ)	0.2
286.2	1,047.9	Radio Lyons	0.5	501	599	Milan (Milano)	8.5	678.7	454.6	Lausanne	0.6
296.4	1,012.1	Limoges (PTT)	0.5	<b>LATVIA</b>							
304	988	Bordeaux (PTT)	35.0	525	572	Riga	12.0	1,216	246.7	Istanbul	5.0
315	952	Natan-Vitus, Paris	0.5	<b>LITHUANIA</b>							
<b>GERMANY</b>											
<b>NORTH AFRICA</b>											
<b>SWITZERLAND</b>											
<b>TURKEY</b>											
<b>YUGOSLAVIA</b>											

## HOME-RECORDING

THE latest hobby is that of recording broadcast items in permanent form. In the ordinary radio-gramophone, the L.F. valves of a wireless receiver are used to amplify the sounds reproduced from a gramophone record. In the home recorder, by way of contrast, the received broadcast signals, after amplification, are fed to a "reversed" pick-up, or stylus, which impresses or records them on a prepared gramophone "blank." Once "bottled" in this way a favourite broadcast item can be reproduced as often as desired. M. L.

## THE DECIBEL

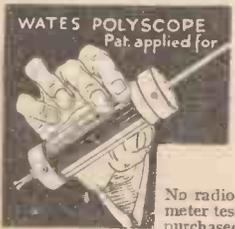
THE decibel is the modern unit of sound intensity. If the output power from an amplifier is found to be four times greater

than the input energy, the "gain," expressed in decibels, is six. This may seem a little puzzling, but it is due to the fact that the "decibel" is actually ten times the logarithm of the ratio between the input and output energies. The log of four is 0.6, and ten times this is six. The reason for using the decibel unit instead of the ordinary ratio between input and output is that it simplifies the mathematical handling of sound-amplifying problems, particularly in connection with telephony, public-address systems, and the talking pictures. M. B.

Have you already picked up the tests carried out by the new Sofia broadcasting station on 319 metres? The call is "Rodno-Radio."

**NEW YEAR PRICE REDUCTIONS**

**WATES**

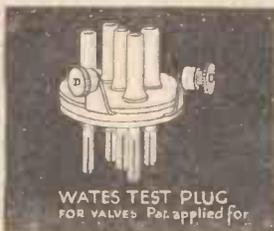


**POLYSCOPE REDUCED FROM 3/- TO 2/6**

No radio user need be without this meter testing instrument. Thousands purchased the polyscope immediately it was introduced last year, thousands more will now be able to enjoy the benefit of this "electrical detective" at the new price.

At 2/6, the polyscope is the most useful instrument you can have. It enables you to measure and check everything — used in conjunction with a three-in-one meter, it measures valve consumption, seeks out causes of distortion and enables you to locate every fault that may be creating poor results from your set.

**WATES TEST PLUG REDUCED FROM 2/6 TO 1/9**



WATES TEST PLUG FOR VALVES Pat. applied for

The New Year heralds yet another effort to put the famous Wates product within the reach of the most modest pocket. The Test Plug in the only device which enables you to make a "professional" test of valves. Tests the filament, permits measurement of consumption, etc. Always keep one handy and save money and time. Use the original and genuine Wates 3 in 1 meter. Price 8/6. Backed by service and fully guaranteed. From all Radio dealers.

**STANDARD BATTERY CO., LTD.**

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(Reg. Design)

The Console Cabinet shown here takes panels up to 18" x 8". Baseboard up to 12". Speaker chamber 18" x 15" x 12". Height 3 ft.; removable back, lift-up lid and silk-covered fret, best French polished figured oak. Packed and delivered free in England and Wales. Price 45/-. Any speaker fitted for cost of speaker only.

**VOXKIT RADIOGRAM**  
As above with Motor, Pick-up and volume-control. Carriage free. From £4 15 0.



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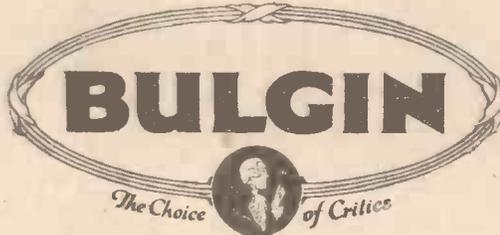
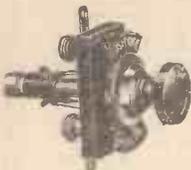
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**DON'T BE MISLED!**  
The "1931 Ether Searcher"  
Kit of Parts  
**IS NOT GENUINE**

unless complete with

LIST No. S.22  
Price 1/6 each.

LIST No. G.6  
Price 9d. each.



**ON-OFF SWITCH AND HORIZONTAL GRID LEAK CLIP as specified.**

Write for new 60-page catalogue. (Post free 2d.)

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Phones: Holb. 2072 - 1072

**THERE ARE NO SUBSTITUTES**

**TANNOY PRODUCTS**  
*Not massed produced - but individually built*

**Mains Units**  
recommended for use with the 1931 "Ether Searcher"

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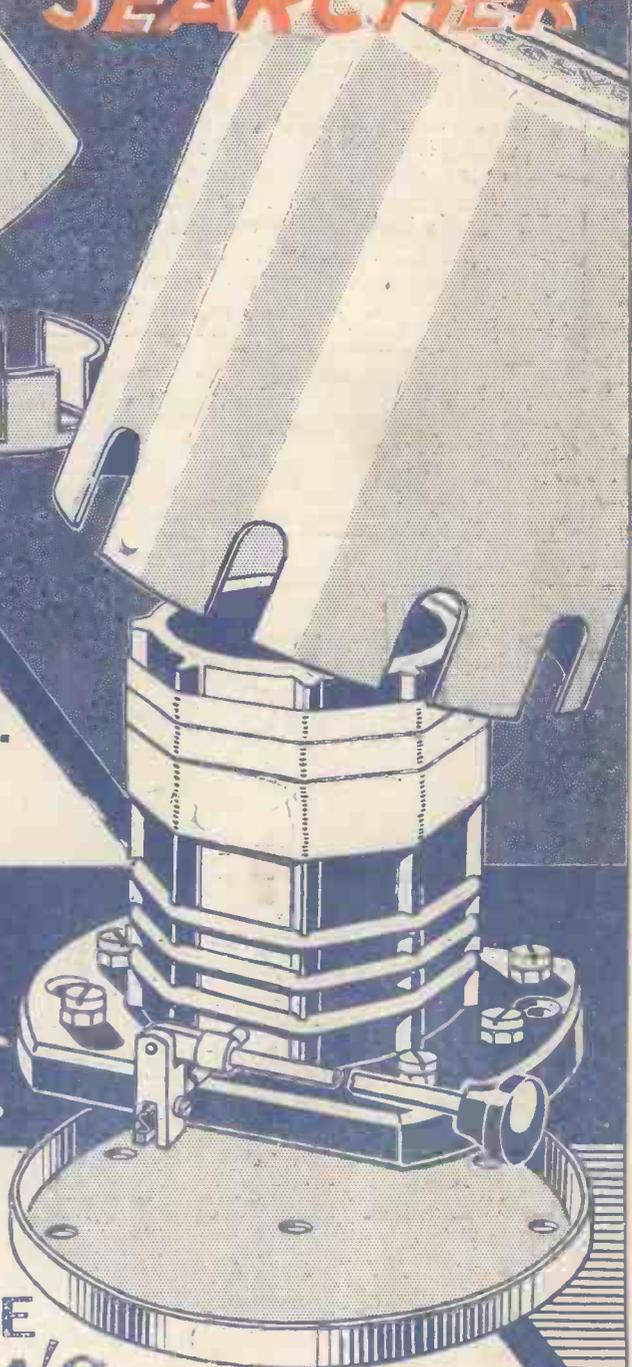
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A Weekly Programme Criticism—By SYDNEY A. MOSELEY.

# Without Fear or Favour



## REVUES

### A TRAVESTY

IT is difficult, I know, to put over new stuff on a high level several times a week. Comes the question whether it would not be better *not* to put revues and such on until the real stuff is found. Here is, for instance, *World for Sale*, boosted in the general and official press as a new satirical revue by Mr. John Watt.

In view of the importance this production assumed in advance, one made sure of listening. And it turns out to be a ragged collection of pitiful clichés without rhyme, reason, or rhythm. From the opening chorus—which, as usual, was a jumble of raucous noises—until half-way through, when I had had quite enough, a third-rate production was broadcast to hundreds of thousands of homes.

It was a relief to turn to the National programme and listen to Margaret Harvey-Samuel in her Chopin studies on the pianoforte.

Jack Payne (continued). The men who take the parts respectively of the Cockney, Welsh, Yiddish, and the Northerner in "There's a Good Time Coming" are good mimics. "The Guy who Wrote the 'Stein Song'" is also in the right spirit; but "Go Home and Tell Your Mother"—words fail me.

I am sorry they parodied under the title of "Say it With Flowers" that pretty radio play *The Flowers Are Not For You to Pick*, to which I have already paid a tribute. Why does the B.B.C. gag its own decent productions? That is what I complain of in the "get-up" of Savoy Hill's outlook on life—a jazzy outlook on life. If it does happen to say something beautiful, it blushes, apologizes, and—turns to jazz again.

I do not think such expressions as "You low-down street girl!" should be bawled into the domestic hearth. Sometimes the censor at Savoy Hill—I mean the Censor of Taste—is away on holiday.

What is the use of these opening choruses which sound like a jumble of meaningless, musical discord. No one can understand the words or even the sense of what is being sung. It is merely following the old idea that something in 6/8 time must

start the show, but it is very irritating trying to understand what it is all about.

In the discussion between the older and the younger generations, Mr. G. Lowes Dickinson easily got away with it for the older generation. I don't know who Mr. John Maud is and who selected him as the spokesman for the younger generation, but we—for, believe me, I count myself a member of the younger generation!—were not too well represented.

I heard part of what was called "a recital"—surely inadequate; it might be a recital of anything—and thoroughly enjoyed Pouishnoff's beautiful pianoforte playing.

Billy Mayerl in a serious vein was a revelation. I only hope that he does not turn the Greig First Movement he played so nicely into syncopated music!

Very dramatic and inspiring was the message of the Archbishop of Canterbury, knowing, as we did, that it was being delivered in the great empty silence of the Cathedral. I bet a good many listeners went to bed feeling the better for it. It

## THE OPENING CHORUS

### A NEW TURN

was one of those accomplishments in which the B.B.C. shows itself at its best.

I think also that the "Retrospect of the Past Year" was cleverly arranged, except, perhaps, that instead of going backwards, which was rather misleading sometimes, it would have been better to have started from the beginning of the year and worked upwards. The interpolation of the gramophone records was most effectively carried out, although I have since learned that there may be some trouble about using some of these records without acknowledgment. I cannot see, for the life of me, how they can acknowledge them in the middle of a dramatic work of this nature.

After all the fuss about Amos 'n Andy, they were more or less a flop. I much preferred Alexander and Mose, who came to London's microphone. The humour of this famous American broadcasting pair was certainly tenth-rate. I do not suppose we shall hear them often, even though they do hold up the traffic in New York.

Something really new in broadcasting was the turn given by Ola Lilith and Willy Godik, who sang Jewish folk songs. The explanation of the announcer was welcome, although this pair was so artistically effective as to render explanation unnecessary. The rendering of folk songs in varied moods was cleverly portrayed and bore out the promise of the translator that the language difficulty would be minimised.

I listened again to Wish Wynne, and desire to inform her that as a London schoolgirl she is *par excellence*. That is her *métier*. "Little Red Riding Hood" was little better than her other fairy-tale sketches, but the London coster girl beats them hollow.

The Neapolitan Players come over well because their instruments "take" to broadcasting.

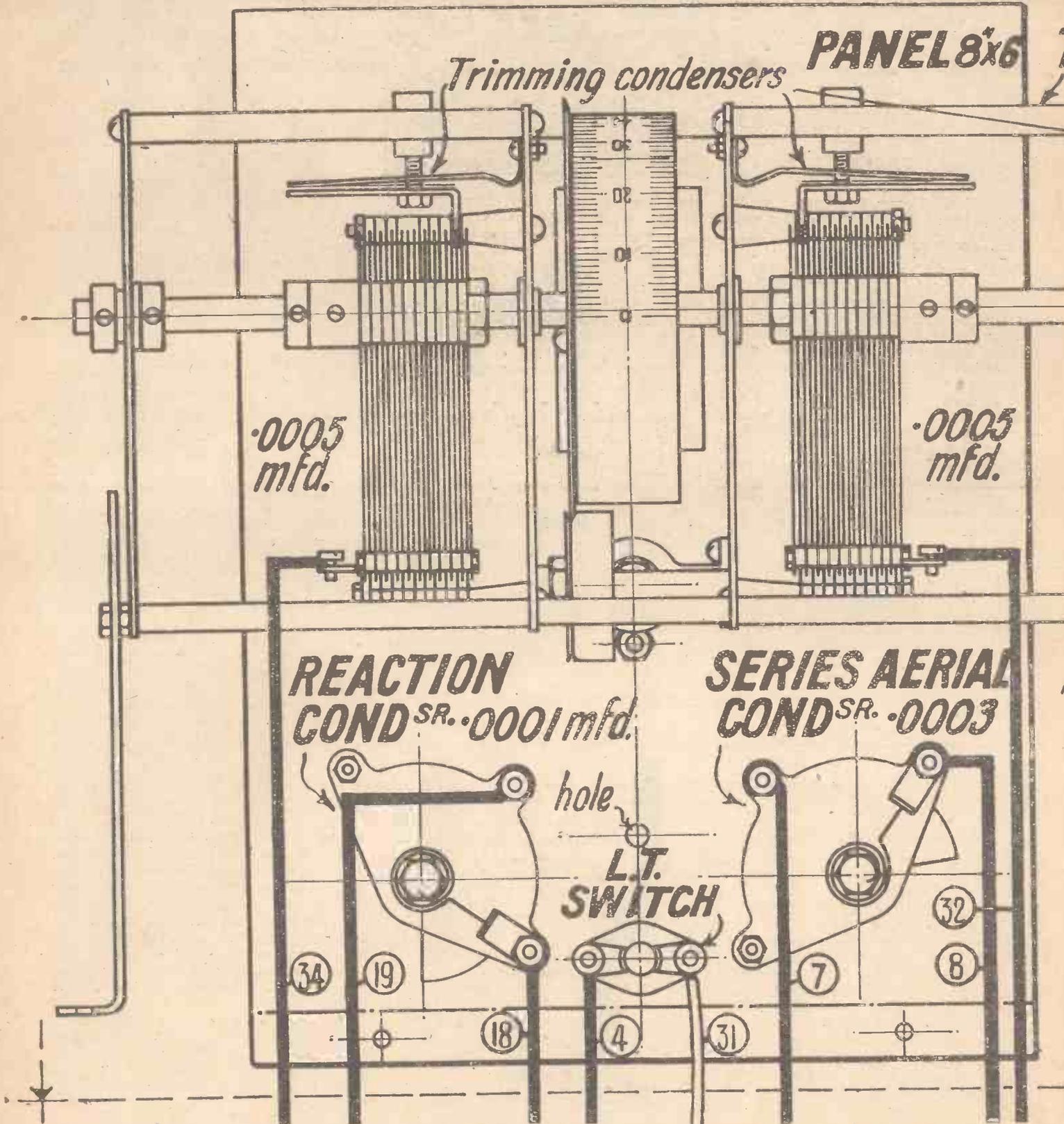
I heard part of John Coates' latest recital, and still think that, although he has made history, he is not necessarily at his best. Other people, probably more sentimental than I in these matters, think otherwise.



An impression of Billy Cotton

# THE '1931 ETH THE SET OF

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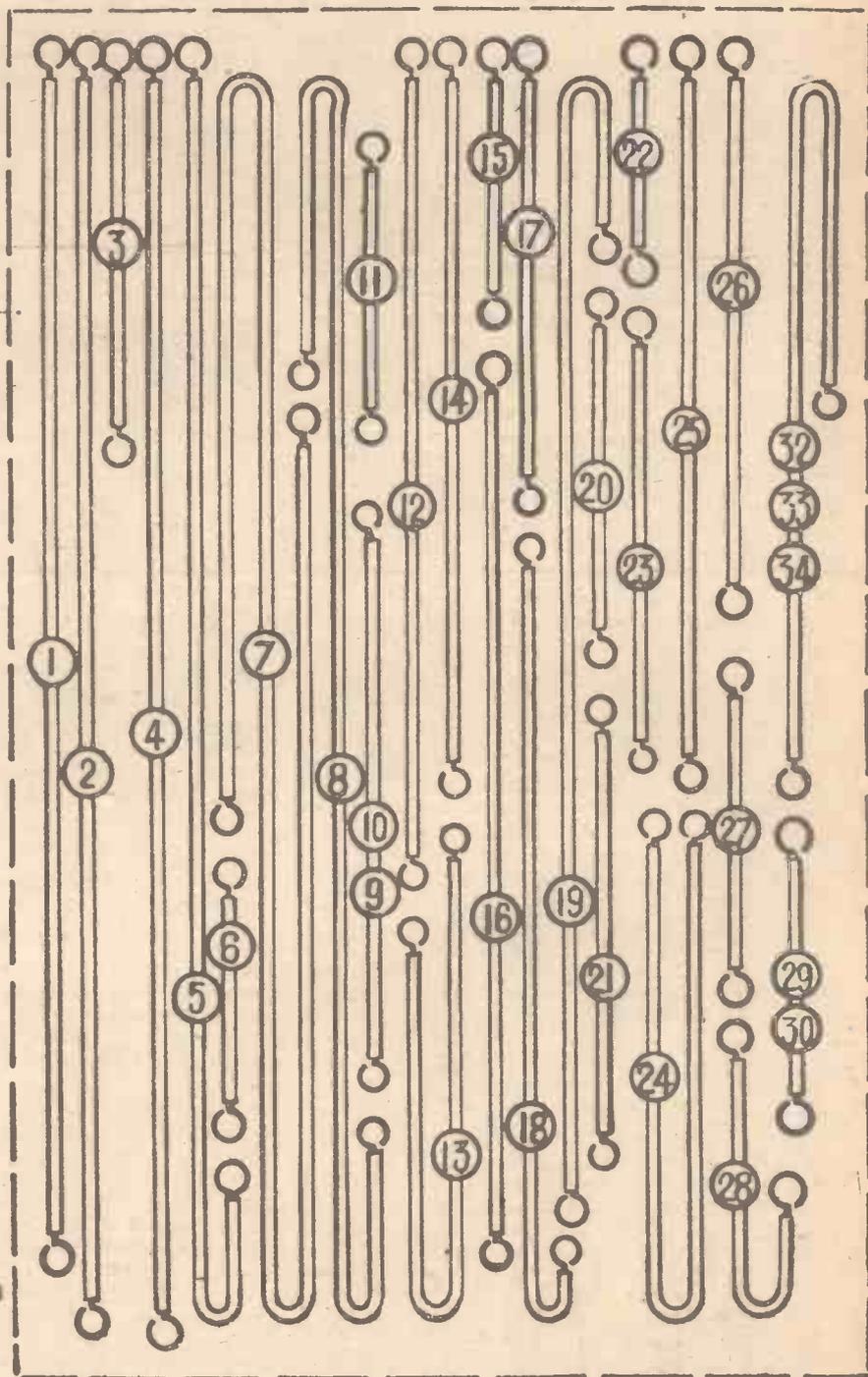
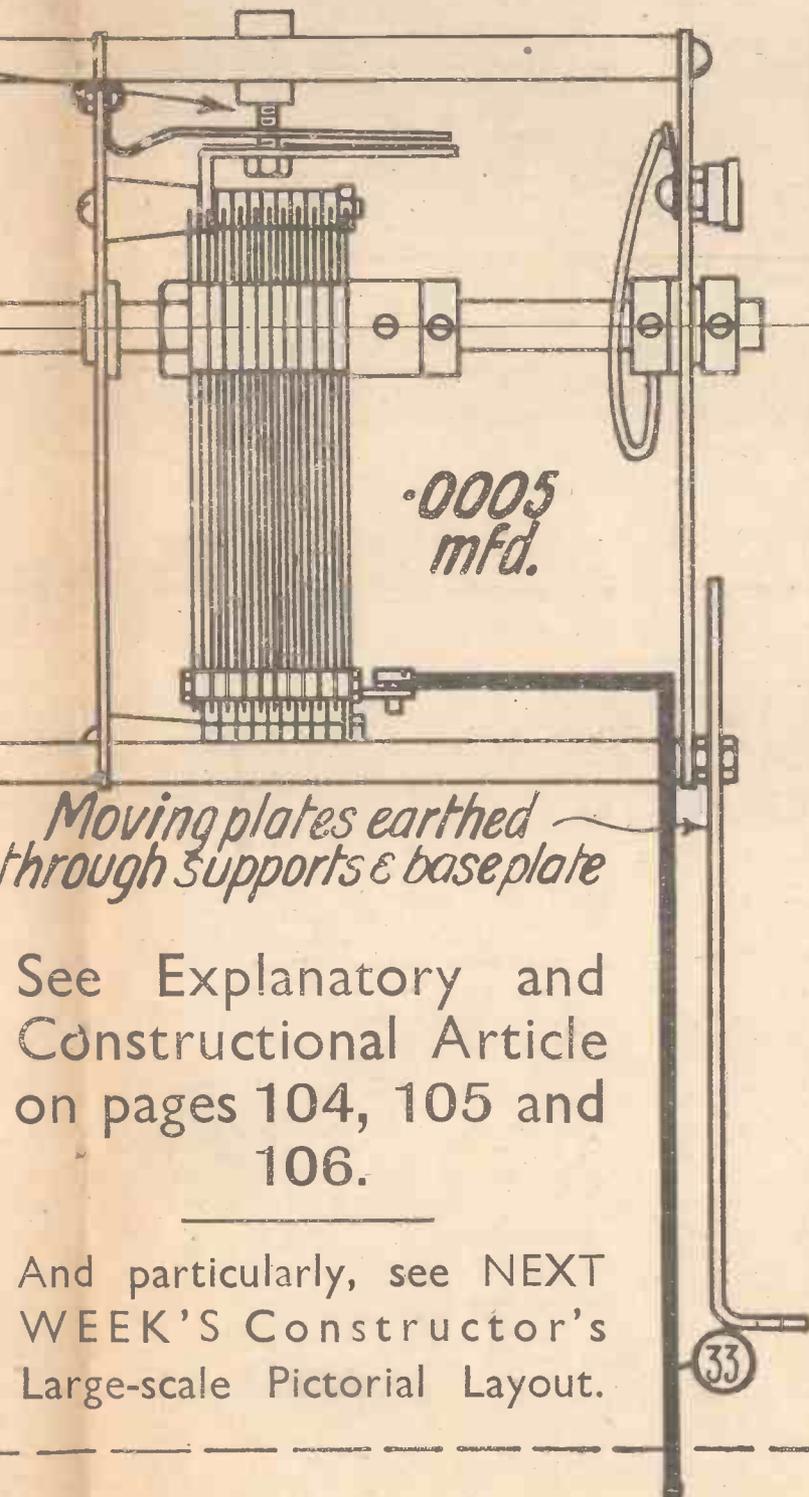


Registers with Arrowhead at top left of Baseboard Layout

# HER SEARCHER" OF THE SEASON

NEL. Full-size Baseboard Layout is given later in this issue

## TRIPLE GANG COND<sup>SR.</sup>

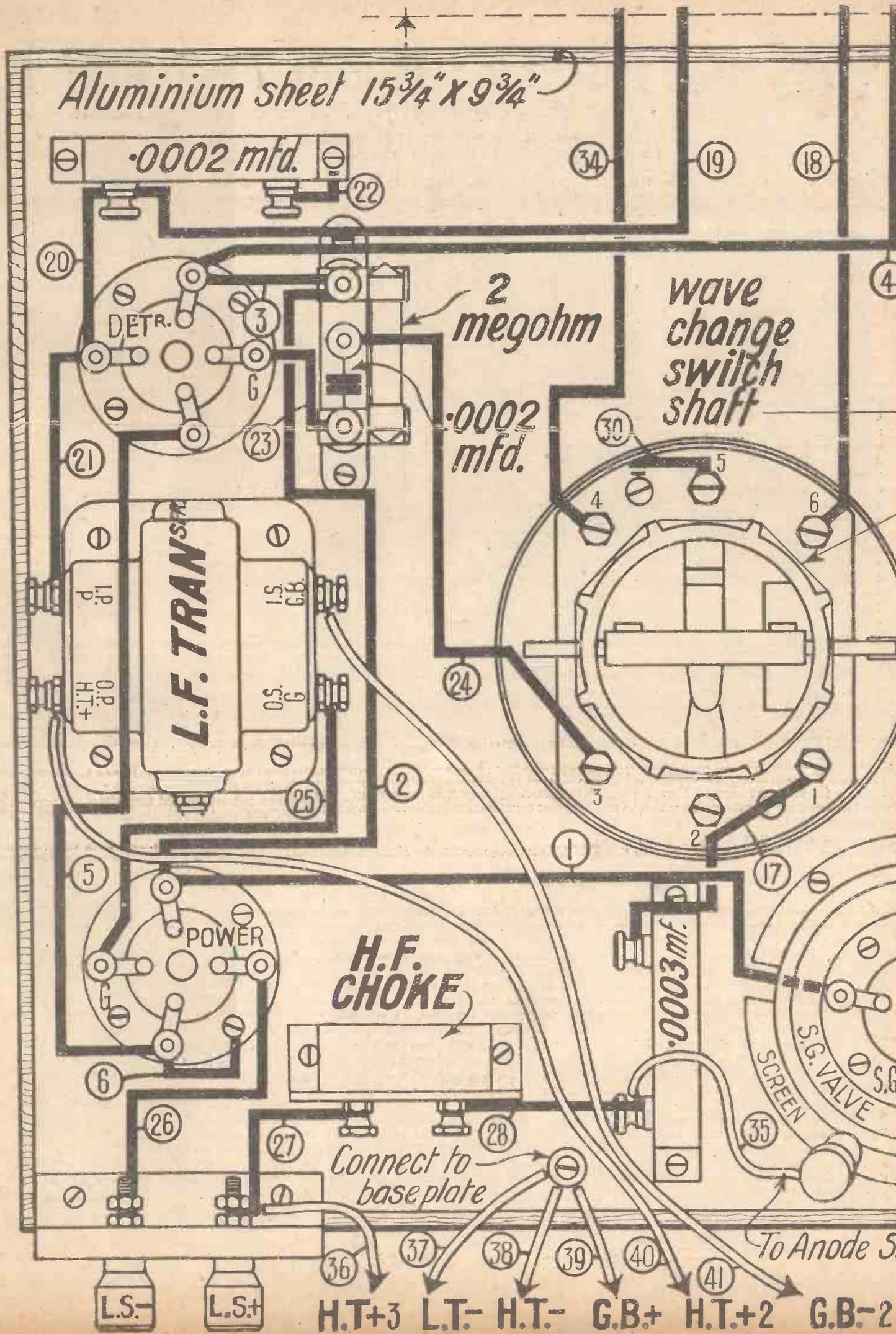


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See Explanatory and Constructional Article on pages 104, 105 and 106.

And particularly, see NEXT WEEK'S Constructor's Large-scale Pictorial Layout.

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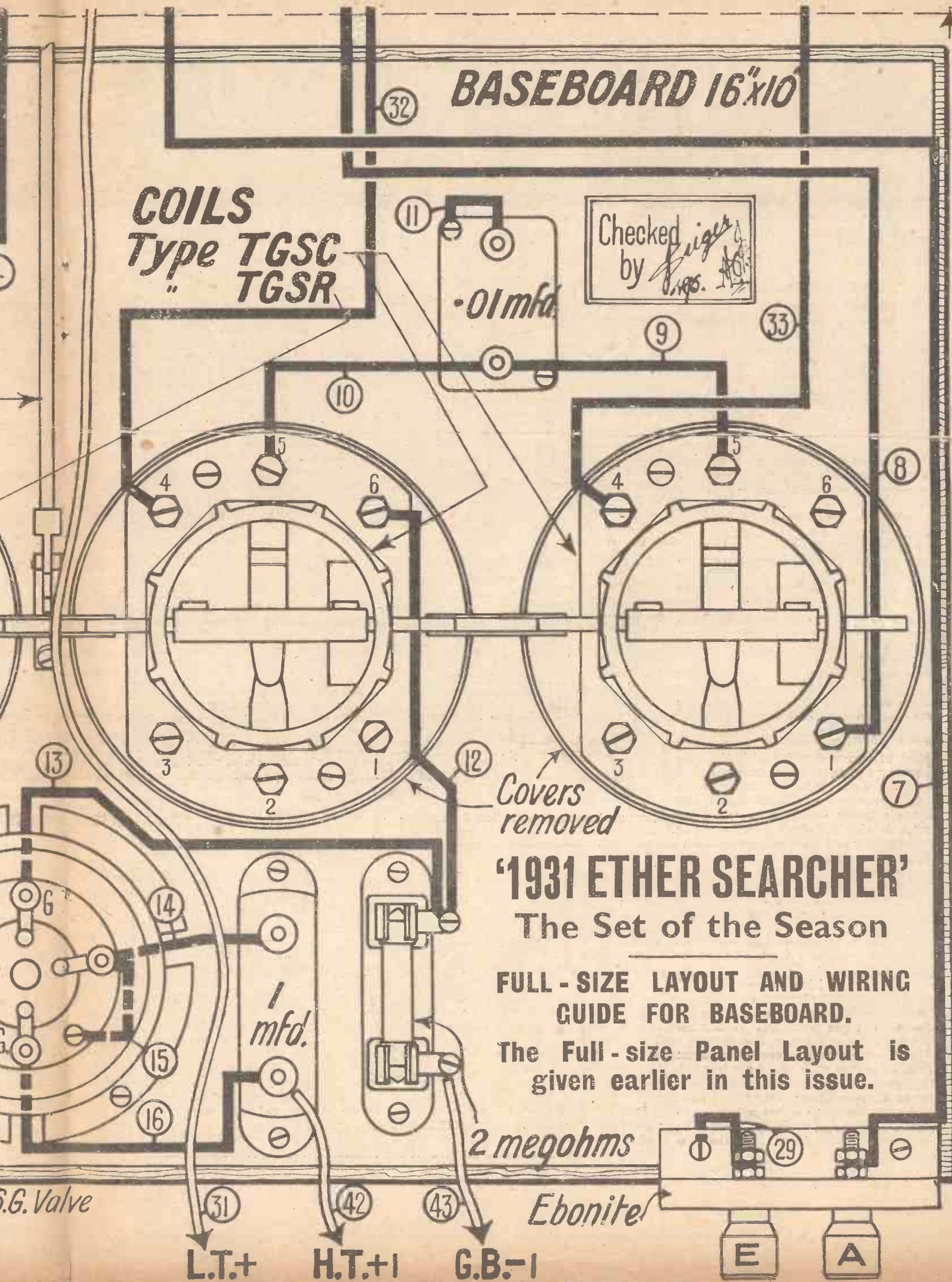
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H.T.+2

G.B.-2

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# RADIO NOTES FROM THE U.S.A.

Culled by ALAN HUNTER

## New Television Invention

ACCORDING to a message from New York, P. T. Farnsworth, a young mathematical wizard who is technical director of Television Laboratories, California, has greatly impressed the Federal

end. It is interesting that Farnsworth conceived this idea entirely mathematically. He set up the necessary equipment in his laboratory and it worked the first time he tried it!

I gather that the backers of Farnsworth

noticed that on the distant vessel a waving arm was in perfect time with the singing on the bridge of the *o4*. The apparent discrepancy was due, of course, to the appreciable time taken by sound to travel across the water. Listeners heard the two quartets in perfect unison.

## Canada's Radio League

The future of broadcasting in Canada is at the moment in the melting pot. A Canadian Radio League has been formed with the object of nationalising the Dominion's broadcasting as a public service. Many of the League's principles are in common with the findings of the Royal Commission on radio. Included in the League's proposals is the establishment of a broadcasting company having the powers of a private enterprise and the function of a public utility.

It is also proposed to appoint a Board of Directors to control the company, without political or other interference. Another aim is to develop Canadian orchestras and choirs. One of the most interesting proposals of the League is that the national broadcasting system should be leased to advertisers for sponsored programmes. It will be seen that the League proposes to extract the best of two worlds, for the public utility idea is essentially that of the B.B.C. in England and the sponsored programme idea is typical American practice.

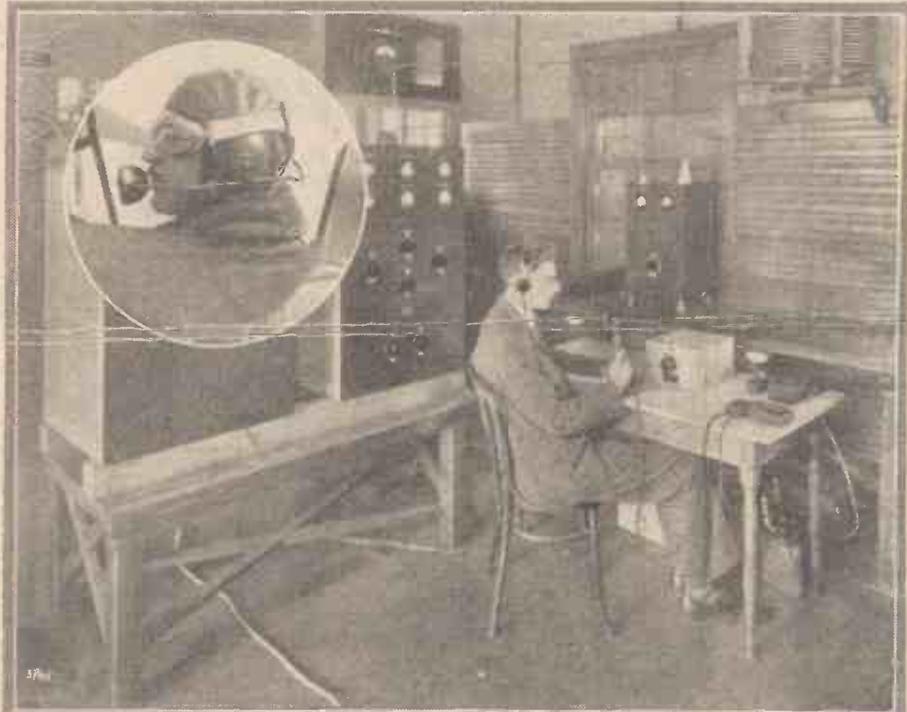
## FROTHING IN ACCUMULATORS

EVERY accumulator should "gas" freely when reaching the fully-charged state, to an extent depending upon the charging rate. Sometimes, however, particularly in celluloid cells, a peculiar soapy-looking froth is produced long before the terminal voltage rises to the maximum value. This is an indication that impurities are present in the acid. The trouble can often be cured by pouring out the old acid and thoroughly washing the plates with water that has been boiled and allowed to stand. The cell is then filled with fresh acid of the proper specific gravity and recharged.

M. B.

During the month of January the German studios will transmit a late concert according to the following rota: Breslau (17), Cologne (21), Koenigsberg (Heilsberg) (24), Leipzig (28), and Munich (31). The broadcasts start at 11.30 p.m. G.M.T. and usually last for one hour.

The Radio Maroc (Rabat) broadcasts are re-transmitted every Sunday by the new 9-kilowatt Maroc-France short-wave station between 12.30 and 2 p.m. G.M.T. on 23.8 metres, and between 8 and 10 p.m. on 32.26 metres. CN8MC (Casablanca), on 48 metres, also relays the same entertainments according to the following schedule: Monday, 9 to 11 p.m.; Tuesday, 1 to 2 p.m.; and on Saturdays from 1 to 2 p.m., and from 9 to 11 p.m. G.M.T.



A Bell Telephone laboratory engineer in touch with the pilot of a Ford aeroplane over the Whippany aerodrome. The Bell people are making extensive research into aviation telephony

Radio Commission with a demonstration of a new tube claimed to make television immediately practical. This inventor has applied for authority to operate a high-power television station in New York.

I understand that this tube, which has no moving parts, is claimed to accomplish electrical scanning, converting light waves into electrical waves and transferring these back again into an image, still or moving.

One of the great claims of the new Farnsworth invention is that television images of good detail can be transmitted through frequency bands no wider than in common use for broadcasting. The absence of moving parts, of inertia effects and of complicated mechanical devices is claimed to permit transmission of any desired amount of detail. The Farnsworth system requires only 20 kilocycles for conveying pictures and sound.

A professor of the University of California states: "The results are impressive. The principle involved is quite unlike single sideband telephone transmission, where the carrier and one side-band are suppressed at the transmitter and added at the receiver. In Farnsworth's development the necessary width of the frequency band is narrowed by a distorting process and this distorted signal is transmitted, being only changed back to its original form at the receiving

propose to put his invention into effect as soon as the Radio Commission agrees. If Farnsworth really has overcome the difficulty of the frequency band required for transmitting images, he has certainly made a great contribution to television science.

## An N.B.C. Stunt

The "Divisions" department of the B.B.C. must have read with some envy the account of a recent outside broadcast arranged by the National Broadcasting Company in America. A successful broadcast was done from a submerged submarine off New London, Connecticut. The description of the under-water manoeuvres was remarkable for the exactitude in timing, in cue handling and in the manipulation of microphone pick-ups from the various moving points involved. The broadcast opened, according to William Burke Miller, of the N.B.C., with two male quartets singing in perfect unison, in spite of the fact that they were on the decks of two different submarines, 150 yards apart.

The artistes were the officers of the two submarines, *o8* and *o4*, and their song was a favourite ditty, "Any greasy submarine is home-sweet-home to me!" Spectators on the deck of the *o4*, listening to the strains from the *o8* across the water, imagined the two quartets were out of time, until they

# IN MY WIRELESS DEN



WEEKLY TIPS—  
CONSTRUCTIONAL AND THEORETICAL

By W. JAMES.

## What About Your Reproduction ?

I OFTEN wonder how many amateurs with their home-made sets and speakers, too, sometimes, have a quality of reproduction which would be thought reasonable by the more careful listeners.

Some, I know, have the strangest ideas, well balanced reproduction is often not obtained, the user appearing to prefer excessive bass or perhaps, though rarely, relatively strong top notes.

The quality is, of course, dependent to a large extent upon the speaker. If we supplied this instrument with undistorted low frequency currents we should see what a mess some speakers make of the quality. They add tones as well as losing some.

So it would seem that we are largely in the hands of the speaker.

The amateur does, of course, try to make the results pleasing by adjusting the set in a way which masks as much as possible the defects of the speaker, but really bad faults, such as resonances, cannot be avoided by this means.

There are numbers of reproducers having not too glaring faults from which good results are to be obtained provided the set is satisfactory, but when the speaker itself is really bad nothing much can be done.

## Startling New Condensers

Most of us are familiar with the low-voltage type of electrolytic condenser. We use them for smoothing the supply to the six-volt type moving-coil loud-speaker, and for the filament circuit filter when the current is obtained from an alternating current supply and a low voltage rectifier.

High-voltage types of these condensers have been used in America for several seasons. One type is only  $4\frac{3}{4}$  in. long and  $1\frac{3}{8}$  in. diameter, having a capacity of 8 microfarads and rated at 430 volts, peak value.

For the capacity and voltage the size is remarkably small and the unit is quite robust.

Leakage of liquid is supposed to be not possible. Whether the 8 microfarads smooths as well as 8 microfarads of capacity in the form of a paper condenser is another matter.

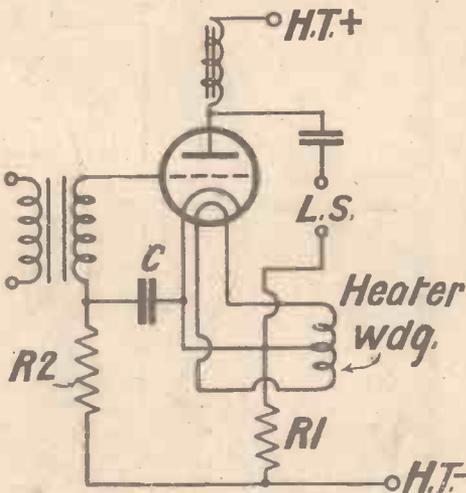
But these electrolytic condensers must be satisfactory or they would not be used. They are certainly compact and in convenient form for fitting. One that I have seen has a screw type socket mounting, so that it may be fitted in any position. The case is the negative terminal of the condenser

## For Mains Users

The connections of the power valve in a set run from the mains are quite important if freedom from hum is to be secured.

Not always is an indirectly-heated type of power valve necessary, but when one is used the connections shown in the diagram may be followed. Here the resistance  $R_1$  is included in the negative return lead and the fall in voltage across it is obtained by multiplying the value of resistance in ohms by the current in milliamperes and dividing by 1,000.

For a 1,000-ohms resistance and a current of 20 milliamperes the voltage drop is 20. This is applied to the grid of



Here are the output connections for a mains-driven set. Particulars are given in the accompanying paragraph

the valve through the filter circuit,  $R_2$ ,  $C$ .

This filter will prevent low-frequency variations from the resistance  $R_1$  reaching the grid. It is not always necessary, but should always be tried. Condenser  $C$  is usually of 2 microfarads, and the resistance  $R_2$  may be of 100,000 ohms.

The cathode of the valve is joined to the centre point of the heating circuit and so is one side of the loud-speaker. With these connections the cathode has a voltage but little different from that of the heater. The voltage drop in resistance  $R_1$  involves a loss in the anode voltage of the valve, but this is usually not serious.

## Does It Howl ?

Is a howl produced when the detector valve of your set is pulled out? I have just had a set to test in which there is the usual single stage of transformer-coupled low-

frequency magnification, and a fine howl is set up when the detector valve is out.

This indicates, as a rule, that the transformer is not too good for the circuit. Sometimes the power valve and its circuit is such that the feed-back is considerable, and the circuit oscillates when the damping of the detector is removed. The detector valve, being across the tuning of the transformer, loads it and tends to prevent the howling by levelling its frequency response-curve.

If the curve of a transformer is taken with various resistances across the primary, or secondary, for that matter, you will find that the curve becomes flatter as the resistance is reduced. Without a resistance the curve will probably be peaked, especially when the secondary is connected to a condenser representing the capacity of the output valve.

## A Coil Breakdown

We are used to coils which break down after a period, the winding which goes being the one connected to the high tension. Just lately I have had fixed resistances, wire wound, become disconnected in the same manner.

A green spot develops at one end of the winding and sooner or later a break occurs. Low-frequency transformers used to give trouble, but do not in these days. With good materials the faults in coils and other components having wire windings will also disappear.

## Getting More Power

The increase in volume obtained merely by putting a second valve in parallel with the one already in the last stage is often disappointing.

The anode current to the last stage is doubled, but the volume seems not to have increased by anything approaching a like amount. The quality, too, may not have improved to a noticeable extent. What is wrong?

Probably the whole trouble is that the output circuit, designed for a single valve, has not been changed. If the circuit is suitable for the single output valve, it is not right for the two valves connected in parallel. A transformer must be used, or a tapped output choke.

With a circuit properly adapted, the volume should show a satisfactory increase, but although twice the electrical power is available under suitable conditions, the actual volume may not sound so much greater.

However, it is sometimes worth while connecting two valves in parallel.

THE HOW AND WHY OF RADIO

XIX—CIRCUITS SIMPLY EXPLAINED  
HIGH-FREQUENCY AMPLIFIERS

If you are a beginner in wireless, now is your chance to gain a clear conception of its theory and practice. In this series of articles, specially prepared for the beginner, no previous knowledge of wireless is assumed. It is intended to deal with every aspect of the subject and the whole series will endow the beginner with sufficient knowledge to enable him to derive the greatest possible interest from the fascinating hobby of wireless

AS I showed last week, circuits lose all their terrors when dissected. Now we are going to build up a high-frequency amplifying circuit, noting why as well as how during the process.

Turn to Fig. 1. At A are shown two simple circuits. In every modern set there is one more stage of tuning than stages of high-frequency amplification. A three-valver with one high-frequency stage has two tuning circuits, a receiver with two high-frequency valves has three tuning circuits and so on. For our example we will stick to one high-frequency amplifying stage. Hence the two tuning circuits shown by Fig. A.

The high-frequency valve links these two circuits together, in a way that will soon be clear. Now note Fig. B, which shows the interposition of the high-frequency valve. The sequence is tuning circuit—H.F. valve—tuning circuit.

Remember last week we saw that in addition to a filament circuit, a valve has a grid circuit and an anode circuit. The high-frequency valve links together these two tuning circuits by means of its grid and anode circuits. One tuning circuit is connected to the grid of the valve and the other to the anode.

At A in Fig. 2 is shown the left-hand tuning circuit of Fig. 1 connected to the grid circuit of the high-frequency valve. It will be recalled that the grid circuit of the valve consists of the path from the grid, to low-tension negative. So the tuner is connected across the grid and filament as shown at A in Fig. 2. The right-hand

tuning circuit of Fig. 1B is shown at Fig. 2B as part of the anode circuit of the high-frequency valve. Note that between the anode and the point indicating the grid of

anode coupling. The tuning circuit in the anode of the high-frequency valve, together with the fixed condenser, form this tuned-anode coupling. It is still frequently used, especially with screened-grid valves.

But for various reasons the tuned-anode coupling of Fig. 3 is losing popularity in favour of the circuit of Fig. 4. Here it will be seen that instead of a single tuning coil and condenser there are two coils. The smaller is the primary winding connected between the anode of the high-frequency valve and the positive high-tension supply. The larger coil is the secondary, tuned by a condenser as in Fig. 3. The primary and secondary coils are wound so that they are very closely coupled together. So much so that when the secondary coil is in effect also tuned.

These two coils form what is known as a high-frequency transformer. By suitable arrangement of the windings it is possible to obtain a step-up in signal voltage with this coupling. An interesting point for the beginner to note is that there is no need for the fixed coupling condenser to prevent the high-tension voltage reaching the grid of the next valve. This is because the high tension is applied through the primary winding only. If the valve following the high-frequency amplifier is a leaky-grid condenser detector, the usual fixed condenser will be necessary.

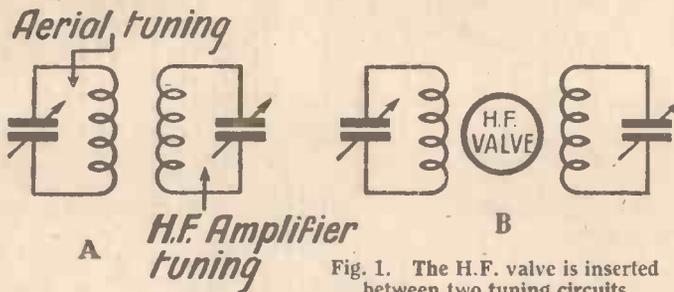


Fig. 1. The H.F. valve is inserted between two tuning circuits

the detector valve is a fixed condenser. Through this are passed voltages developed in the anode tuning circuit to be applied to

a condenser as in Fig. 3. The primary and secondary coils are wound so that they are very closely coupled together.

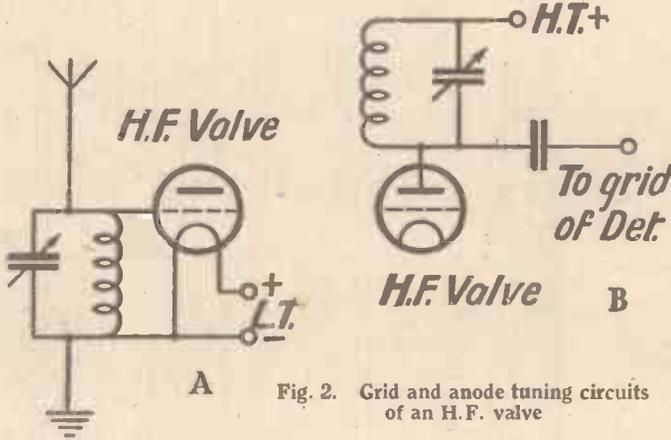


Fig. 2. Grid and anode tuning circuits of an H.F. valve

the grid of the detector. It will be seen that the high-tension supply to the anode of the valve shown at Fig. 2B is applied through the tuning coil of the anode tuning circuit. The fixed condenser between the anode and the grid of the next valve prevents this positive high-tension voltage from being applied to the grid of the detector.

Now look at Fig. 3 where Figs. 2A and 2B are combined. We now have the correct connection for a high-frequency amplifying valve placed between two tuning circuits. The incoming signal is first tuned by the aerial tuning circuit connected across the grid-filament circuit of the high-frequency valve. These signal voltages appear in the anode tuning circuit in an amplified form, where they are again tuned and passed on to the next valve through a fixed condenser.

The circuit of Fig. 3 shows the skeleton connections of what is known as tuned-

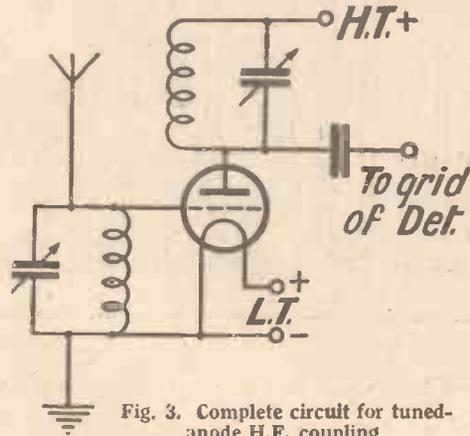


Fig. 3. Complete circuit for tuned-anode H.F. coupling

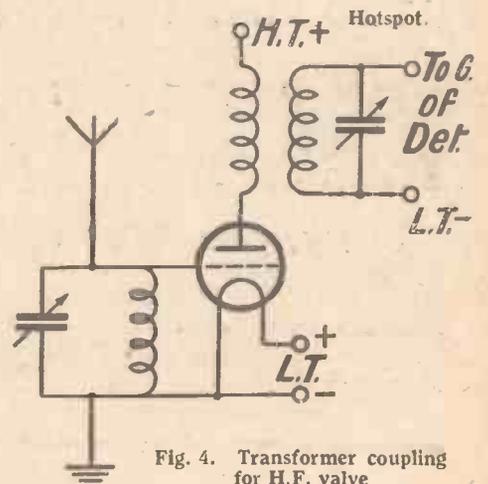


Fig. 4. Transformer coupling for H.F. valve