

PRACTICAL ARTICLES on SOLDERING & MAKING SMALL CONDENSERS

Amateur Wireless

3^d
Every
Wednesday

and
Radiovision

**ONE-VALVER FOR
SHORT WAVES**

**LITTLE NATIONALS
MAY STAY**

**EXPERIMENT WITH
A CRYSTAL SET**

**NEW WAVE-
CHANGE CIRCUIT**

"Goodwill" Sets

Are What You Need

This Christmas

● **THE GOODWILL THREE
IS A SELF-CONTAINED
BATTERY SET**

● **THE GOODWILL TWO
WORKS ON ANY MAINS**

● **BOTH SETS ADAPT-
ABLE for AERIAL & EARTH**



IF You Want a Free Blueprint of the ALL-BRITAIN THREE Join the Constructor Crusaders



THE PRIVILEGES OF MEMBERSHIP

- 1.—Immediately on enrolment every Constructor Crusader receives free full-size photographic blueprints of the All-Britain Three (described Oct. 6) and of the Crusaders' A.V.C.4 (published on August 18). He will also receive a free blueprint, immediately on publication, of the two "Amateur Wireless" star sets to be released on January 23 and March 13, 1935.
- 2.—Every member will also be entitled to free technical advice in connection with any or all of the four special Crusader sets mentioned above (each query must be accompanied by a stamped and addressed envelope for the reply). In the case of queries regarding any other "Amateur Wireless" sets the usual rules of the Information Bureau must be observed.
- 3.—All Constructor Crusaders are invited to contribute ideas and suggestions to the Constructor Crusaders' Corner. Constructive suggestions will be specially helpful and will be interpreted by the "Amateur Wireless" Technical Staff as far as possible to the advantage of all set builders.
- 4.—Immediately his application for membership has been approved every Constructor Crusader will receive a certificate of membership. Note that the membership number must be quoted in all future correspondence.
- 5.—Constructor Crusaders will be authorised to wear the badge of membership. Badges for buttonhole wear can be obtained for 1s. extra each, post paid.

WHAT THE CONSTRUCTOR CRUSADER UNDERTAKES

To further the interests of home construction in every way that may present itself, and to encourage as many people as possible to take an active interest in the greatest hobby ever invented.

To do everything possible to raise the standard of radio reception — by making suggestions and by using only the best and newest methods and circuits so that other listeners will realise what great strides radio makes from year to year.

To build at least one new set every year and not to make do with an old receiver that should have been scrapped, or at least rebuilt, years ago.

To report on the performance of every new set made up and tried out — and to make reasonable and fair criticisms.



To Constructor Crusaders, "Amateur Wireless,"
58-61 Fetter Lane, London, E.C.4.
(Enclose in envelope bearing 1½d. stamp.)

Please enrol me as a member of the Constructor Crusaders. I enclose postal order for 1s. to cover postage on four free blueprints and office expenses (and also an extra 1s. for buttonhole badge).
It is understood that I shall be entitled to free technical advice on any matters concerning the four free blueprint sets. My name and address are:

December 15, 1934

Value of Postal Order Enclosed

For office use only.

No.

C

B

L

*Delete if not required

Join Now by
Completing the
Membership Form

Editor-in-Chief:
BERNARD E. JONES

Technical Editor:
J. H. REYNER
E.Sc. (Hons.), A.M.I.E.E.

Radiovision Editor:
H. CORBISHLEY

Amateur Wireless and Radiovision

Editor:
D. SISSON RELPH
Research Consultants:
W. JAMES and
PERCY W. HARRIS
M.Inst.Rad.E.
Assistant Editor:
ALAN HUNTER

Published by BERNARD JONES PUBLICATIONS, LTD., 58/61 Fetter Lane, London, E.C.4. Telephone: Central 4341 (four lines). Telegrams: "Beejapee, Fleet, London." Subscription price paid to any part of the world: 3 months, 4s. 6d.; 6 months, 8s. 9d.; 12 months, 17s. 6d. Published on Wednesdays and dated for the following Saturday.

Little Nationals May Stay

"Little Nationals" May Stay

ALTHOUGH the B.B.C. will not admit it, there is a strong feeling that the "little Nationals"—London, West and North—will *not* be shut down after all.

Droitwich has not proved the one hundred per cent station that was anticipated.

Moreover, the B.B.C. is recognising that, in any case, reception of a long-wave station offers difficulties that hundreds of thousands of medium-wave National listeners would have to tackle.

Daventry Again

OUT of broadcasting hours the B.B.C. has been testing the old Daventry transmitter up against Droitwich, engineers stationed in various parts of the country noting the difference in fading and night distortion.

It has been established that fading is not, in general, any *worse* with Droitwich than with Daventry, but the incidence of the "black spots" is of course different because the site of transmission is different.

Distortion Is Worse

WHAT will perhaps interest a vast number of "fringe" listeners to Droitwich is the discovery that the new station is *definitely causing more night distortion than ever Daventry did.*

A curious reason accounts for this. Droitwich has a much higher frequency response than Daventry with the result that the differential reflection effect is much more pronounced.

Quality A Drawback

IT is the good quality of Droitwich transmissions that is now causing the increased night distortion—the outer sidebands becoming mangled during the process of this differential reflection by the Heaviside layer.

Then again, the B.B.C. engineers explain, many sets this year are for the first time fitted with A.V.C.—which during the fade periods tends to accentuate the distortion.

In the old days this distortion would merely have been registered as a fade-out. Now the A.V.C. holds up the signal strength, but of course, distortion in "trough" conditions does creep in.

The Magic Ring

INSIDE a radius of 200 miles, the B.B.C. can find no evidence of night distortion or fading—it is around the 250-mile mark that all the trouble seems to be centred.

Just in the very districts where a good local regional programme is wanted the Droitwich National seems to be failing. It is all rather worrying—for listeners as well as for the B.B.C.

Midland Regional

AS we ventured to forecast some months ago, the new Midland Regional transmitter now being assembled at Droitwich to take over the plant at Daventry, will be testing soon after Christmas.

Don't be surprised to hear mysterious and powerful signals any time now, therefore.

Public Tests

OFFICIALLY, the new Midland station will not be on the air until the New Year. When it does come it is proposed to subject it to fairly lengthy public tests.

What with the drastic change of site from Daventry to Droitwich, and the proposed change-over of wavelengths, listeners in the Midland area will want some weeks to adjust their sets to the new conditions.

Wavelength Re-shuffle

MANY people are guessing as to what the wavelength changes are to be when Midland Regional takes the air from Droitwich.

Even the B.B.C. does not yet know its own mind. Certainly Midland Regional will lose its present wavelength, probably to Scottish Regional.

Further than that we cannot yet say, except that the re-shuffle will not entail any particular difficulty for listeners.

Decisive Factor

WHETHER the changes will be as drastic as was at first anticipated depends very largely on the decision over the little Nationals.

They were to have been shut down at the end of this year, but forces are growing against that. Certain it is that they will not

be shut down for several months—if at all.

Bangor Studios

WORK has been started on the Bangor studios for North Wales talent supply to West Regional—and later for feeding the proposed Bangor relay station.

A largish house called "Brynmeirion" has been purchased in upper Bangor for the studio adaptation, with about a quarter of an acre of ground.

This new studio centre will be ready for broadcasting work by the middle of 1935, when the lines from Bangor to Cardiff will have been laid down by the Post Office.

North Wales Relay

ALTHOUGH nothing definite has yet been done about the North Wales relay station, it is thought that it will be sited somewhere on the Isle of Anglesey.

It will thus be quite convenient for hook-ups with the Bangor studios and West Regional.

Trade Worried

OVER the imminent "swop" of wavelengths among the regionals, the radio trade is said to be getting a little restive. Sets with station-marked tuning scales are their particular worry, of course.

They want to know in good time what the changes are to be—so that they can produce new scales to replace those that will be made rather confusingly inaccurate as and when the changes do occur.

The B.B.C. is quite aware of this difficulty and will notify the trade the moment a decision is taken. In any case no listener will be deprived of his station—even if the readings are a bit out.

Greenland Medley

WE like the idea of sending the Oxford University Greenland Expedition a special Greenland Medley by radio.

Harry Roy will be responsible for this tie-up on December 21. He will include Christmas good wishes among the tunes selected by the Expedition.

Which station will they pick up? Droitwich ought to be audible—and then there are the Empire short-wave stations, of course.



Meet the Three Radio Rogues—the famous American trio who have been such a success recently on the stage and over the air. They will feature in a British Lion production called "In Town To-night"



Why We Build Sets

This is Paul Smith's idea for fitting is rather large table cabinet set into a handsome piece of furniture—the set takes pride of place at the top of a writing bureau. And very handsome it looks, don't you agree? We shall be very pleased to publish other bright ideas of this kind if Constructor Crusaders care to send pictures to us.

It is on such apparatus that records are set up. The quietness of operation of these sets, when used with a sensitive pair of headphones, enables the veriest whisper of sound to be picked up—and logged.

Comes another shoal of advocates for a super-het. Crusader set, included among them being a letter from a Royal Air Force fan, who says: "Universal mains valves, though, if you please. The grid system has not yet reached the wilderness of Salisbury Plain and I am sure there are many such places existing."

Grid Not Tapped

He is right, of course. The pity is that the grid wires, with which now carry the standard high-tension supply over practically the whole of these islands, is not yet being tapped sufficiently by the very places the grid was designed to fill up—the out of the way villages and townships.

Until the golden age of electricity does down, the universal-mains set is likely to find increasing favour, simply because, while it works very effectively indeed as an A.C.-mains model, it can, at will, be used for D.C. supplies—of which there are an unconscionable number still in existence.

Although not a Crusader, Paul Smith of Nottingham has found a very suitable home for his rather large set, as shown by the photograph at the top of this page. But let us quote him:

Space Is Restricted

"As space is very restricted in our flat, I had to do some very hard thinking before even studying the blueprints. After a careful survey of the furniture, I decided to utilise the top of the writing bureau which had always been used as a bookcase. I measured up the space and then set out to build my set, to fill the space, and I found this planning a fascinating job.

"It wasn't a very big job to stain and polish the plywood panel to match the oak bureau, and a few pence covered the cost. The small square of tapestry, gold in colour, set in front of the loud-speaker added a touch of much needed colour to the set. I made a neat plywood back for the cabinet in place of the o.d one which I discarded, and cut out several holes for the various leads and baffle."

Well done, Paul Smith! It makes a handsome-looking job.

Talking again of the next set, a Suffolk Crusader writes: "I agree that the set should not be a superhet, but of the straight type and, as CC1265 puts it 'selective and giving really good quality.' That is a very important point about quality, I think."

All For a Chassis!

Now for a very significant remark. "I've always been a baseboard fan but after seeing these new designs in A.W. I'm all for a chassis for the next big Crusader set." He goes on to give us some very interesting dope on what to do about the next design. Thanks, CC2488—we'll bear you in mind.

HOME construction will never die! That is the comment most suitable after reading the letter of an Ilkeston reader.

"I am building the AVC4 for a client of mine, being a dealer I tried to persuade him to purchase a particular receiver, and his reply will interest you.

"I have never heard a poor set constructed by you and have never had any regrets by owners of sets built by you.' As nearly all my construction has been culled from A.W. and W.M. I think this is a tribute to your publications and technical staffs."

A Little Light

This is the sort of thing that does bring a little light into our fog-beridden lives at the moment. We shall go on plugging away at home-constructor designs, knowing full well that they provide the discerning listener with a performance, a flexibility, and a freedom from service worries that even the most expensive factory-built set cannot, in the nature of things, compete with.

Here's another plea for the next Crusader set to include a sort of short-wave equipment—not that, judging by present experiments, this will actually be possible.

"How about a three-valver, with class-B output, self-adjusting volume control, using a Westector, tone control—all built on a baseboard, plus a short-wave converter" That is the contribution of William Page, of Tottenham, N.15.

Cry in the Night

He also says that in his district the great cry in the night is for sets that will boost up the foreigners, which, seemingly, come in



Have YOU joined the Crusade yet? If not read all about the simple conditions on the inside front cover this week. It costs only 1s. to become a member!

there rather weakly. Is Tottenham, of illustrious associations, really a wireless "black spot"?

We might at this point interpolate a point about short-wave equipment. Judging by many letters received, it is still thought that a short-wave converter is the finest thing out for good short-wave reception.

The truth is, as Kenneth Jowers often points out, that the best amateur results on the short waves are obtained with a straight type of set, either with a plain detector and low-frequency amplifier or with a stage of screen-grid high-frequency amplifier before detection.

America on Five Metres!

By PERRY W. HARRIS, M.Inst. R.E.

AS a persistent "Doubting Thomas," I have frequently written about the danger of accepting without question the various theories put forward by experts, and not long ago I stated in these pages that I did not believe in the theory which holds that the very short waves have a range limited by their straight-line path.

I am very interested and delighted, therefore, to hear from my old friend, Arthur H. Lynch, in New York, that the Garden City Radio Club of Long Island, N.Y., have embarked upon a very convincing series of tests and that the range of these tests has been extended to England.

Long-distance 5-metre Tests

The recent successful tests on long-distance 5-metre transmission conducted between the headquarters of the American Radio Relay League at Hartford, Connecticut, and the testing laboratory of Mr. James Millen, at Middleton, Massachusetts, have encouraged my American friends to undertake what is considered to be one of the most outstanding and well-laid plans for 5-metre communication hitherto contemplated.

The Garden City Radio Club, which is affiliated with the American Radio Relay League, is unique in that it has no officers, no dues, and no regular meeting nights. More than 90 per cent. of the members of the club, in addition to being regularly licensed amateur radio station owners, are also licensed airmen.

The club has just concluded arrangements with the Hotel New Yorker to supply the equipment for this new 5-metre communication scheme, and arrangements have been made to install 5-metre beam outfits on the north-east and the south-west corners of the roof. The transmitters and receivers will be in the hotel's modern radio room on the forty-first floor.

The negotiations for this set-up were concluded recently by Arthur H. Lynch (W2DKJ), representing the Garden City Radio Club, and Mr. Eli M. Lurie, chief radio engineer for all of the hotels under the Ralph Hitz management.

Preliminary tests made with a standard 5-metre portable transmitter and receiver have been conducted over a period of ten days and have shown that the hotel seems to be ideally located for this new form of communication, even on extremely low power, over the entire Metropolitan area.

Mr. Lynch tells me that the first long-distance tests to be undertaken will be conducted with the Hartford headquarters of the American Radio Relay League, and it is hoped that within a reasonably short time the regular communication links between Washington, Baltimore, Philadelphia, New York, Hartford, and Boston will be established. The station at the New Yorker (W2DLG) will, of course, work with any amateurs in the Metropolitan area.

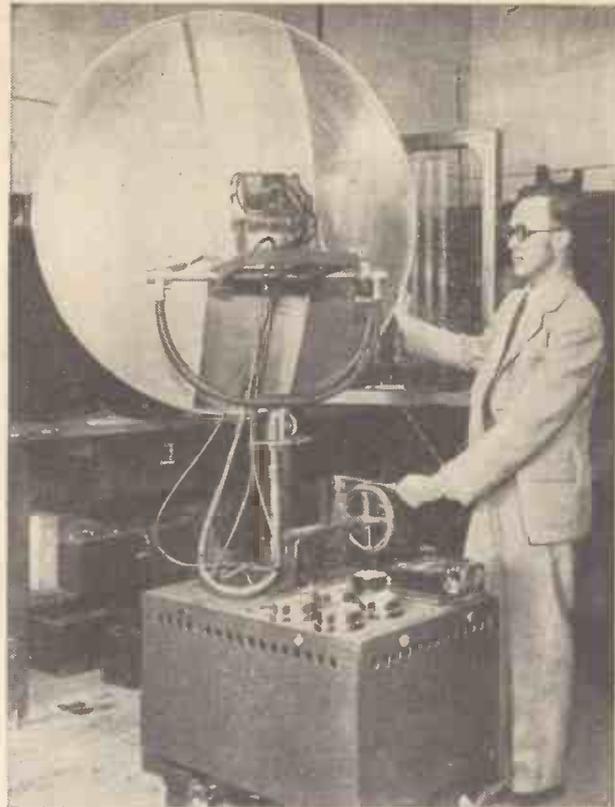
The low-powered 5-metre transmitter which has been operating in various sections of the 56- to 60-megacycle spectrum is covering the New York Metropolitan area in a remarkable manner. Two-way conversations have been effected between the installation on the forty-sixth floor of the Hotel New Yorker and nearly every town within a radius of forty miles. Reports are reaching the members of the club which operate the station to the effect that the transmitter is being heard over even greater distances. In the past, as I have explained, it has been considered possible to carry on such work on the ultra high frequencies over distances limited to the range of vision.

The power in use at this new station (W2DLG) is less than 15 watts and the reported signal strength from all of the outlying districts indicates that this station is transmitting the most effective signal in the Metropolitan area.

For Television, Too

The primary purpose of the new installation is to secure accurate data on the possibility of using the ultra high-frequency bands for consistent communication purposes, as well as for the broadcasting and television, as soon as that part of the radio art is developed to a point which will enable amateurs to experiment in this increasingly important field.

Having this in mind, it is the Club's aim to establish direct and as consistent communication as possible between the headquarters of



With his ionic modulator Dr. Irving Wolff, research engineer of R.C.A., New Jersey, is able to generate wireless waves only four inches long

the American Radio Relay League at West Hartford and amateurs throughout the New York Metropolitan area. Recent work indicates that it will not be long before satisfactory conversations will be a regular thing between these two points. Two stations in Yonkers (a suburb of New York) have already conducted two-way conversations with Hartford, Connecticut, as has one station in Montclair.

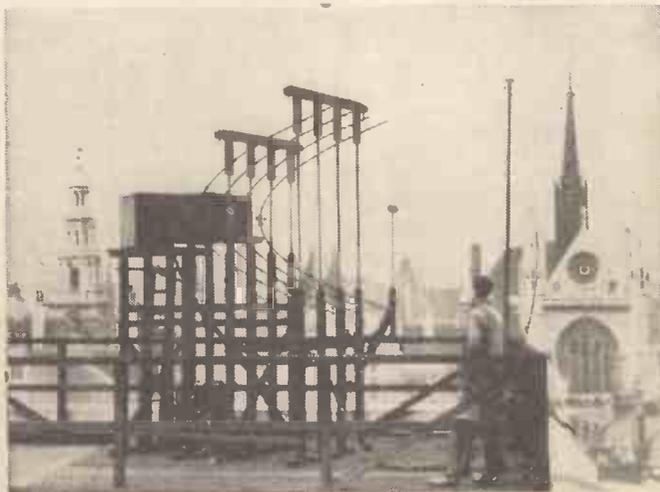
In order to facilitate picking up the West Hartford station, a definite schedule has been arranged between Ross A. Hull, associate editor of "QST" magazine, who operates station W1AL at West Hartford for the League, and Arthur H. Lynch, who is directing the work at the New York end of this circuit.

The schedule includes transmission from W1AL on a special beam aerial directed toward the centre of New York City and operating on 59.7 megacycles at the following hours each night: 9.00 to 9.5, 9.30 to 9.35, 10.00 to 10.5, and 11.00 to 11.5 p.m. This schedule is followed by transmission from the New York end to Hartford for the succeeding five minutes of each period.

For about two minutes before the Hartford station goes on, the New York station transmits to all amateurs in the Metropolitan area indicating that transmission from Hartford is about to start and enabling the New York amateurs thus to determine where to look on their dials for the Hartford station. As a general rule, this transmission is made on tone-modulated telegraphy, not voice.

For communication with amateurs in the Metropolitan area, the station on the New Yorker generally operates on a frequency which

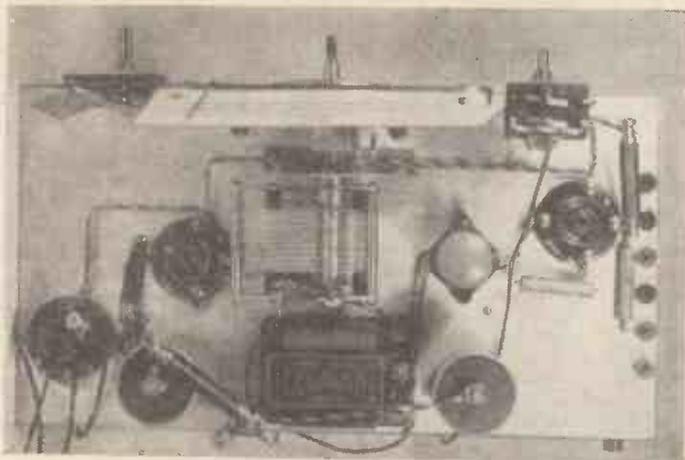
Continued on page 648



Here on the roof of Electra House, Thames Embankment, London, a complete micro-wave beam transmitter is fitted up for experiments on a wavelength of only one metre



Completely self-contained, the Goodwill Three is a detector and low-frequency amplifier set working from batteries. The design is a simple metal baseplate



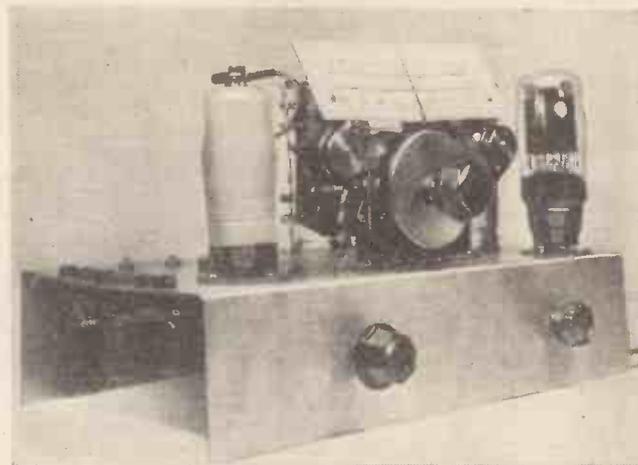
Plan view of the Goodwill Three, showing the very simple layout of the baseplate components. Note, too, the six sockets on the right for the frame connections

"Goodwill" Sets

Further details are given in these three pages of our special Christmas designs, which were introduced to you in our preceding issue. The Goodwill Two is just the set for universal mains working, and the Goodwill Three is a completely self-contained battery set ideal for taking with you to parties—or keeping at home as an auxiliary to the existing set. Both are easy to build and can be guaranteed to give good reception of locals with a fair sprinkling of foreigners.

set with a detector and power circuit, a third valve being used for rectification—essential when the set is being used in its A.C. function. As

kept on the all-in idea. If that is so there is no need to sigh in vain, because we have foreseen this possibility and have left ample space on both baseplate and chassis for



Front view of the Goodwill Two, a universal mains set that is designed on the chassis principle. This set works at will, without any alteration on A.C. or D.C. mains.

with the battery version, the Goodwill Two can be entirely self-contained, the frame windings and the loud-speaker being just the same.

But perhaps many of you, liking the general layouts of the sets, are not too

with the inclusion of a suitable tuning coil. This Graham Farish coil, the A1 type, takes the place of the frame windings, being tuned by the variable condenser in the normal way. Also, of course, a normal aerial and earth are then used, with the small fixed condenser in the aerial lead for added selectivity.

In order to make the changeover as easy as possible—and as foolproof!—we have arranged the frame windings, for medium and long wavebands and for reaction, to terminate in

TWO sets that will appeal especially to those of you who delight in the feature of self-containedness were introduced in the Christmas number last week.

The first set will probably be the more popular because it is for battery operation. A detector and two low-frequency set with frame aerial. Not, at first sight, much of a ranger.

Yet, with reaction applied to the frame windings, and modern valves at every stage, added to the enormous power of many broadcasting stations, put an entirely different complexion on the possibilities of the specification.

A Dozen Stations

We ourselves have logged upwards of a dozen stations at good loud-speaker strength—but under better conditions we feel sure that many of our dexterous readers will be easily able to exceed this number of stations by at least half a dozen.

The Goodwill Three is utterly self-contained as we explained last week, with the baseplate set at the top and room below for the loud-speaker and batteries. Yes, and that includes a double-capacity high-tension to feed the three valves with a proper amount of "juice."

As for the Goodwill Two, it is a metal-chassis

PARTS NEEDED FOR THE GOODWILL THREE (BATTERY TRANSPORTABLE)

BASEPLATE

1—Aluminium, 13 in. by 7 in. by $\frac{1}{8}$ in.

CONDENSERS, FIXED

1—T.C.C. .0003-microfarad, tubular type (or Dubilier).

1—T.C.C. .0002-microfarad, tubular type (or Dubilier).

1—T.C.C. .001-microfarad, tubular type (or Dubilier).

1—T.C.C. .01-microfarad, tubular type (or Dubilier).

2—Formo 2-microfarad, screened paper type.

CONDENSERS, VARIABLE

1—J. B. Popular Log, .0005-microfarad.

1—Graham Farish, .0005-microfarad type reaction (or J.B.).

CHOKE, HIGH-FREQUENCY

1—Wearite screened, type HFP.

DIAL, SLOW-MOTION

1—Wilkins and Wright, single ratio type W346.

HOLDERS, VALVE

3—Telsen 4-pin baseboard mounting (or Benjamin).

PLUGS, SOCKETS, ETC.

5—Clix wander plugs, marked G.B.—1, G.B.—2, G.B.—3, H.T.—1, H.T.—2 (or Goltone).

7—Clix insulated sockets.

1—Clix metal socket.

7—Clix plugs.

RESISTANCES, FIXED

1—Graham Farish Ohmite, 1-megohm (or Erie, Franklin).

1—Graham Farish Ohmite, .5-megohm (or Erie, Franklin).

1—Graham Farish Ohmite, 20,000 ohms (or Erie, Franklin).

1—Graham Farish Ohmite, 30,000 ohms (or Erie, Franklin).

1—Graham Farish Ohmite, 10,000 ohms (or Erie, Franklin).

SWITCHES

1—Wearite rotary switch, type I22.

SUNDRIES

2—2-inch metal mounting brackets.

Connecting wire and sleeving (Goltone).

32 yards Goltone 9/40 Litz wire.

2 oz. of Goltone 30-gauge double cotton covered wire.

2—Bulgin No. 5 type grid-bias battery clips.

2—Bulgin 2-volt .06 ampere dial lamps.

2—Bulgin knobs, type K14.

1—Bulgin knob, type K12.

2—Bulgin reducing sleeves, 3/16th.

2 yards thin flex (Goltone).

TRANSFORMER, LOW-FREQUENCY

1—Ferranti, type AF10.

ACCESSORIES

CABINET

1—Kobtex, type BWD.

BATTERIES

1—G.E.C. 120-volt, type L255.

1—G.E.C. 9-volt grid-bias battery.

1—Exide type DTG accumulator.

LOUD-SPEAKER

1—W. B., type Stentorian-Baby.

VALVES

1—Ccs. or 210HL met. (or Record Radio H2, 362 HL2).

1—Cossor 210Det met. (or Record Radio L2, 362 L2).

1—Cossor 220P (or Record Radio P2, 362 LP2).

You Need for Christmas!

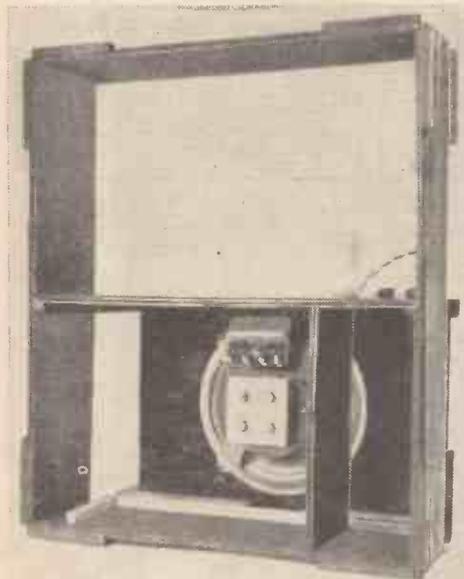
plugs that are inserted in six sockets on either the baseplate or chassis.

Now, when the frame aerial is scrapped in favour of the coil, the six numbered connections sockets correspond with the connections on the specified coil—and all you have to do is to take six flexible leads from the coil to their appropriate sockets.

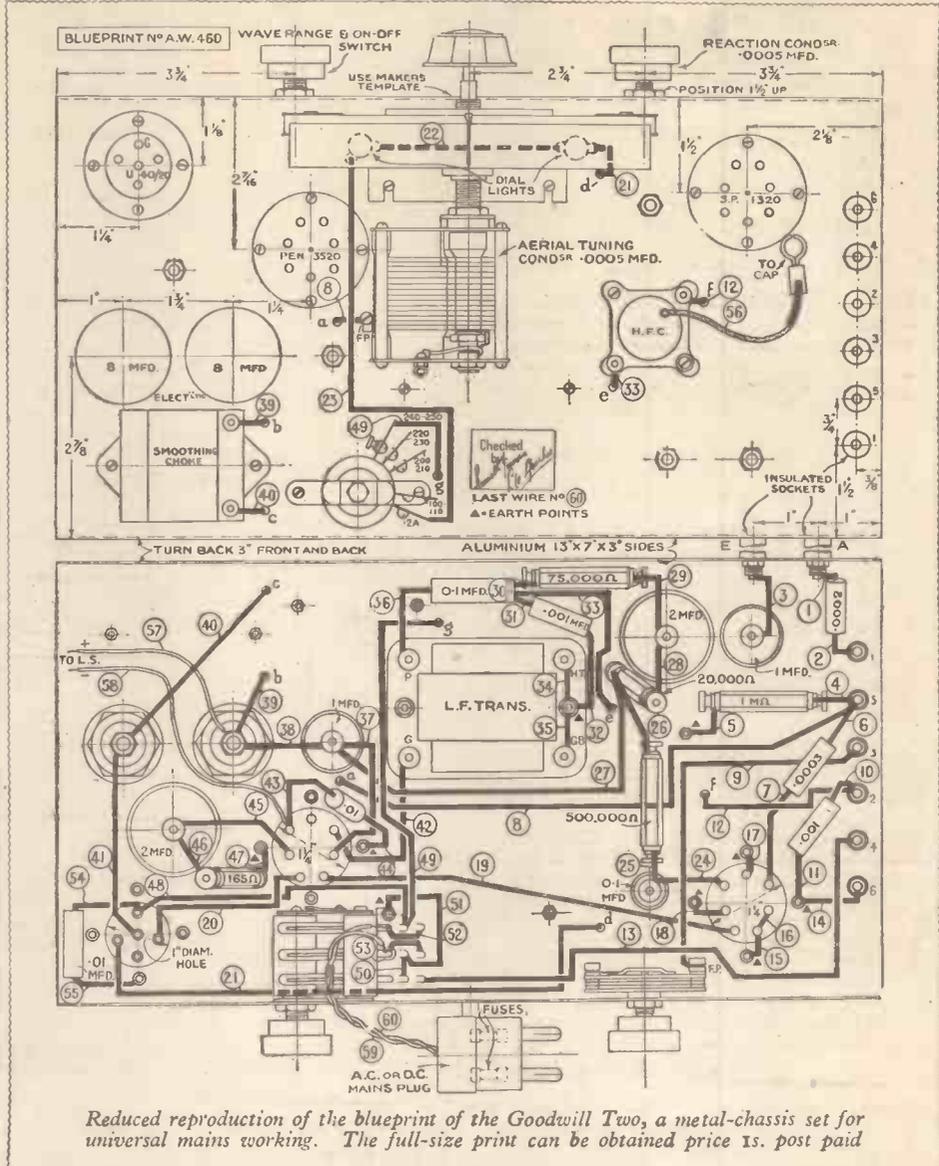
With Aerial and Earth

Of course, with the aerial and earth and tuning coil circuit, the selectivity, while being good for a single circuit set, is not benefiting from the directional properties of the frame aerial.

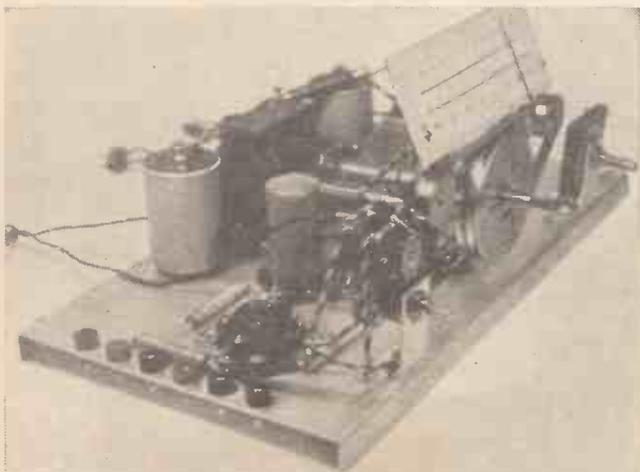
That much ability to separate stations coming from different directions is lost, therefore, but many will not consider this is such a drawback. At the same time, too, there is no doubt that the range of the sets, both the battery and mains versions, is much extended by the use of a full aerial and earth.



Upon this skeleton framework the Goodwill Three battery set is assembled. The outer part is for the frame windings, with ample space for the set at the top and the loud-speaker below with the batteries



Reduced reproduction of the blueprint of the Goodwill Two, a metal-chassis set for universal mains working. The full-size print can be obtained price 1s. post paid



Another view of the Goodwill Three that shows how simple is the layout of the components. Note the metal brackets for volume and reaction controls at the front

Another possible variation in the specification as given in the preceding issue is the fitting of the sets into table cabinets—doing away even with the self-contained idea. Many readers who already have loud-speakers in good cabinets or behind ample baffles will prefer to do this. There is absolutely nothing against fixing the Goodwill sets into table cabinets—and indeed if the coil is used in place of the frame aerial, part at least of the point of using the large cabinet disappears.

From what we have said it will be appreciated that the basic designs lend themselves to any

amount of individual variation. For example, with the battery models it may be desired to work the valves from a D.C. supply, in which case a suitable unit will be one giving a 120-volt output at 20 milliamperes—the advantage being that a super power valve or pentode can be used.

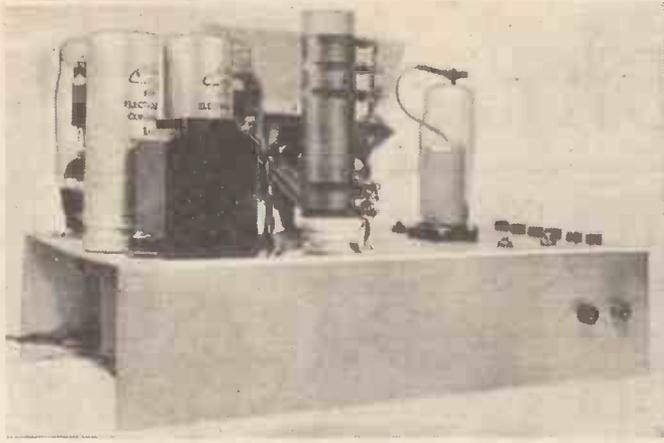
The output stage of the Goodwill Three is arranged so that either a power or pentode valve can be inserted in the valve holder without any alteration to the wiring.

No Battery Overload

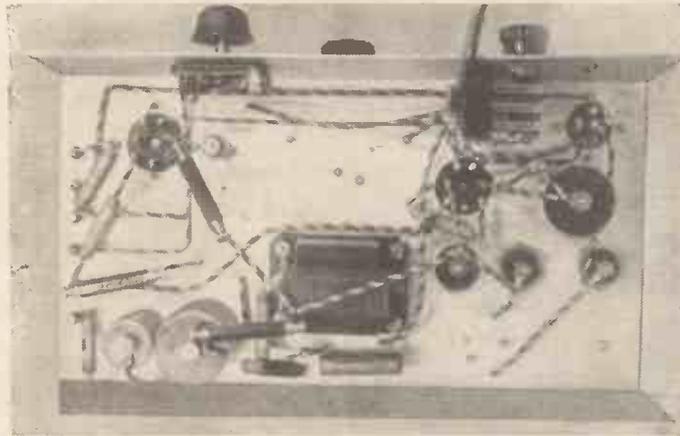
With the specified double-capacity battery, the small power valve recommended in the list of components will work very effectively, and will not unduly run down the battery, because it will not overload its normal output capacity.

In case you want to use the set as originally specified, we think a few words extra on the frame aerial windings will be useful.

All the details were given last week, so there is no point in repeating them, but we had no space to tell you how to adjust these



Back view of the Goodwill Two, with the smoothing components clearly shown on the left, and the mains voltage-dropping resistance at roughly the centre of the metal chassis



Under-chassis view of the Goodwill Two, a "shot" taken when the chassis had been completely wired up as in the blueprint—which is a very great help in this set

windings during actual reception with the set.

It may possibly be found, for example, that reaction is a little difficult at the top end of the wavebands. If this is so you can try moving the reaction winding a little nearer to the medium wave winding—or, if the trouble applies to both wavebands and not merely to the medium, adding a turn or two will do the trick.

The frame windings have been arranged so that in conjunction with the specified condenser the dial wavelength calibrations come almost exactly right. By a little "wangling" you can get them exactly right during tests.

If the readings are on the low side, try squeezing the windings together a little. If on the high side, separate them out a bit. In this way it is possible to get things exactly right, we find.

Too Expensive to Run?

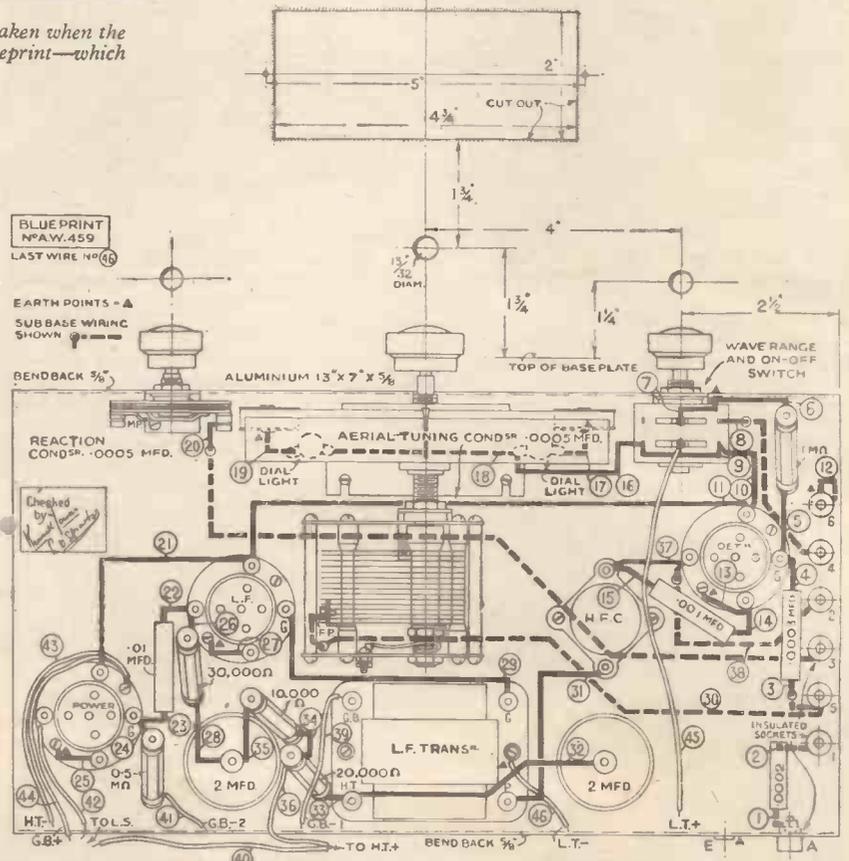
By the way, talking of tuning, those dial lights may prove too expensive a luxury for the battery model—between them they take .2 ampere, which is as much as a couple of valves would take. So if you want to conserve your low-tension supply leave these lights out—the tuning scale is a wide vision affair, anyway. With the mains model this point does not arise, of course.

Coming to this mains job, there are one or two points of importance not yet mentioned. For the screen volts of the detector in the Goodwill Two you will find that we have specified a half-megohm resistance for voltage dropping of the main supply. It may be that with your particular valve a one megohm resistance will give better results—more volume and smoother reaction, we mean.

PARTS NEEDED FOR THE GOODWILL TWO (AC/DC TRANSPORTABLE)

- CHASSIS**
1—Aluminium, 13 in. by 7 in. by 3 in.
- CONDENSER FIXED**
1—T.C.C. .0002-microfarad, type tubular (or Dubilier).
1—T.C.C. .0003-microfarad, type tubular (or Dubilier).
2—T.C.C. .001-microfarad, type tubular (or Dubilier).
2—T.C.C. .01-microfarad, type tubular (or Dubilier).
1—T.C.C. .1-microfarad, type tubular (or Dubilier).
1—Formo .1-microfarad, type screened paper.
2—Formo 2-microfarad, type screened paper.
2—Formo 1-microfarad, type screened paper.
2—Dubilier 8-microfarad, 500-volt working, type electrolytic.
- CONDENSERS, VARIABLE**
1—J.B. .0005-microfarad, type Popular Log.
1—Graham Farish .0005-microfarad, type reaction (or J.B.).
- CHOKE, HIGH-FREQUENCY**
1—Wearite type HFPA (screened).
- CHOKE, LOW-FREQUENCY**
1—Varley Nichoke II.
- DIAL, SLOW-MOTION**
1—Utility type W346
- HOLDERS, VALVE**
2—Clix 7-pin chassis-mounting.
1—Clix 5-pin chassis mounting.
- PLUGS, TERMINALS, ETC.**
8—Clix insulated sockets (or Goltone).
8—Clix insulated plugs (or Goltone).
1—Clix top cap connector (or Goltone).
- RESISTANCES, FIXED**
1—Graham Farish 1 megohm, type Ohmite (or Erie, Franklin).
1—Graham Farish 500,000-ohm, type Ohmite (or Erie, Franklin).
1—Graham Farish 75,000-ohm, type Ohmite (or Erie, Franklin).
1—Graham Farish 20,000-ohm, type Ohmite (or Erie, Franklin).
1—Graham Farish 165-ohms, type Ohmite (or Erie, Franklin).
1—Bulgin for 88-volt .2-ampere.
- SUNDRIES**
2—Bulgin pilot lamps 6-volt .2 ampere.
Connecting wire and sleeving (Goltone).
Thin flexible wire (Goltone).
Frame aerial wire, 30 yd., type 9/40 (Goltone).
2 oz. 30 gauge D.C.C. wire (Goltone).
1—Clix 2-pin 5-ampere fuse-plug.
- SWITCH**
1—Wright & Weaire, rotary, three-pole double-throw, type 123.
- TRANSFORMER, LOW-FREQUENCY**
1—Ferranti, type AF10.
- ACCESSORIES**
- CABINET**
1—Kebtex type BWD.
- LOUD-SPEAKER**
1—W.B. type Stentorian Baby.
- VALVES**
1—Mazda SP13/20.
1—Mazda Pen 35/20.
1—Mazda U40/20.

Another little point. If you notice any motor-boating with the Goodwill Two try reversing the secondary connections of the low-frequency transformer. We have found that when they are one way round there is a slight tendency for motor-boating, but it is completely curable by the process suggested.



Reduced reproduction of the full-size blueprint of the Goodwill Three—simple metal baseplate set with easy assembly. A full-size print comes to you, price 1s. post paid from us

On Your Wavelength

The Week's Radio Gossip :: By THERMION

Queer Radio Problems

MANY strange and interesting problems are put to me by readers. Sometimes the solutions occur almost at once; sometimes they take a bit of thinking out.

Here's one that came along the other day. It concerned an oldish set with two tuned circuits and two tuning dials. Originally, I was informed, the two dials went almost in step; but of late one of them had required a higher and higher reading in comparison with the other.

What prompted my correspondent to write to me was that in the end the reading of one had become so much higher than that of the other that he couldn't tune in certain stations at all. Can you see without reading further what had happened?

For a moment this seemed rather a poser; then the key to the mystery occurred to me. Obviously, the dial which showed the increasingly high reading was slipping on the spindle of the condenser to which it was attached.

Tip for Condenser Dials

SUCH skidding, as I well know, does take place occasionally when the drive is connected to a round spindle by means of a collar and a setscrew or grub screw. It is particularly liable to happen if the condenser is rather stiff to turn. It has occurred in sets of mine more than once, and it's a great nuisance even in a single-dial set which has previously been carefully calibrated.

Here's a way of dealing with the matter, which effects not only a cure, but also that prevention which is better than any cure. Once you have got the dial set to your satisfaction (it may require, to begin with, a certain amount of adjustment with regard to the spindle, especially if it is marked off in wavelengths or kilocycles), turn it so that the setscrew or grub screw is at the top.

Now remove the screw altogether for a moment and with a sharp drill make a little hollow in the spindle. Put the screw back again and it will stay put for ever 'n ever.

I have tried it. It never fails.

Christmas Wireless Stars

THE B.B.C. has collected a splendid constellation of stars to entertain us during Christmas week. On December 19 the kiddies will be thrilled by hearing Chief Os-ke-non-ton, the famous Indian—a real Red Injun—who will describe an Indian Christmas and sing some Indian Christmas songs.

Then on December 20 we have what I believe is the first broadcast appearance of Larry Lupino Lane, the thirteen-year-old son of Lupino, sen.

On Christmas Eve the inimitable Mabel Constanduros appears with her Buggins Family and on Christmas Day itself Derek McCulloch—or "Mac," as most of us know him—is weaving and filling a special Christmas stocking.

That's just a few of them. There are just heaps and heaps of others.

Luxembourg's Bad Luck

IT is a thousand pities that Luxembourg, which is one of the best received and certainly one of the most popular of Continental stations, should so frequently be heterodyned.

Luxembourg's programmes are first-rate, its transmitting plant is absolutely top-notch, and it probably has more listeners in this country than any other long-wave station except Droitwich.

The trouble is, of course, that Luxembourg, despite all its merits, is considered by some European broadcasting authorities as an interloper. If they could send out half as good programmes as Luxembourg or enable us to obtain anything like the quality of reproduction we might not mind so much.

But we do feel a little sore when stations, whose programmes are

In some parts of our own country Kalundborg is superimposed on the North Regional and other long-wave stations behave in the same way in different localities.

Shorter Waves, Too

THE station causing a background effect with another's transmissions need not necessarily be using a wavelength of the kind we know as long. In his investigations of the problem, Dr. van de Pol, the famous Dutch wireless authority, found that a station with a wavelength in excess of about 450 metres might appear as a background of one using a shorter wavelength.

Recently several observers have found that Cologne on 455.9 metres can appear as a background of Leipzig on 382.2 metres in localities where these two German stations are pretty well in a straight line with the receiving aerial.

Pity the Poor Experts!

THESE things show some of the complications that have arisen to make more difficult the way of those who drew up the Lucerne Plan. Before it came into operation, nobody had ever heard of such a thing as the Luxembourg Effect and probably no particular importance was attached to the production of harmonics by long-wave stations.

Now we know that a long-wave station—and, for a matter of that, a medium-wave station near the top of the medium-wave band—can produce an astonishing number of harmonics.

The net result is that the "free from interference" channels theoretically available are in practice much reduced in number.

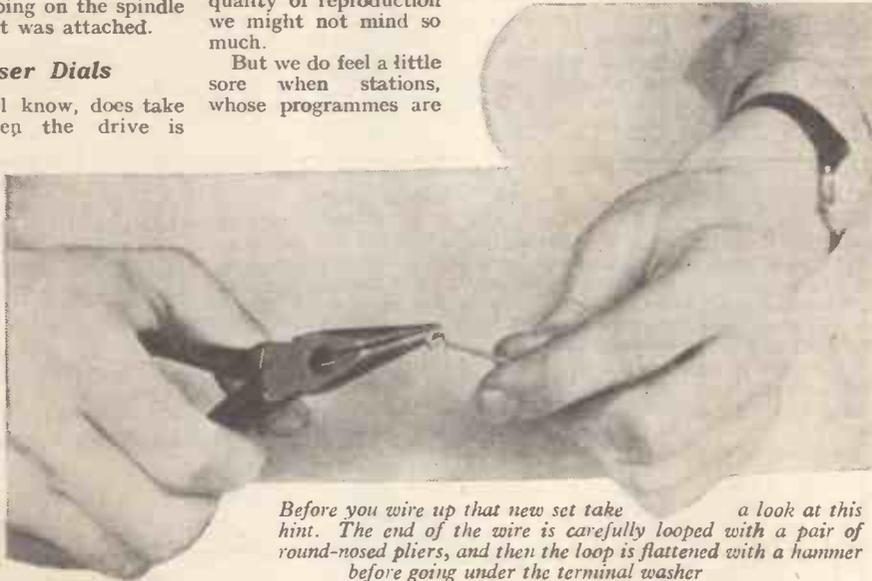
The wonder of the whole business is that, with all these new possible causes of mutual interference between stations, the Lucerne Plan works out as well as it does. And that it does work out is demonstrated beyond all argument by the fact that you can receive about twice as many stations now as you could this time last year.

The King's Christmas Message

IT'S great news that we are to have another Christmas broadcast from His Majesty the King. It will be preceded by a special programme called "Empire Exchange," in which messages and typical sounds from all over the Empire will be broadcast.

"Empire Exchange" is to start at two o'clock, and at a quarter to three the King will once more speak to his people. This is the third Christmas message, and it will be an especially welcome one, since it comes so soon before the King's Silver Jubilee.

All parts of the Empire, however remote, now feel that Christmas is a really royal occasion.



Before you wire up that new set take a look at this hint. The end of the wire is carefully looped with a pair of round-nosed pliers, and then the loop is flattened with a hammer before going under the terminal washer

nothing to write home about and whose transmitters are far from being above criticism, encroach upon Luxembourg's wavelength and produce most unwelcome whistles.

It's about time that European broadcasting authorities using the long waves realised that Luxembourg has come to stay and that it's one of the most popular of European stations throughout the Continent.

Fair does, says I.

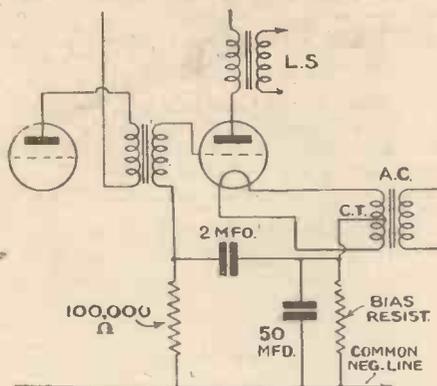
And Luxembourg's "Effect"

MORE and more letters are reaching me which comment on what is now known as the Luxembourg Effect. I have mentioned this before, but I would just remind readers that it consists in a background from the long-wave station on medium-wave stations, which are more or less on a straight line between Luxembourg and the receiving aerial.

It is perhaps rather unfortunate that Luxembourg should have been the first station to cause this effect to be more or less generally observed. Actually, it takes place with any long-wave station and any medium-wave stations which are pretty well in line with the receiving aerial. In Holland they call it the Droitwich Effect, because Droitwich appears as a background to Athlone.

"A.W." Reference Sheet—No. 11

Bias for Directly-heated Valves



Circuit for automatic grid bias when using a directly-heated output valve

WHEN output valves have their filaments heated from a raw A.C. it is necessary to provide some means whereby the equivalent to the negative side of a battery filament and/or the cathode of an indirectly-heated valve is obtained. This is usually secured by tapping the filament winding at its electrical centre. Owing to the small number of turns used great care has to be taken in determining this point, otherwise serious hum is likely to be

experienced. Where a centre tap is not provided the dead electrical centre of the winding can be obtained by means of a potentiometer, which is connected across the winding and the movable arm adjusted until the required point is reached.

To obtain automatic bias we have to employ this electrical centre which normally goes to the common earth negative line, in a way which is only another version of the battery method. It will be seen in the diagram that a resistance has been inserted between the earth line and the centre tap.

A voltage drop is produced across the resistance by virtue of the valves anode current, therefore the effective bias will depend, as in the two other methods, on the anode current and the value of the resistance.

The same calculation applies: Resistance = Volts \times 1,000, the voltage being, of course, the required bias for the valve

concerned at the value of high-tension applied. The 100,000 resistance shown is fitted to decouple the grid circuit and it is advisable to fit this. It should be noted that if two valves are employed in the output circuit, separate windings must be used to enable the bias to be adjusted to suit each valve.

Messages from the Empire

IN "Empire Exchange" we shall hear messages from typical people in Canada, Australia, New Zealand, the Irish Free State, Southern Rhodesia, and South Africa.

A planter in South India, a fisherman in his cottage on the coast of Canada, a native chief in South Africa, and an officer stationed in a fort in the Khyber Pass are amongst those who will send greetings and tell us something of what they are doing in far-away parts of the world.

Just before the Empire programme the Bells of Bethlehem will be relayed, as they were for the first time in 1933.

American Stations are Easy

NOT for ten years have American medium-wave stations been coming in as well as they are at the present time. In 1923 or 1924—I forget which—it was not at all unusual to receive KDKA and WGY on single-valve sets. Since then, though American stations have been receivable almost every winter, their strength has been very much less (despite increases in output power), and it has been necessary to use both a good aerial and a set with at least one efficient stage of high-frequency amplification.

I have just had a report from a young enthusiast, who is still in the one-valve stage, that he has had WCAU at good telephone strength. He is hearing some other stations but up to the moment of writing he has not been able to get hold of their call-signs.

Even on a Portable!

FINDING that Americans were roaring in with a superhet, I thought a few nights ago that it would be worth while to see what a portable could do. With a five-valve set containing a built-in frame I was able, after a good deal of manoeuvring, to pick up several stations rather faintly, and when I helped out the frame with a few yards of wire slung across the room half a dozen of them came in well enough to be identified.

"Free" Electricity

MR. PATERSON, in his recent lecture at the Royal Institute, puts his finger on what seems to me to be the keynote of modern electronics. He pointed out that engineers of the old school simply had no use for "free" electrons. They always wanted them safely confined to a metal conductor—in the form of a useful current. Nowadays, by contrast, we start off by forcing the electrons out of a conductor—for example, the heated filament of a valve—and then proceed to manipulate them in the "free" state.

By way of demonstrating how flexible and sensitive electrons are, when in this condition, he used the amplified currents from a gramophone pick-up to control the light emitted from a neon lamp, and then transmitted the modulated rays from the lamp across the lecture room on to a photo-electric cell. This converted the rays back into an electric current which was then used to reproduce the original sound in a loud-speaker.

The thermionic amplifier is, of course, the first "free" electron appliance. The neon lamp is the second, because the visible glow is produced as the result of collisions between gas molecules and high-speed electrons, whilst the photo-electric cell is the third, since it emits free electrons under the influence of light.

Garage Cells

SPEAKING of the photo-electric cell, I see it is now being used as an ingenious safeguard for motorists in the big West End garage recently opened by Mr. Hore-Belisha, the Minister of Transport.

The building contains no fewer than five parking floors, access to which is given by means of spiral "ramps" leading from the ground floor to the top. The ramps are con-

structed to allow plenty of head-room in the ordinary way.

But if a car appears on the scene with luggage piled up to an excessive height, the P.E. cell automatically warns the driver not to attempt the passage. The top of the load intercepts an invisible ray and so operates a relay which automatically lights up two red discs and displays the word "Stop." At the same time a gong is sounded, so that the driver gets ample warning not to get himself into a "jam."

Frequency Compromise

A READER wants to know why it is that transmitting stations are only separated by a frequency "gap" of 9 kilocycles in the ether, when they are supposed to transmit side-band frequencies of more than that amount. The only answer I can give is that a nine-kilocycle spacing is the best compromise that can be found in present circumstances.

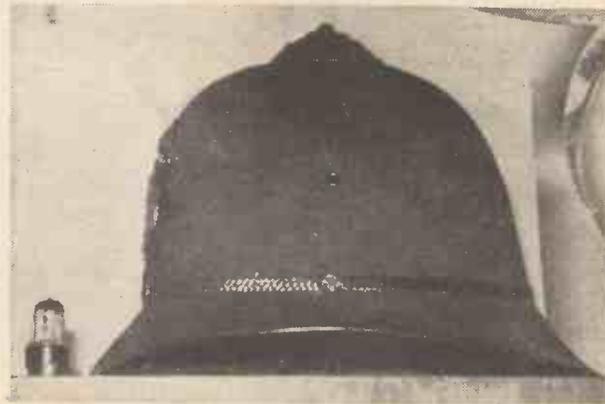
Of course, if two stations happened to be close neighbours, geographically as well as in the frequency-scale, the arrangement simply wouldn't work, because overlap would occur for all side-band frequencies of 5 kilocycles and over, but in practice, care is taken to see that this doesn't happen. In other words, stations which are separated by only 9 kilocycles in the ether are usually located a good distance from each other as the crow flies.

One thing that should be avoided at all costs is interference due to direct heterodyning between the carrier-waves of different stations and here a minimum gap of 9 kilocycles ensures that—even if it does occur—the resulting beat note is so high-pitched as to be practically inaudible.

A Flexible "H.T.B."

ONE of the neatest inventions that I have seen for a long time is a flexible high-tension battery! Instead of being packed into a rectangular case and stuck firmly into position with bitumen or wax, the cells are housed in little pockets in a long ribbon, so that the whole thing looks rather like a cartridge bandolier.

You will see at once how useful the idea is. A high-tension battery made on these lines can be folded up or rolled into any shape you like; thus the one pattern will fit almost any high-tension battery compartment.



Midget valves of the Marconi and Osram type, with 1-volt filaments and special bases, are especially useful for police radio work. Here's a midget up against Robert's helmet!

Or, if you build a portable set for hiking purposes, you can make it quite small and light and wear the high-tension battery comfortably round your waist as a belt.

One great advantage of the high-tension battery made up in this way is that it is far lighter than the usual kind, since the insulation weighs so much less. It's an American invention and not at present obtainable in this country; so, please, don't write and ask me where you can buy it. For the moment you can't.

Percy W. Harris Suggests that You

Experiment with the Crystal Set

As our well-known contributor points out, the crystal set has a definite application in these days of high-power stations—more especially as reception technique has so improved that really low-loss coils can now be used to increase the crystal's range to really amazing distances

JUST as in the development of mains wireless receivers a large number of manufacturers, temporarily, at any rate, rather overlooked the battery-set market, so at the present time, when wireless receivers are so cheap, many people think the crystal set is dead.

That this is far from being the case is shown by the popularity of the recent crystal set published by this journal, and I have reason to think that with the better perspective which comes with time, many experimenters are realising that this form of wireless receiver still offers many opportunities of experiment.

Why Popularity Waned

From time to time in these articles I emphasise the necessity of constantly reconsidering a subject in the light of later knowledge and, therefore, let us see why the crystal set passed out of popularity some time ago. Mainly, I believe, it was because, having no means of amplification, its range is very limited, being practically a one-station receiver—at least, one station per waveband.

But do not forget that at the time when the crystal receiver gave way to the valve the

majority of listeners were not ordinary people—they were wireless enthusiasts and experimenters almost exclusively. Since that time the position has changed and the great majority of listeners are not wireless enthusiasts in the technical sense, but use their sets only for the entertainment provided by the programmes. Most of them confine their listening to very few stations, and some even to one alone.

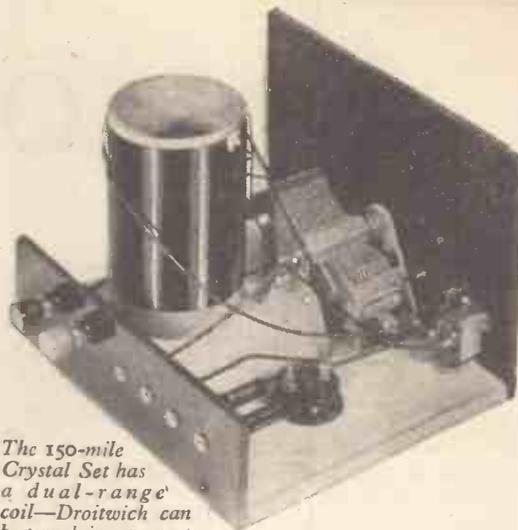
Again, since the time to which I have referred, the power of the stations has increased very considerably, which means that their crystal range has also increased to a great extent. Have many of us not forgotten this? If you build up a crystal set nowadays you will be very surprised at its performance.

Then let us look at it from another aspect—electrical efficiency. Within the last few years, and certainly since the crystal set passed out of popularity, the technique of reception has improved in many directions, notably in the development of special kinds of coil when they are required.

Efficiency Not Wanted

I say "when they are required" advisedly, because in the great majority of wireless receivers we do not want our coil to be too efficient. In the case of a crystal set, however, where there is no magnification available and no means of making up losses introduced by the resistance in the coil, it is of the greatest importance to have a very low-resistance coil—the lower resistance the better—in order to build up the greatest possible potential from the incoming signal.

Some years ago, when I was experi-



The 150-mile Crystal Set has a dual-range coil—Droitwich can be tuned in at great distances

menting with low-loss coils, I succeeded in building a crystal receiver on which I repeatedly received (very weak, it is true, but distinguishable for identification) more than one German broadcasting station on the medium band, and this was long before they had their present power.

Low-loss Technique

We have a much better low-loss technique available to us now, particularly with the introduction of special forms of iron-cored coil, and it should be possible to bring out a long-wave coil, with tapings, of so low a resistance that the signal strength obtainable with it on a reasonable aerial should enable good reception to be had from Droitwich over a far bigger area than is normally supposed.

To the experimenter who does not mind taking the trouble, I would suggest a winding of a bank-wound Litz coil tapped so as to allow of both variable aerial connection and variable crystal tapping, the value of the coil to be such that Droitwich tunes in with about half of the average .0005-microfarad condenser.

For a given aerial—this, by the way, should be as efficient as possible, as should the earth—the aerial coupling is fairly critical, as is the portion of the coil across which the crystal is tapped. If you have facilities for experimenting with iron-dust cores, then try and design the lowest possible resistance circuit for the long waves.

Crystal Damping

There is no need to worry about attenuation of high frequencies, which is bound to occur in a very low-resistance circuit, for the damping introduced by the crystal itself can be adjusted to take care of this. Remember you are out to produce the highest possible voltage across the coil before you add the crystal to it.

If you propose doing serious work, it is rather waste of time to experiment with the modern "canned" coils designed for use in valve circuits, for the damping of these is far higher than is advisable with a well-designed and efficient crystal set.

Not that you will fail to get results with such coils—you may even be surprised at what you do get—but the fact remains that for results to be really useful a specially designed coil is required. One such coil you have already seen in this paper (October 27, 1934), and the field is open for a great deal more experiment in this regard.

A well-designed single- or two-station crystal receiver will last indefinitely and, of course, requires no batteries or maintenance costs. As such, it is a boon as a second receiver for old people, who like to sit quietly in their own rooms and listen to the news.



This is one of the most popular crystal sets we have introduced in "Amateur Wireless"—the 150-mile model, designed by Kenneth Jowers and fully described in the October 27 issue. A fine set for Droitwich reception at distances up to nearly 250 miles



At this moment the lady is not actually listening, for headphones are needed with this one-valver—but she looks interested, doesn't she?

Our Short-wave One

Here are the promised details for making the adaptor/convertor described in the December 1 issue into a very efficient little one-valve headphone set for short-wave reception. During an evening's test we logged America at readable 'phone strength

As we mentioned in the December 1 issue, when the description of the unit first appeared, it is quite easy to make a one-valve adaptor converter into a serviceable little one-valve headphone set.

This is what we have been doing and the results have exceeded our hopes. It is as well to recall, perhaps, that this unit consists of a short-wave tuning circuit made up of our short-wave coils tuned by a .0005-microfarad short-wave condenser.

Very Small Condenser

In series between the aerial lead and the grid end of the tuning coil is a very small variable condenser—actually one that used to be used for neutralising high-frequency circuits—having a maximum capacity of .0005-microfarad.

The anode circuit of the set differed slightly for the two functions—a plug adaptor being inserted for the use of the unit as a short-wave adaptor with simple sets, and a coupling condenser for using the unit as a super-het converter with sets having a stage or more of high-frequency amplification.

In both circuits there was a high-frequency choke in the anode lead. Now, in order to use the unit as a complete one-valver, it is essential to keep all trace of high-frequency currents from the headphones circuit. Thus we have, in addition to the high-frequency choke in the anode circuit, a bypass condenser of .0005-microfarad between the anode and earth. The high-tension side of the choke now goes to one side of the headphones, the other side of which goes to the high-tension positive terminal.

As this is a self-contained unit set we also need a high-tension negative terminal, which has therefore been added. Apart from these small alterations, the set is practically the same as the super-het converter, with its own high- and low-tension battery terminals, and terminals for the headphones, plus the extra bypass condenser.

Sensitive 'Phones Advised

We advise you to use as sensitive a pair of headphones as possible, though even on a very cheap pair we have been able to hear America quite clearly.

Which brings us to the actual operation of the unit in its one-valver form. Make sure that your earth is a good low-loss arrangement, as this will materially reduce the risk of hand-capacity effects. Also put up a short but clear of the walls aerial wire. We have obtained quite good results with an indoor wire of about 15 feet.

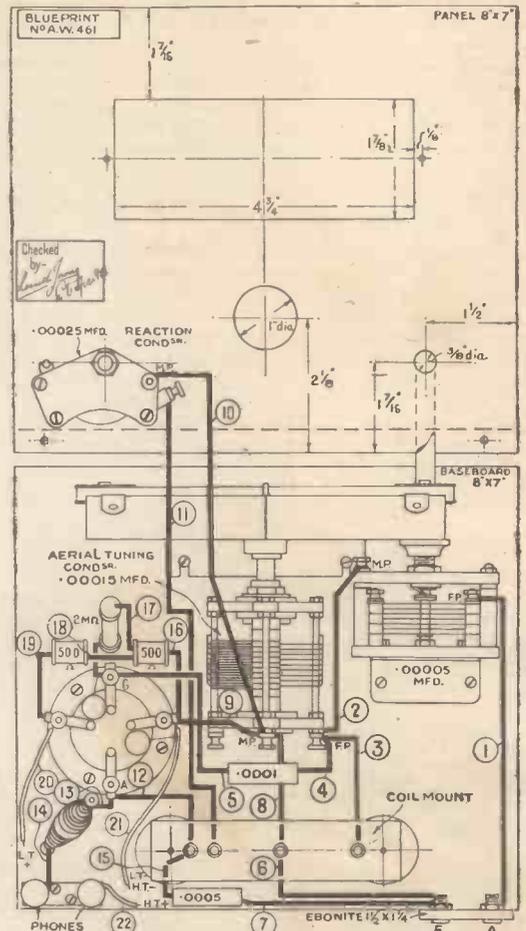
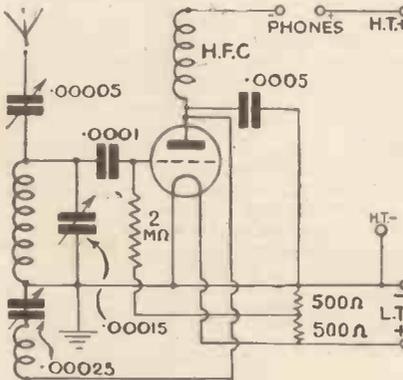
Almost any detector valve will give some sort of results, but this is really a matter that offers plenty of scope for experiment—seeking out a valve that is at once sensitive and capable of providing smooth oscillation without backlash or "plop."

During our tests in South-west London we were able to log European and American broadcasters at good phone strength without any special fiddling about.

W₃XAL on the 48-metre band was heard at really enjoyable strength, with very little fading. We were able to follow Amos and Andy, as well as to hear all about the finding of "Baby-face" Nelson.

Similarly, on the other wavebands the little set was very lively. Much depended on the correct adjustment of the reaction, of course. The secret is to bring up the reaction until the set is just oscillating, and then, when a carrier is heard, to reduce just below the oscillation point.

(Right) Reduced reproduction of the full-size blueprint, which is available price 1s., post paid. (Below) Theoretical circuit of the one-valver



PARTS NEEDED FOR THE SHORT-WAVE SET

BASEBOARD

1—5-ply 8-in. by 8-in. (Peto Scott).

CHOKE, HIGH-FREQUENCY

1—Short-wave (Wearite, type HF3, or Eddystone, type 948).

COILS

1—Set home-made with base as described in AMATEUR WIRELESS dated November 10 (or Wearite, Peto Scott).

CONDENSERS, FIXED

1—.0001-microfarad, type tubular (T.C.C., or T.M.C., Hydra).
1—.0005-microfarad, type tubular (T.C.C. or T.M.C., Hydra).

CONDENSERS, VARIABLE

1—.00015-microfarad (Eddystone, type 942).
1—.00025-microfarad (Eddystone, type 957).
1—.00005-microfarad (Peto Scott, type neutralising).

DIAL, SLOW-MOTION

1—Dual-ratio full-vision (Utility, type W530).

HOLDER, VALVE

1—4-pin (Eddystone, type 949).

PANEL

1—Ebonite 8-in. by 7-in. by 3/8-in. (Peto Scott).

PLUGS, ETC.

2—Metal sockets (Clix).
1—Wander plug, marked H.T.+ H.T.—(Clix).
2—Spade terminals, marked L.T., L.T.—(Clix).
1—Telsen terminal block.

RESISTANCES, FIXED

2—500-ohm 1/2-watt (Franklin, or Dubilier).
1—2-megohm (Dubilier).

SUNDRIES

Connecting wire and sleeving (Goltone).
2 ft. 4-way flexible cable (Goltone).
1—Ebonite strip 1 1/2-in. by 1 1/2-in. by 1/8-in. (Peto Scott).

VALVES

1—Cossor 210 Det. (met.) or
1—Marconi L21 (met.) or
1—Mullard PM2DX (met.) or
1—Mazda L2 (met.) or
1—Osram L21 (met.) or
1—Micromesh HLB1 (met.) or
1—302 Radio HL2 (met.) or
1—Record Radio DL2 (met.).

Wire-wound Condensers

By *The Experimenters*

HOW often do you get stuck for a very small capacity condenser? As often as we do, presumably. Well, here's a little idea that ought to appeal to you. Nothing less than condensers made with common or garden D.C.C. wire, which can be wound up to make any small capacity you need.

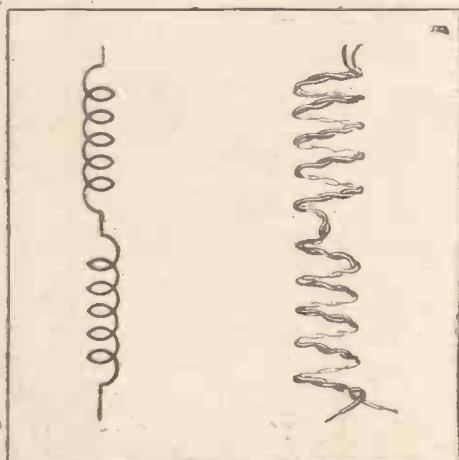
The principle is just the same as for ordinary condensers, except that there are only two "plates." Take for example our .0001-micro-

them in the jaws of a twist drill. Fix the looped end of the wire in a vice and twist away until the wire resembles a sort of flex.

It is important to do this job properly—by which we mean you must wind or twist really tightly, otherwise the capacity between the two wires will be



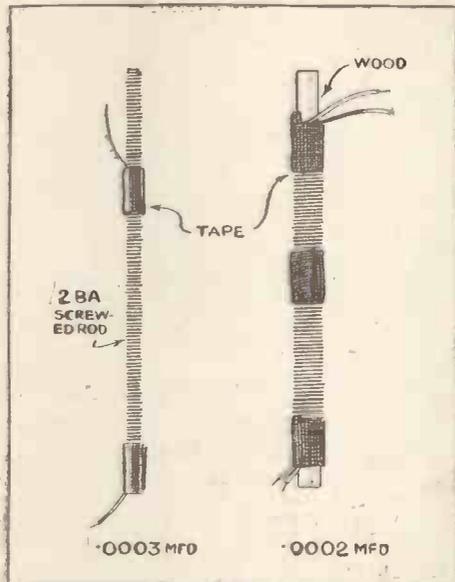
All you need to make these wire-wound condensers are vice, twist drill and suitable wire—plus a little patience!



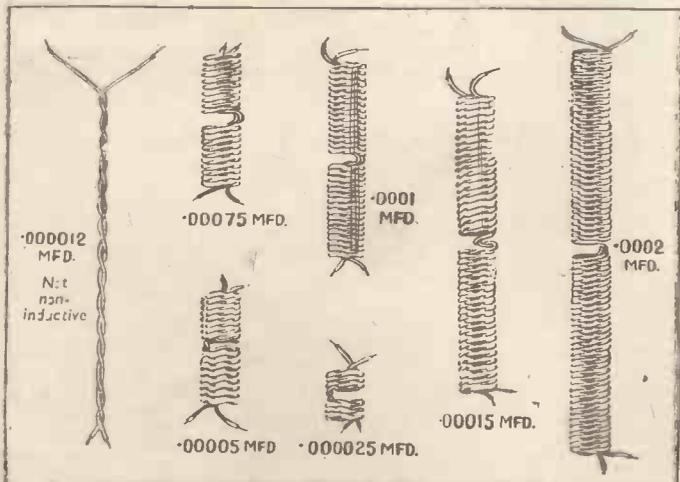
These condensers are made non-inductive by adopting the astatic principle of winding, as shown above

farad condenser. You need 4 ft. 6 in. length of No. 22 gauge D.C.C. wire.

Put one end in the vice and stretch until it "gives." Then take the two ends and clamp



(Right) .0002-microfarad condenser wound on a length of 1/4-in. diameter curtain rod. (Left) Condenser in screwed-rod electrode



This group comprises seven home-made wire-wound condensers, varying in capacity from .000012 microfarad to .0002 microfarad. All except the very smallest are non-inductive and cost practically nothing.

lower than it should be owing to the gap.

When the wire has been twisted you cut the loop and spread the two ends apart so that they cannot touch. Clean the two ends that were in the jaws of the twist drill—they are the two contacts of the fixed condenser.

That, actually, is the condenser. As, it is 2 ft. 3 in. long, though, it is not practicable for use in a set, and even if it were, it is inductive and liable to cause trouble in high-frequency circuits.

To overcome the first snag we coil up the length of condenser on a pencil or 1/4 in. curtain rod. That brings the length of the condenser mentioned down to about

2 in. and then it can be connected right into the circuit without any external wiring—a neat and compact little gadget.

To overcome the inductive effect we have to alter the method of winding. First of all, wind on half the length of twisted wires in a clockwise direction and then, when you get to the end of the first half, knock a little tack into the former and wind the wire onwards but in the opposite—that is anti-clockwise—direction.

Self-supporting Condenser

When this has been done you take out the tack and slide the coiled wire off the former—the tack having kept the wire taut and the resulting coiled condenser being quite self-supporting. Remember that one end must have the two wires cleaned off for contact, whereas the other end must just be cut; on no account must the two wires be allowed to touch.

These remarks apply to the making of all the condensers shown in the main group by the drawing except the .00002-microfarad condenser. This little condenser is intended for use as an aerial pre-set in a short-wave receiver. It is not non-inductive—as this hardly matters for the purpose in mind,

Capacity	Wire Length	Winding Length
.0002	9 ft.	4 1/2 in.
.00015	6 ft. 9 in.	3 in.
.0001	4 ft. 6 in.	2 in.
.000075	3 ft. 1 1/2 in.	1 1/2 in.
.00005	2 ft. 3 in.	1 1/4 in.
.000025	1 ft. 1 in.	1/2 in.
.000012*	7 in.	3/2 in.

*Not non-inductive

With this system it is not practicable to go much bigger than .0002 microfarad because the actual formation of the wire becomes rather straggly.

But it is possible to make a bigger capacity condenser by using a slightly different method.

We only recommend this type for use as by-pass condensers on the low-frequency side and so on.

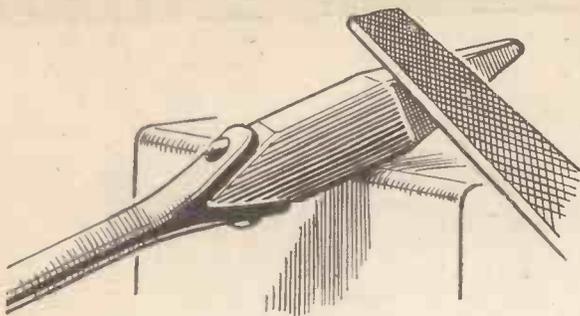
Nearly everyone has a piece of 2BA screwed rod on hand, which forms one plate of this second type of condenser. To make a .0003-microfarad, use a piece of rod 2 1/2 in. long and wind on it 100 turns of 36-gauge D.C.C. wire. Simply wind the wire in the threads of the rod, so that there is only a very small gap between the wire and the rod. You only use about 2 ft. of wire—getting the high capacity from the fact that the rod at the centre and the wire round it are so close together.

One contact is the rod—solder on to that. The other contact is one end of the wire—whichever you like. Fix this by a piece of insulation tape.

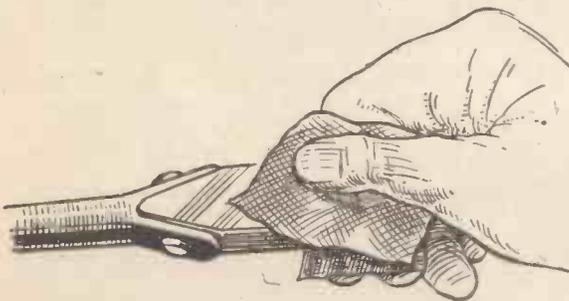
Soldering Is So Easy!

RADIO soldering is far easier than most people imagine. In fact, it really presents no difficulty at all if you go about it in the right way and are careful to follow out a few simple rules.

Admittedly, a little practice is necessary before you can be confident of making a first-class joint at every attempt. But the necessary knack is well worth acquiring, because soldered connections, if they are properly made, offer a number of advantages over the screwed down, wire-loop kind.



Filing the bit—one of the most important jobs in successful soldering. Everything must be clean!



Giving the bit a final polishing up with a piece of emery paper—sand paper will do at a pinch

Even if you never soldered a single connection in the ordinary course of wiring up a set, it would still be worth your while to get skilful with the soldering-iron, because soldering is almost indispensable in repair work.

A large number of broken components that would have to be scrapped or else returned to the dealer or manufacturer for repair (involving delay and expense) can be mended at home in a few minutes if you are handy at soldering.

Briefly, the "secrets" of successful soldering are these:—

- (1) Perfectly clean, well-tinned surfaces.
- (2) Correct heat.
- (3) Suitable flux and solder.

Scrupulously Clean and Bright

The first point is perhaps the most important. It is practically impossible to make a satisfactory connection with a sooty, dirty or inadequately tinned soldering bit, or with partially corroded wire or with tarnished soldering tags. All the metal surfaces to which you want to apply the solder must be scrupulously clean and bright, otherwise it will fail to adhere properly and will not make an effective, lasting joint.

The first job is to clean and tin the copper bit of the soldering iron. A flat file and some fine emery paper (or even sandpaper, if you have no emery handy) will enable you to get the surface of the copper into an ideal state for tinning.

A perfectly clean, bright copper or brass surface can be

tinned instantly without the least difficulty if you apply a trace of suitable flux and then run a little solder over the surface. So you will appreciate that getting the iron "clean" is nearly half the battle.

The file had better be an old one, as soft metal such as copper tends to clog up a file pretty badly, although this can be minimised by rubbing chalk into the grooves beforehand.

If your soldering-iron has been heated in an ordinary gas jet or fire and allowed to get sooty, or if it has been left lying about and become corroded, you will need to use the file pretty vigorously in order to clean away the dirty surface and get down to the bright copper underneath. You can then polish up the bit to a smooth, even finish with fine-grade emery paper.

Hard Filing Not Necessary

In the case of an electrically heated iron, however, hard filing should not be necessary. Using a file too vigorously on an electric soldering-iron is rather like using a pickaxe to open a sardine tin—it certainly does the job, but it does it much too thoroughly.

When you have got the iron clean and bright, heat it up to the requisite temperature for tinning. There are various ways of heating the bit, and of these electric heating is the best. If, however, you have not got an electric soldering-iron, or if you have no supply of electricity available, you will need to fall back on an ordinary soldering iron heated in a flame.

A spirit lamp gives a nice clean flame that will not get the copper surface in a sooty mess. In the absence of anything better, an ordinary gas jet can be used; but after heating the iron in this you will need to go over the surface of the copper quickly and vigorously with a file to clean it again before tinning.

Speedy Clean-up

In any case, some slight cleaning will probably be needed between the heating and tinning processes; but this clean-up must be carried out very speedily in the case of a flame-heated iron; otherwise it will get too cold to be tinned easily.

If the iron is being heated in an ordinary gas flame, the colour of the flame around the copper will turn from blue to a very brilliant green when the iron is just about hot enough for tinning.

Another test for heat, useful in the case of an electric soldering-iron, is to touch a piece of paper with it. If the bit chars the paper it is usually hot enough. Of course, the iron must not be too hot or the solder will simply "boil off" in globules and refuse to adhere to the surface at all.

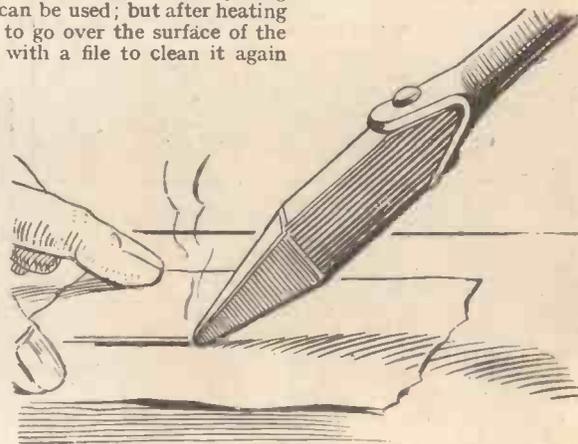
There are two easy ways of tinning an iron with ordinary flux and solder (as well as less general methods).

One way is to break up a stick of solder into small pieces and place them, together with some "blobs" of flux, in a shallow tin lid. Then, when your iron is heated and cleaned, rub the bit in the mixture of solder

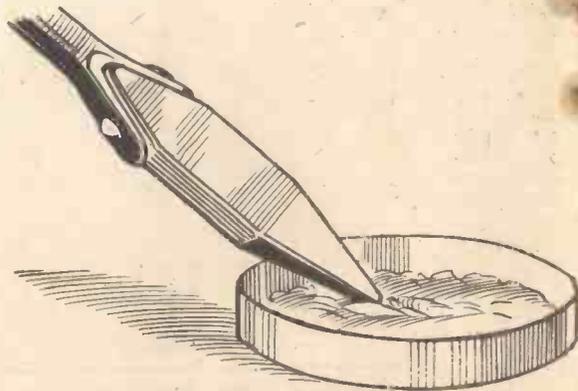
thoroughly on all sides and be content with tinning for really good, clean work for about an inch up from easily.

For the second method need a small tinning tool of a piece of tinned-copper wire and a piece of thick lead pencil. Push the lead right out of the centre of the pencil (this can usually be done easily, with the aid of a knitting needle or something of that sort), and in place of it insert the wire.

The latter should be of a gauge that will be a firm fit in the central hole through the pencil, and should be long enough to project a couple of inches or so when pushed home. The projecting wire should be flattened, by a little judicious hammering, for about an inch up.



How to test the heat of the iron—see if it chars a piece of paper. If so the temperature is just right



Tinning the bit is quite easy if you follow this simple method of rubbing it in a mixture of solder and flux

and flux, rotating the iron and holding it at such an angle that all faces of the bit receive a thorough, even coating of solder. The bit should look like brightly polished silver when this job is done. Any superfluous flux or solder can be wiped off by rubbing the bit on a piece of rag.

After a little practice you should be able to tin the bit without reheating the iron. Never just the extreme tip of the bit; work you need to tin all faces of it to the tip. This can be done quite

When tinning your iron you will find a suitable one can be made out

ensure the good joint that results from absolute cleanliness.

Cleaning and tinning tags is a tedious business if you do them one by one. But here is a short cut that makes it quick and easy. Take a strip of bakelite (not ebonite, as that is softened too readily by heat) and drill a 4 B.A. clearance hole near one end. Insert a fairly long 4 B.A. screw and secure firmly with a nut. Provide the screw also with a small terminal nut to fit.

When you want to tin a number of soldering tags, slip them on to the stem of the screw and spread them out fanwise, then secure them firmly in this position by screwing on the terminal nut.

Apply a trace of flux to each tag, then run your hot iron, charged with solder, over each of the tags in turn, thus tinning the whole lot at one heating of the iron and practically in one movement of it. After removing the tinned tags, wipe off any trace of flux with a soft rag, and they are all ready for use.

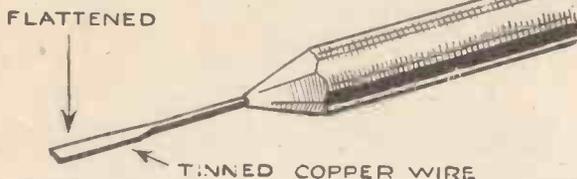
The strongest connections are made by using tags of the pierced type, having a small hole near the narrow end to take the connecting wire.

Having bared and cleaned the wire, if necessary, for about half

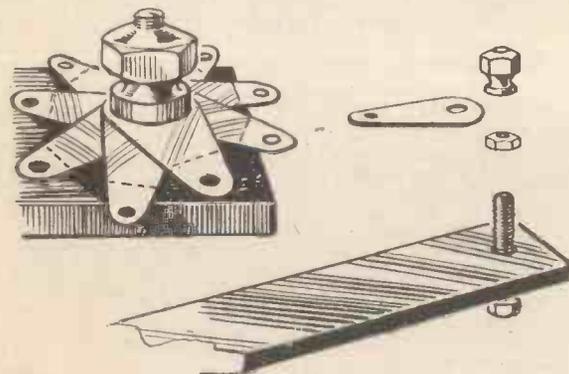


Another picture, taken in our own workshop, showing the all-important job of cleaning the soldering bit—ready for the next and equally important step of tinning the bit

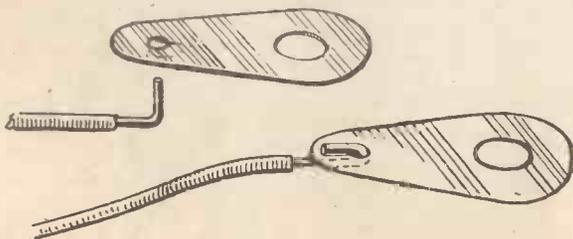
There is no doubt that soldering is the best way of making really sound connections for the home-built wireless set, but many constructors still imagine that the task is beyond the ordinary amateur. Actually soldering is child's play if a few simple rules are observed, as W. Oliver explains in his usual practical and very easy-to-understand manner. Learn these soldering secrets for better sets!



This small tinning tool provides you with an alternative method of tinning the soldering bit, as explained herewith



Here is a really novel idea for saving you tedious time when a large number of tags have to be tinned



Correct connection of the lead to the soldering tag as shown above is one of the secrets of good soldered joints

an inch from its end, pass it through the hole in the soldering-tag and pinch it back double with pliers.

Apply a trace of flux to the juncture of the tag and wire, then pick up a tiny "blob" of solder on the tip of the heated soldering-bit and run it on to the spot where you applied the flux. If the iron is hot enough the solder should flow like water as soon as the tag has warmed up, and the result should be a perfect joint between the wire and the tag. Be careful to clean off all traces of flux with a rag.

When it is necessary to join one wire to another at right

angles, a very strong joint results if you bend the end of the one wire round the other and pinch it tight with pliers, completing the job by applying a trace of flux and running a little solder neatly into the grooves formed by the juncture of the wires.

When using a soldering-iron on terminals of transformers and so on, you should take care not to melt the manufacturers' soldered joints inside the case, which connect the ends of the windings to the terminals. To avoid this risk (and others), never leave your hot iron in contact with the work longer than is necessary.

Quick, Dexterous Touch

A quick, dexterous touch with a really hot iron is far better than a prolonged application of a half-cooled one.

The advantages of a soldered connection to a tag clamped under a terminal-head are not obvious at first thoughts. As the ultimate contact with the terminal is a screwed-down one, you may feel that it would be just as effective to loop the end of the wire directly round the stem of the terminal and clamp it with the nut in the usual manner of a solderless connection.

Actually, however, the soldering method does offer advantages in practice. A better, firmer, more positive contact can be made between a terminal nut and the flat face of a soldering tag than between the nut and the rounded surface of a wire.

Choosing a Flux

THE selection of a flux suitable for soldering does not always receive the amount of consideration it should do. It is usually looked upon as a necessary evil, and as long as it is something sold under the name of flux it is purchased without any further inquiry. As a matter of fact the flux plays a very important part and, as there are many and various kinds and qualities, a few words about them will not be amiss.

The finest flux for radio or electrical work is, without a doubt, pure resin. It is very clean and easy to use and cannot harm in any way the most delicate copper wire. The only objectional feature that I have to find with it is the rather acrid fumes produced.

This is purely a personal fad, and I don't suppose would apply to everyone. Next to resin comes the more popular paste compounds, of which there are many; but here a word of warning.

Some of the very cheap varieties possess foreign matter which is capable of doing quite a lot of harm to the metals being soldered. They often contain a certain percentage of acid which is the one thing that should be avoided at all costs when electrical work is being done.

Pastes like Coraline and Fluxite are prepared in a scientific manner and apart from providing the essential properties of a good flux, they do not contain any trace or form of acid.

It is amazing the vast difference a good flux will make in soldering. It would be no exaggeration to say that much of the unsatisfactory soldering, bad joints and loss of temper is due to wrong flux.—L. O. S.



This universal mains set has one of the cleanest layouts we have examined. Note the very clear tuning scale

AFTER the four-valve super-het type of receiver the next in order of popularity is the straight three, particularly if it is suitable for A.C. and D.C. mains without alteration. Just recently there has been quite a number of these three-valve sets introduced, costing only between £8 and £10.

These inexpensive sets do give a surprisingly fine performance, and well merit their popularity.

In the Swamp Area

When they are used in the swamp area of the local station you will not be able to obtain 9-kilocycles selectivity, but even so, a large number of entertaining programmes can always be received. As they are always fitted with a pre-detector volume control and adjustable reaction, a little care in tuning will enable a high degree of selectivity to be obtained.

A receiver that embodies more than the usual number of noteworthy features is the new Vidor model CN213. This is fitted with what at first sight appear to be five valves.

Looking at the chassis from the rear on the extreme right is the VP13A high-frequency pentode. This is coupled to the second valve through a tuned high-frequency transformer. The second valve is the detector, an SP13 fixed grid base high-frequency pentode. Between the detector and the third valve is a resistance-capacity coupling circuit used to preserve quality. The output valve is a Pen26 which, on A.C. mains, gives about 2,500 milliwatts and on 200 volts D.C. mains a little under 2 watts. The fourth socket is for a UR2 full-wave rectifying valve, which is used with the anode strapped in half-wave fashion.

Constant Voltage

Finally comes the type C1 barretter, which is used to make absolutely sure that the voltage applied to the heaters of the valves remains absolutely constant, irrespective of input voltage. In practice this means that it does not matter whether you are on 200- or 250-volt mains, there will not be any need to make any adjustment to the receiver.

The loud-speaker is of the energised type, but the field coil is not used for smoothing purposes, which in our opinion is a great idea, for very rarely have we found a receiver to be free from hum when the loud-speaker field is in the smoothing circuit.

Vidor A.C./D.C. Universal Three

The controls are very simple indeed. On the left-hand side is the usual combined volume control and on-off switch. In the centre the master tuner, while beneath it is the wavechange switch. Finally comes the reaction control.

A point that will immediately strike any intending buyer is the workmanship of the receiver chassis. All of the components are completely screened, the

valves. In this case all of the valves are of the Mullard side-contact type, that is, without valve legs.

Owing to the receiver being tested within ten miles of the local station, the first thing we had to do was to adjust the selectivity control. This takes the form of a small knob on a condenser between the aerial and earth terminals. All we had to do was to unscrew this until we could tune out the local station in a reasonable number of degrees.

Cutting Out Local

With the volume control approximately half-way on and the reaction in approximately the same position we could cut out the local station in about 20 metres, which was not bad considering that the aerial had a total length of about 80 ft.

The volume, if anything, was a little too great for average use, so we decided to use an internal aerial of about 25 ft., attached to the picture rail. With this aerial and the selectivity control screwed almost fully in, we were able to eliminate the local and other more powerful stations without any difficulty at all.

For example, on the long waves Radio Paris was well cleared from Droitwich, while Kalundborg and Luxembourg could each be received without mutual interference. During the first preliminary test we received twenty-six stations on the medium waves and six on the long waves at full loud-speaker strength. Remember, this was on an indoor aerial.

Sensitivity Test

Just to show how sensitive this receiver is we were able to hear London National and London Regional, Midland Regional, Droitwich and Radio Paris, without any aerial connected whatsoever. We don't advise this sort of thing, but flat-dwellers will be sure of quite a number of programmes with even the worst possible aerial.

IN A NUTSHELL

Brand Name : Vidor.

Model : CN213.

Price : £8 8s.

Technical Specification : This receiver uses three pentodes, a rectifying valve and barretter. The aerial feeds through a simple tuned circuit into a variable- μ high-frequency pentode (Mullard VP13A). Transformer coupling is employed between this valve and the detector, a straight high-frequency pentode (Mullard SP13). The low-frequency side is resistance capacity coupled while the output valve is a power pentode giving 2½ watts (Mullard Pen26). The rectifying valve is a Mullard UR2 while the barretter is a special Mullard type C1.

Type : Consolette.

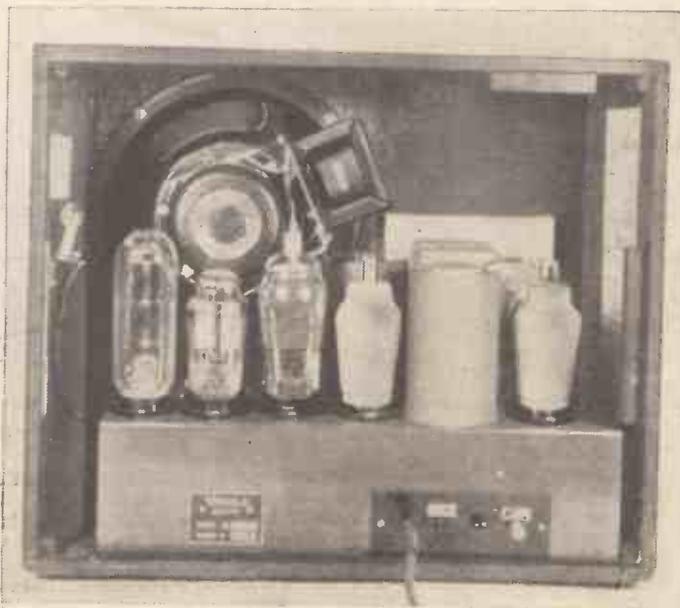
Power Supply : A.C. or D.C. mains 200-250 volts.

Makers : Vidor Ltd., West St., Erith, Kent.

smaller ones and all of the wiring is out of sight. Another feature which should interest the non-technical user is the easy way in which the receiver can be installed. There is simply one mains lead and an aerial and earth socket.

The mains plug simply has to be connected to the nearest power point, the aerial and earth plugged into their respective sockets, and the receiver is ready for operation.

When we first switched on we noticed that the receiver took between 60 and 70 seconds before it began to operate. This is quite usual with universal receivers using the new semi-high potential heater



Modern metal-chassis construction, of course! All the universal mains valves are easily accessible, too

Valves Aid the Doctor

With the development of short and ultra-short-wave apparatus doctors are finding more and more applications of the high-frequency valve to various departments of "bloodless" surgery. This article gives an insight into just a few of the many ways in which the valve has brought about a vast alleviation of human suffering—and we are only, it seems, at the beginning of this specialised work

MEDICINE, in common with many other sciences and industries, has not been slow to take advantage of the benefits which the thermionic valve bestows in the fields of measurement and technical advancement.

Early Applications

One of the early applications, which has received widespread attention, was the use of audio-frequency amplifiers and loud-speakers in conjunction with special micro-



This curious headphone arrangement is used now for treatment of the maxillar-cavity by ultra-short-wave therapy

phones for rendering heart sounds audible to large classes of medical students.

Before that it had been necessary to employ multiple stethoscopes with attendant difficulties in demonstrating specific sounds with absolute certainty to each individual. The amplified heart beat, however, brings out any peculiarity very clearly, to student and doctor alike, so forming an excellent introduction to the stethoscope itself.

The "radio knife" is a development in diathermy which will in time be widely used, because of the advantages it possesses over the steel knife for certain operations.

A powerful high-frequency oscillator, working at about 1,000 kilocycles, is connected through a special cable to a suitable knife-like electrode, and the patient rests on an insulated metal plate forming the second electrode of the circuit.

An intensely concentrated discharge occurs between the electrode and the patient's body when the "knife" is applied, the flesh being cut much as it would be by the ordinary surgeon's knife; but there are features of great importance.

The "burning" acts as its own antiseptic, and there is practically no bleeding, as the wound is automatically cauterised as it is formed. This is a vital superiority when dealing with cases such as mouth operations, where it is difficult to seal off the blood vessels.

It may be a little time before really delicate operations can be carried out

by this new aid, but rapid development is taking place all the time.

An extremely interesting idea is that of being able to "cook" one's internal organs in position, by deep-ray therapy, without burning the skin or surrounding anatomy. If it is achieved, medicine will have a wonderful new weapon against such diseases as pneumonia, inflammation of the lungs, rheumatism, etc., in which the afflicted area should be kept at a high temperature to expedite a cure.

Now we have to apply hot-water bottles, hot plasters, and other remedies which may raise skin blisters—and be very uncomfortable. When the high-frequency eddy current heater is used, the tuning control will be set to the right wavelength—probably between 2 and 6 metres, and the coupling coil will do its work through bedclothes and all, producing a warm feeling in the heart, liver, or tummy—as the case demands.

One will have to make sure there are no metal bedsprings in the field, as these would very quickly become white hot and send up the bed—and patient—in smoke.

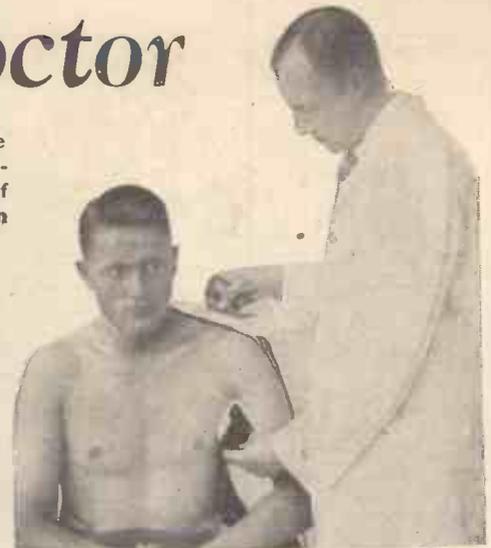
Valve amplification has benefited the heart specialist in more ways than one. He can make its sounds more audible, and he is also in a position to record accurately the e.m.f.'s it

generates.

Instead of a large and expensive piece of apparatus, employing a delicate string galvanometer giving a momentary reading, he uses a valve amplifier which steps up from a few millivolts to an output which drives a robust mechanism giving a permanent record of each heart cycle; and the whole thing is smaller than a radio portable!



Very little discomfort is experienced by this patient whose shoulders are being treated by high-frequency currents



Electrodes being applied to a patient's shoulder for short-wave treatment—a valve generating the high frequencies

Considerable progress in the study of nerves has resulted from the use of valves. It has been shown that when an impulse passes along a nerve fibre it is accompanied by an electrical change, which takes the form of a rapid series of very small e.m.f.'s, of the order of a few micro-volts.

The wave shapes, frequencies, and magnitudes of these have been determined for various types of fibre and strengths of stimulus, by amplifying them up to operate an oscillograph.

State of the Blood

As a final example, there is a very delicate measurement which is useful in determining the state of the blood or tissue fluids in metabolic diseases such as diabetes. The tendency is for the blood to become acid, and it has to be compared with a standard solution.

For this purpose a special vessel is filled with the blood, and into it is dipped a glass bulb containing the standard. The wall of the bulb is very, very thin—about one thousandth of an inch—so that there is a certain penetration of it by the liquids, which come into contact but cannot mix. Electrodes are lowered into the two vessels, and the minute voltage caused by the slight difference in acidity has to be measured.

Before the valve came, a very delicate electrometer, consisting of a hair-like gold wire between two metal plates, was observed through a microscope, and the minute deflection gave the required indication. Now valves are used in a special balanced circuit, and operate a robust galvanometer.

Incidentally, this advance in physiological research also serves the brewing industry, as it is applied to the measurement of the reaction of the "mash," which must be kept closely to a given value for the proper growth of the yeast.

From the examples given above, it is obvious that, without a lot of publicity, the valve first invented by Fleming and De-Forest for wireless reception has already proved a potent aid to medical practice—particularly to some of the more delicate branches of surgery.

Truly it may be said that the thermionic valve has proved itself to be a real Aladdin's Lamp. And he would be a rash prophet who said that the end of the valve's amazing applications has been reached. F. Y.



This is the 2.5-kilowatt modulator transmitting valve a reader bought for four shillings—and made a present of it to Kenneth Jowers. He has already blown the house fuses trying to see if it works!

SEVERAL times during the past week I have picked up American 20-metre 'phone stations which have been participating in 5-metre tests. In one case a portable station temporarily in an aeroplane was picked up by a ground receiving station, transmitted by line to Far Rockaway, New York, and from there generally rebroadcast on 20 metres.

Three-corner Rag-chew

In another instance a three-corner five-metre rag-chew was again rebroadcast on 20 metres. It does seem as if five metres in America are causing a certain amount of interest. I know they are making a lot more progress than we imagine, for several States have standardised on 5 to 6 metre equipment on all police cars. Of course, for a long time various aerodromes have made use of these directional ultra-short waves.

Generally speaking, most amateurs during the past week have experienced considerable difficulty in picking up any noteworthy DX stations. The trouble is that at the moment all the long-distance transmissions are only receivable at awkward times.

In my particular area—North Hertfordshire—a simple short-wave receiver is practically useless between 8 p.m. and 10 p.m., just the times when most people wish to listen.

Because of this, listeners have been complaining that the 20- and 40-metre 'phone stations have all faded out. I agree with this in a way, for conditions have not been up to the standard for the time of the year, except for C.W. reception. If, however, you alter your listening times there will be no difficulty experienced in logging a fair number of amateurs between R6 and R8.

20-metre 'phone

For the moment, anyway, 20-metre 'phone stations can be heard as early as 5 o'clock in the afternoon, continue to be receivable until at least 7 o'clock and in some areas until 8 o'clock.

The 40-metre band is a little more variable. Generally the earliest these stations come in is about 9 o'clock, but they carry on until

about the end of July.

For some reason or other the W8XK on 19 metres has been coming over from about 2.30 p.m. onwards, while W3XAL on the 16-metre band has not been very good strength until about 3.30 p.m. This is just about the reverse of what usually happens.

B. McDougall, of Glasgow, has a very good log of English amateurs on his simple short-wave receiver. You must remember that his reception conditions are very bad and he cannot obtain a good aerial or earth.

Amongst some of the G stations logged on the loud-speaker were G2VZ, G2RR, G2NN, G2PX, G5ML, G5AW, G5MM, G5BJ, and the Belgian ON4AP. Mr. McDougall tells me that conditions are good from between 10.30 a.m. until 12 o'clock and then they rapidly fall off until 1.30 when signal strength is about R3. This, by the way, refers to the 40-metre band only.

Not A Complicated Aerial

The aerial in use is approximately 12 ft. of flex around three sides of the room, with an earth going to the gas pipe, so you will see that you do not have to use a very complicated aerial system to receive some short-wave stations.

Martin Railton, of Loughton, Essex, tells me that conditions are fair on 20 metres, very bad on 80 metres, passable on 40. His log for the week on all bands was approximately 100 stations, not bad going for the time of the year.

Some of his best stations were W1BEQ, OE1XX, FP1AP, W8GLY, W8CYC, W2GFH, CT1KT, LA4P, W2VW, W3HM, W1ATH.

Friends of W1CAA will be glad to know that he is now back on the air after having been closed down for three months with rheumatic fever. At the moment he has a daily schedule with W9BHT, who, by the way, has a new transmitter going, and both of them would like reports from European listeners. All reports will be acknowledged.

I have just erected a doublet aerial, just for

On the Short Waves

By KENNETH JOWERS

between 1 or 2 o'clock in the morning. Numerous readers have commented on the excellent strength of the 75 metre Americans, but only between the hours of 1 and 6 a.m.

experimental purposes with no particular object in mind. With this arrangement there is a distinct decrease in background noise level, while the interference from car ignition, which was very noticeable on my big super-het, has decreased very considerably.

I Pass It On

Just why this should be I don't really know, for it is not intended to be a noise-suppression arrangement. This is passed on for what it may be worth, for most short-wave fans are troubled with car ignition noises round about 20 metres.

What do you think about hypnotism by means of radio? Ernest Hobden of Grays, Essex, wanted to experiment with some transmissions in an aeroplane. His idea was to have his voice relayed by some local amateur station. He picked on my old friends G6KV and G2KT.

Unfortunately, the experiment had to be postponed because of fog, so they varied the idea and used a motor-car instead. Mr. Orton, of Uxbridge, speaking from his transmitter, has claimed to have hypnotised Mr. Follis, of Muswell Hill, who was travelling in a motor-car along the Southend Road many miles away. Whether this was actual hypnotism, thought transference or mental telepathy, remains to be seen.



This is Mr. Sadler's receiving station at Stamford Hill, from which point reports are often gratefully received by Kenneth Jowers about short-wave conditions. Note the QSL cards!

Full English Programmes from

LUXEMBOURG

PARIS POSTE PARISIEN

NORMANDY

RADIO PICTORIAL is the only publication that gives full details of the English programmes from these three Continental stations.

Altogether, eight pages a week are devoted to the English programmes from the Continent.

Besides this very useful information, RADIO PICTORIAL contains pictures, and articles about radio stars and all the well-known people who entertain you over the air.

RADIO PICTORIAL is, in fact, the only paper that is entirely devoted to the entertainment side of broadcasting.

Just look at some of the fine contents of Friday's issue—Dec. 14

Full page portrait of **Florence Desmond**.

Exclusive pictures of **Ambrose and his Band**.

An Article by **Ellen Wilkinson**.

At Home with **Colombo**.

Radio Stars in **This Year's Pantos**.

(Illustrated with two pages of pictures.)

A Thriller—

"**Murder in Broad Daylight**."

★ **DON'T FORGET TO LISTEN-IN TO THE 'RADIO PICTORIAL' CONCERTS**

Paris (Poste Parisien)
Wednesday evenings
Radio Normandy
Thursday evenings

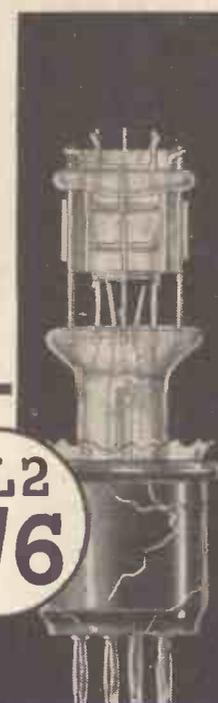
Full details will be found in the programme pages of RADIO PICTORIAL.

RADIO PICTORIAL

Every Friday — Price 3^p

FILAMENT

STILL INTACT!



Dropped 15 ft. on to Concrete Floor . . . Filament Still Intact.

THIS 362 HL2 Battery Valve was recently subjected to the above amazing treatment.

As can be seen, the filament is still intact.

Proof positive of the extraordinary robustness of 362 construction!

GUARANTEED FOR 6 MONTHS.

IF UNOBTAINABLE LOCALLY, SEND P.O. DIRECT TO MAKERS BELOW. Dept. A.W.

362 PRICES.—Battery Valves: H, HL and L, 3/6; Power, 4/-; Super Power, 4/6; SG and VS, 7/6; Pentode Type, 10/-; BA and BX, 9/-.

362 A.C. MAINS VALVES: AC HL4, 7/6; AC PX4, 9/-; AC SG4 and AC VS4, 12/6; AC ME and HM, 13/-; RB41, 7/6; RB42, 10/-.

HL2
3/6

362
VALVES

THE 362 RADIO VALVE CO. 11th STONEHAM RD., LONDON, E.5.

The Ideal Gift



For a Radio Man

The truest test of a gift is the thoughtfulness that inspires its choice. The AvoMinor will be appreciated for many, many years because, for all that time it will ensure trouble-free radio and will invest its fortunate owner with the testing facilities and the confidence of the expert radio engineer. The AvoMinor is the ideal gift, both to give and to receive. See that you get an AvoMinor this Christmas.

40%

If any difficulty in obtaining locally, send direct or write for fully descriptive folder.

Automatic Coil Winder & Electrical Equipment Co., Ltd.
Winder House, Douglas Street, London, S.W.1
Phone: Victoria 3404-7.

THE D.C.

AVOMINOR

REGD. TRADE MARK

TEN PRECISION METERS IN ONE

CURRENT

0-6 m/amps.
0-30
0-120 "

VOLTAGE

0-6 volts.
0-120 volts.
0-300 volts.

RESISTANCE

0-10,000 ohms.
0-60,000 "
0-1,200,000 "
0-3 megohms.

Criticisms by WHITAKER-WILSON

My Broadcasting Diary

IF I were not a perfect little gentleman, I should say something terse and 'arsh about dividing plays in two parts. However—

Monday

IDID my first bit of Wuthering on those Heights-to-night. I nearly wuthered away. Still, a good entertainment and an unimpeachable production by Howard Rose who, with his charming wife, Barbara Couper, was concerned in the adaptation.

Quite a number of people told me they thought it good. Therefore, oh, Howard, oh, Barbara—write it down a success but don't revive it too soon. You reached great Heights but, remember, even a Rose will wuther. . . .

Tuesday

SWITCHING on unsuspecting-like, I heard a noise like forty thousand cats being sacrificed. It turned out to be the merry Café Coleteers a-tuning up.

He's Telling Us!

Very smart production. Referring to the programme I see it is another of "Bill" Hanson's. . . . H'm! He's telling us, isn't he?

"Dotty Ditties." That's what they called them. I could have called them something else but, as I have said, I am always the little gentleman.

Those ten minutes are a complete blank to me. I have no recollection of what happened. By which I imagine I must be paying Max Kester and Austen Croom-Johnston a high compliment.

If there are to be any more of them, may we have a running commentary to keep us straight? John Snagge or someone?

Peggy Cochrane and Stuart Ross brought me back to earth at 8.40. Their pleasing tunes roused me sufficiently to take interest in John Watt's Gresham Lecture on the Best Sellers in the light song world.

When John is a very, very old man, he will leave the B.B.C. heavily decorated and with a huge pension. He will then be appointed Keeper of Antiquities at the British Museum and will spend his days cataloguing the songs he has collected from the Shows.

Meanwhile, while he is yet with us, I offer a suggestion: a broadcast of all the songs about Yee-ou.

I have been down in the depths myself, but, Sir James Jeans knocked the bottom out of anything I've ever reached in that way.

The chief announcer, introducing Sir James, said he was taking us to the farthest depths of

Space, leaving us to get back as best we could. I caught a 'bus on one of the rings of Saturn, took a tram from the Milky Way to Kingsway and got back for supper.

Wednesday

SINCE then I've been carried back to green, green pastures; but that came of listening to the Kentuckies, whose singing I thought none too good. The comedy was as good as ever, but I think the singing wants a little looking into.

Can't Hear! Conductor!

Later, Stravinsky's *Perséphone*. The fact that he was conducting made no difference to me. As I said last week, one can't hear a conductor.

Good music, of course—so far as any hyper-modern music is good. *Good broadcasting?* Emphatically *no!* Waste of time trying to put it over. Sounded as though everyone had gone mad. The French prose spoken through the music, for example, sounded fatuous. In the hall, with a score, I could have been caught by it, but . . . Well, they will do it. I am merely wasting paper in pointing out the failure of it all.

Thursday

THE Royal Wedding came through amazingly well. I should like to congratulate Mr. Gerald Cock and his doughty engineers on pulling off a difficult piece of outside broadcasting. The Abbey is not the most fortunate place in the world for sound.

Howard Marshall disappointed me. Too solemn. Not an easy thing to do, admittedly, but I thought there were too many repetitions. I got tired of the plane trees. He might have made them oaks the ninth time.

I was amused when he tried to be bright by saying he was glad it was a dull, misty day because it went suitably with pageantry such as London only could produce. Yes, but London produced a perfectly lovely day with brilliant sunshine on the Tuesday of that week. She frequently does produce those sort of days in November.

I heard a bit of the evening broadcast of the records made of the wedding ceremony. I switched off because I did not want to hear it twice, but I thought it a good idea to repeat it that way, at that hour, for the sake of those who missed it in the morning.

As I have said before, the B.B.C. never lets us down on these occasions.

Friday

HAVING Kentuckied on Wednesday, and as they were still pushing that Show over, I listened for a while to the St. Andrew's stunt. I think it must have been very good. Not being a Scot, perhaps I did not wholly appreciate it. After that I listened to the news which I thought exceedingly dull.

Tired of the "Causes"

Even with Announcers Hibberd and Grisewood, contrasting their voices and enunciation, I completely failed to be interested in the actual matter broadcast, though I liked them.

And I am so tired of the Causes of War. . . .

Saturday

IN TOWN TO-NIGHT" really interested me. Quite one of the best. The Young Maiden from an Information Bureau delighted me by saying there were 5,000 lipsticks sold every week. I should have thought 50,000 nearer the mark.

I will give her one to answer. How many Peroxide Pollies are there in London—those saucy suicides who dye by their own hand?

A goodly music-hall withal. The simplicities of Charles Higgins contrasted with the syncopatics of Ross and Sargent, or the topicalities of the Waters Sisters, and Long the Norman.

Billy Merson's last appearance, I expect, before he goes to Australia—unless they can squeeze his little form in once more.

I have fallen for the Dancing Daughters. A week or so ago they imitated a train leaving a station. I admired the effect and was pleased with their little Scottish effort to-night.

That sort of radio dancing is definitely a medium of expression—*Imitative Dancing*.

I think the D.D.'s have justified their existence. How proud of them their father must be!



"S.O.S. Missing from his home
May be suffering from loss

since December 24.
of memory!"

A BATTERY TWO-VALVER

Complete with . . .

- VALVES
- BATTERIES
- CABINET
- MOVING-COIL SPEAKER

for ONLY £4

An extremely simple two-valve set described in the December issue of the "Wireless Magazine" is just the thing for beginners in radio.

On test this little set has brought in more than twenty stations on the loud-speaker, proof indeed that it can be relied upon to give a reasonable selection of entertainment programmes under all conditions.

At the price of £4, the set is absolutely complete—there is nothing else to buy—a remarkable set for so low a cost.

SOME OF THE OTHER CONTENTS OF THE DECEMBER "WIRELESS MAGAZINE"

FOR THE CONSTRUCTOR
THE DE-LUXE D.C. THREE. Described by the "W.M." Technical Staff.

THE SUPER SENIOR MODIFICATION.

TECHNICAL FEATURES
HOW TO START EXPERIMENTING. By Percy W. Harris, M.Inst. Rad. E. IS A TRANSPORTABLE STENODE POSSIBLE? By Paul D. Tyers.

WHAT YOU SHOULD KNOW ABOUT SHORT-WAVE DESIGN. By Kenneth Jowers.

SOMETHING NEW IN DETECTORS. By Noel Bonavia Hunt, M.A.

READING PICK-UP RESPONSE CURVES. By P. Wilson, M.A.

CURING CAR-MADE STATIC. By R. C. Rickard.

THIS IS A SUPER-HET SEASON! By J. H. Reyner, B.Sc., A.M.I.E.E.

TESTS OF NEW APPARATUS.

TRIODES VERSUS PENTODES. By Captain H. J. Round, M.I.E.E.

A NEW USE FOR OLD VALVES.

MICROVOLTS IN YOUR AERIAL.

GENERAL ARTICLES

WORLD'S BROADCAST WAVELENGTHS.

SET BUILDING STAGE BY STAGE.

THE B.B.C. PLANS A NEW REGIONAL SCHEME. By Alan Hunter.

NEWS OF THE SHORT WAVES. By Kenneth Jowers.

WIRELESS JOBS MADE EASY FOR MR. EVERYMAN. By R. W. Hallows.

IS THERE A CURE FOR ATMOSPHERICS? By G. S. Scott.

THE MYSTERIES OF STATION FADING. By E. H. Chapman, D.Sc.

TELEVISION SECTION

HOW THE CATHODE-RAY TUBE WORKS.

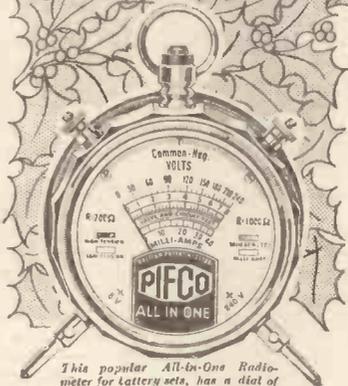
THE FUTURE OF TELEVISION.

Get Your Copy TODAY!

WIRELESS MAGAZINE

DECEMBER ISSUE—PRICE 1/.

"Now that's a really sensible Xmas present..."
A PIFCO ALL-IN-ONE RADIOMETER!



This popular All-in-One Radiometer for battery sets, has a dial of 2 1/2 in. diameter and is finished in wrotted bakelite. Thousands are in use all over the world. A case can be supplied at 2/6 extra.

AN inexpensive present, yet one which will bring lasting delight to every radio enthusiast, owning a battery receiver.

The Pifco All-in-One Radiometer is unique among testing instruments, enabling a number of useful tests to be made and troubles to be traced in no time.

The happy owner will soon admit that it is one of his most useful and interesting possessions.

12/6

See one at your dealers or write for the new Testmeter Folder to PIFCO, LTD., Shudehill, Manchester, or 150 Charing Cross Road, London, W.C.2.

PIFCO 'All-in-One' RADIOMETER A.C. AND D.C.
PIFCO ON THE SPOT WILL TRACE YOUR TROUBLES LIKE A SHOT

For a cool, rich smoke...



10^D PER OZ.

ALSO AIRMAN MIXTURE and AIRMAN FLAKE 10^{oz} AIRMAN NAVY CUT DE-LUXE 11^{oz}.

New Wave-change Idea

CONFRONTING the designer of a short-wave receiver is often the question of how to provide a means for changing the wavelength ranges of the circuit.

At present there are only two methods in general use—both having disadvantages. In one method the coils of the receiver are changed by hand, and although this is efficient it is objected to by many listeners as being cumbersome.

In the other method, the wavelength bands of the receiver are changed by shorting a portion of the tuning coil with a switch, and although this system is neat and handy, it is not efficient—and efficiency in short-wave receivers means everything.

While experimenting with my neutralised inductance tuning system, details of which appeared in the November 10 issue of AMATEUR WIRELESS, I found a system of changing its frequency bands that has the efficiency of the first method and the utility and convenience of the second.

Varying Earth Tapping

To make the method clear, I have re-drawn the circuit, and, as will be seen, its wavelength range is altered simply by varying the position of the earth tapping on the coil L1.

If only two tappings on the coil are needed, an S.P.D.T. switch will be found to be the best to use, but for more than two tappings a few small sockets should be mounted on a strip of good insulating material, and connected to various parts of the coil, while a plug to fit them should be connected to the earth lead so that it can be easily inserted in any of the sockets.

In this way you will be able to cover a really wide band of frequencies with the one coil, and with the minimum of trouble.

Owing to the exceptionally high inductance-to-capacity ratio of this circuit, its sensitivity

is abnormally high, and this fact together with its unique system of wavelength changing will be appreciated.

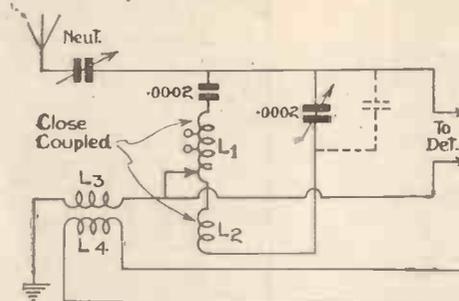
One of the most typical features of any short-wave receiver is the exceptional sharpness with which stations are tuned in and out. Indeed, many listeners find that the tuning of a short-waver, because of this fact, is rather tricky. With my circuit, by loosening the coupling between the two tuning coils L1 and L2, the tuning of the receiver can be broadened to almost any extent, although of course the wave range will be decreased in proportion.

Degree of Sharpness

Conversely, as the tuning is sharpened by placing the two coils nearer together, the waverange is increased, and by a little experiment the exact degree of sharpness of tuning most suitable for yourself can be readily determined.

This circuit holds a wide field for research for the more experienced short-wave fan, and for the ordinary listener it enables stations inaudible when tuned-in with other circuits to be clearly heard.

G. R. W.



Proposed circuit for high-efficiency all-wave tuning coil on the short waves

A Westinghouse metal rectifier is used in all models, while the mains transformer feeding this is of such design that an ample factor of safety is assured.

A rather neat idea which is embodied in an indicating light which tells you at a glance if the charging is proceeding correctly.

One item which will appeal to all is the remarkably low cost of the charging when using one of this particular make of charger.

The 2-volt 1/2-ampere model takes, on load, 5 watts, and to quote my own case, where a unit of electricity costs 1/2d., I can get 20 hours of charging for that sum. In other words, I can fully charge a 30 ampere-hour cell for the huge sum of 1 1/2d. I shall soon save the cost of the charger.

L. O. S.

Weather Station For Aircraft

A NATIONAL aviation meteorological station, whose programmes will consist only of weather reports, weather forecasts and warnings for airmen, is to be erected by the Marconi Company for the Air Ministry at Cranwell, Lincolnshire.

This new station, operated by the Air Ministry, will transmit meteorological bulletins at regular intervals throughout the day for aircraft and aerodromes.

It will have an aerial energy of two kilowatts—several times the power of the well-known Heston station. Its messages are expected to be easily receivable over a wide area of Great Britain.

No interference will be caused with B.B.C. programmes, for the Cranwell station will operate on the wavelength now used by Heston, which station it will supersede, namely 1,158 metres.

This important extension of the present meteorological services of the Air Ministry will be of practical utility to pilots, air-line companies, and flying clubs throughout the country, enabling them to receive regular and authoritative weather reports without difficulty or delay.

Installing Receivers

It is probable that most air ports and flying clubs will install suitable receivers to enable their users and members to listen-in to the Air Ministry weather broadcasts from the new station, which should thus prove to be a further valuable contribution on the part of wireless to the safety of civil aviation.

The station is expected to be opened in the early summer of 1935. Its transmitter will be supplied by the Marconi Company.

While the station itself will be established at Cranwell, Lincolnshire, in order to obtain the advantages of a central situation, the actual announcing will be done from the Meteorological Office of the Air Ministry in London.

Charging At Home

ONE night about three ago, as a matter of fact it was a Saturday night, I was let down by the Johnny who used to do all my charging for me.

I well remember the incident, as there was a particularly attractive programme on which I wished to hear, and incidentally show off my set to the friends I had calling.

It was, no doubt, my fault for not making better arrangements, but there, I suppose I was only like some countless others—leaving it to the charging man.

It was through that little experience that I started to look around for something to render my radio activities independent of outside co-operation.

Still Use Battery Valves

Many will, no doubt, say: "What's the matter with a mains-operated receiver?" Nothing the matter, except that I happen to be one of those funny people who still choose to use battery valves and obtain only my high-tension from the mains.

Since deciding to lash out and secure a trickle charger, I can say, to use the phrase beloved by writers of the testimonials we see in the papers: "I have not looked back."

Gone are the trips to the charging station on a wet night, when I want the cell back in a hurry. No more phone calls to remind the fellow that he promised this or that: no more

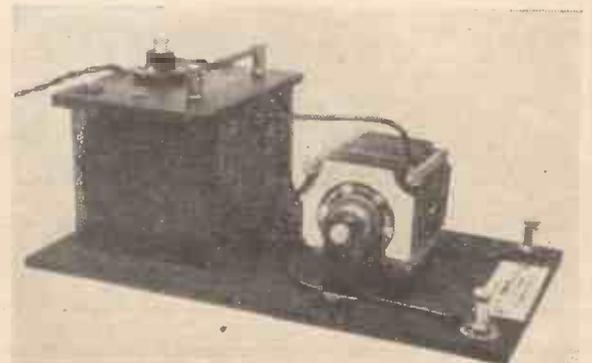
getting the wrong cell or being told that no one was in when our boy called.

All those irritating little snags have been eliminated and in their place I have a trouble-free supply of low-tension which only requires a flick of a switch and a spot of distilled water occasionally.

What started off this train of thought was a leaflet, among many others, which I received during the week. It was from T. W. Thompson of Greenwich, an old-established firm of electrical engineers, and makers of several types of A.C. low-tension chargers.

Apart from giving all the usual necessary technical and constructional details, the makers have also mentioned some of the many advantages to be obtained by using their products. After studying the points they raise, and bearing in mind my own experiences, it is amazing to find how few listeners, using accumulators, employ or have ever thought of employing a trickle charger.

The photo shows one of the 6-volt, 1- to 1 1/2-ampere chargers made by Thompson & Co., but other sizes, starting from 2-volt at 1/2 ampere, are available.



This is the trickle-charging outfit referred to in the accompanying article—a good suggestion, by the way, for a Christmas present

Leaves from a Short-wave Log

Plenty of Programmes

By J. GODCHAUX ABRAHAMS

THE incentive created by the establishment of a regular Empire broadcasting service by the B.B.C. has urged many Continental nations to follow the same example.

So far, we have had special transmissions by the Zeesen short-wavers and lesser well-organised services by Radio Colonial (Paris), EAQ, Madrid, CT1AA, Lisbon, Ruysselede (Belgium) and casual transmissions destined to overseas listeners by Budapest, Vienna, and other European capitals.

Regular Alternatives

Without doubt, these are being fast developed and we may soon expect to find on the Continent a number of regular day and night broadcasts on short waves as an alternative to programmes captured on longer channels.

Rome during the past fortnight has been carrying out a number of tests with her new 20-kilowatt stations. You will have already logged I2RO on 30.67 metres and are now given the opportunity of hearing similar transmissions through IRA on about 49.1 metres.

The actual channel officially allotted is 49.3 metres (6,085 kilocycles), but it is possible that in the earlier experiments there has been some deviation.

Zeesen DJM on 49.35 metres (6,079 kilocycles) has been on the air several times, and the separation is only 6 kilocycles, which may account for the search of another suitable channel.

This particular section of the waveband given over to broadcasting stations—namely, 48.78-50 metres (6,150-6,000 kilocycles)—is already fairly well distributed and you will find it a busy one.

Another newcomer to the ether is CT1GO, Lisbon, on 48.4 metres (6,198 kilocycles), operated by the Radio Club da Costa do Sol (Portuguese Radio Club), and which under the call sign CT1GL works the Radio Parede broadcasting station on 291 metres. Tests are also being carried out on 24.2 metres (13,396 kilocycles).

Whether these channels will be retained is doubtful, as they are not in a section permitted for broadcasting and consequently to say the least are liable to interfere with commercial and other services.

Moreover, the position is an unfavourable one as it is surrounded by morse transmissions. The station is hardly likely to prove a severe competition to the more official Radio Colonial Lisbon on 31.17 metres.

Rio Station Identified

Although the identity of PRF5 has been clearly established as a Rio de Janeiro station, there still exists some doubt as to the Brazilian working on 48.95 metres (6,127 kilocycles), and from which the call of the Radio Club of Brazil has been heard.

A correspondent has picked up an announcement from which he has gathered that it is PRF3 of Sao Paulo. Has anybody more definite information to give?

Vienna OER2 appears to have increased its frequency by some 30 kilocycles and will now be found on roughly 49.1 metres in the immediate neighbourhood of YV2RC, Caracas

49.08 metres), which is now proving such a strong signal after midnight.

There have been two slight alterations in the wavelengths of Daventry GSC and GSE, and it is worth while noting them; they now work respectively on 31.32 metres (9,580 kilocycles) and 25.3 metres (11,860 kilocycles). Alterations of three or four cycles frequently provide much clearer channels.

A few nights ago I discovered a Spaniard working on 19.65 metres (15,265 kilocycles) and later ascertained that this is the wavelength used by EAQ, Madrid, for special relays to South America.

Whilst exploring the 20-metre band in the early afternoon in the immediate neighbourhood of HVJ, Vatican heard the same morning on 19.84 metres, I picked up a conversation between two station operators, one of which was apparently in the U.S.A.

The dialogue proved that I had been listening to RKI, Moscow, a 20-kilowatt on 19.88 metres (15,090 kilocycles), which is entrusted with the relay of Russian programmes to the N.B.C. Network.

The transmissions usually take place between 1 and 2 p.m. G.M.T., but you will often find RKI on the air as it seems to be frequently conversing with other Russian centres.

Power Increases

The Broadcasting Caracas which operates two stations in the Venezuelan capital, namely, YV2RC and YV3RC respectively on 340.1 metres and 250 metres, and simultaneously on 49.08 metres (6,112 kilocycles) and 48.78 metres (6,150 kilocycles) will be shortly increasing the power of its stations to 5 kilowatts.

Of the transmitters on that Continent, it would appear that these possess the largest fan mail and, curiously enough, most of the letters received emanate from England, South Africa, and Australia.

The best time to tune-in is about G.M.T. 1530-1830 or between 2130-0330; all announcements in both Spanish and English. On December 11 next, the stations will celebrate their fourth anniversary with a special broadcast.

Another Venezuelan short-waver to which it is worth your while to listen is YV5RMO at Maracaibo, operating on 49.42 metres (6,070 kilocycles), which is to be heard between G.M.T. 2215 and 0200 daily. If you should pick up references to *Tio Nicolas*, you will be listening to the children's hour.

Tio Nicolas is a Venezuelan Santa Claus who, more liberal with his visits than his European colleague, visits the studio daily; he is, in fact, a Señor Rafael Rivero, a well-known South American artist and cartoonist.

Russian short-wave stations have also extended their programmes, and possibly you have already picked up the Moscow RNE broadcasts on Sunday destined to the English-speaking races.

These are broadcast on 25 metres at G.M.T. 1100 and 1500, also simultaneously through RKI on 19.95 metres (15,040 kilocycles).

A CHRISTMAS GIFT for ALL!

Now you can put Philco Shadow Tuning on any make of A.C., D.C., or battery set which has A.V.C. This new accessory can be fitted without adjustment and makes this exclusive Philco tuning device available to all. The Shadow Tuning Meter is complete with its own cabinet, decoupling condenser, wire, lamp and full fitting instructions. Or, if desired can be fitted inside the set's own cabinet. Shadow Tuning shows you when you have hair-line tuning—and therefore pure, undistorted reproduction. Tuning-in is completely silent. Makes station-finding child's play. Indicates, as well, the comparative signal strength of stations.



PHILCO SHADOW TUNING METER

for any make of set with A.V.C.—either A.C., D.C. or Battery

The Philco Radio & Television Corporation of Great Britain, Ltd., Aintree Road, Perivale, Middlesex.

PHILCO

ENJOY WORLD-WIDE

SHORT-WAVE PROGRAMMES

INCREASE THE RANGE OF YOUR PRESENT SET by using the Unit Radio short-wave convertor adaptor. For use with any receiver, straight or superhet. Complete with walnut cabinet, as illustrated.

No Extra Batteries Required.

CASH or C.O.D. **39/6**

Send for Illustrated Leaflet



UNIT RADIO, 12, Pulteney St., London, N.1

Tel. Terminus 5382



256 PAGES

ENGINEERS!

YOU NEED THIS EXTRAORDINARY HANDBOOK

Send for your copy to-day - FREE of obligation

BRITISH INSTITUTE OF ENGINEERING TECHNOLOGY
409 Shakespeare House, 29/31 Oxford St., London, W.1

Add 50/- WEEKLY to your earnings

by charging accumulators in your spare time.

Complete plant for A.C. mains incorporating Westinghouse Rectifiers to charge 105 L.T. cells weekly. Trade price £4 4s. or 6/- monthly. Send for descriptive Booklet.

M.P.R. Ltd ROMFORD, ESSEX.



OUR LISTENING POST

Rennes Starts Testing

By JAY COOTE

NOTWITHSTANDING the numerous reports and denials regarding the increase in power of Rennes P.T.T. which have been published in Continental papers during the past fortnight, it is now definitely confirmed that the new 40-kilowatt transmitter has started its tests. (One Paris paper states that Rennes works on 40 volts! Oh, those lay journalists!) Trial broadcasts are being carried out in the early morning and also in the evening hours.

Brussels Puzzle Solved

Listeners are sometimes puzzled at the difference in volume of the transmissions put out by Brussels No. 1 and No. 2 in view of the fact that the stations situated at Velthem and Louvain possess the same power rating, namely, 15 kilowatts.

The reason is a simple one; it is merely a question of the aerials. They have been erected at right angles to each other and that used for the Flemish broadcasts on 321.9 metres points towards North-west Belgium to serve Flanders.

In consequence, in the south of England, Brussels No. 2 is heard at better strength than No. 1 on the higher wavelength.

Mention is now seldom made of Radio

Toulouse which, in the earlier days, was one of our most-prized captures. The station was opened on April 15, 1925, and has just celebrated its 10,000th broadcast. The programmes, however, are very much what they were then—mostly gramophone records.

In view of Holland's geographical position in relation to, say, Belgium, which works to Greenwich Mean Time, it seems rather ridiculous that clocks in Amsterdam, for instance, should be twenty minutes ahead of ours.

Apparently the same idea struck the Dutchmen and a proposal was put forward to the effect that the country should adopt G.M.T. and B.S.T. when the brighter days came round. The same opposition, however, prevailed as did in Great Britain when the 24-hour clock system was suggested and, in particular, the agricultural communities were against the alteration.

New Dutch Time

The Dutch Government has now abandoned the idea of introducing G.M.T. and now proposes to adopt Central European Time, namely, one hour in advance of G.M.T., as with the exception of Belgium, France, and Luxembourg, it would bring the country on a par with other nations in Western Europe.

For the supply of official news bulletins to the provincial newspapers in Russia, pending the completion of the short-wave network, the Soviet authorities, after broadcasting hours, use the high-power stations at Moscow and Leningrad as well as some of the larger provincial transmitters such as Kharkov, Archangel, Astrakhan and so on.

Slow Speech

This explains the slow speech which you may hear on various wavelengths in the night hours. The sentences are usually repeated and all punctuation is indicated. Russian newspapers, as you probably know, may only print news supplied through Government sources.

There has been some talk of the B.B.C. broadcasting early morning physical exercises in a similar way to the method adopted by Continental stations. Possibly it is only *talk*, but why not follow the example set by Riga?

Tune-in to 525.3 metres at 5 a.m. and hear the Latvian roosters waking the stay-a-beds. This welcome (?) sound is usually followed by the cackling of hens, the mooing of cows and other farmyard noises. Almost as efficient as a cat on the tiles!

Our Prince is Radio-minded!

THE PRINCE OF WALES amazed experts at the Hayes radio factories with his technical knowledge of engineering and radio when he recently made a five-hour tour.

His Royal Highness was almost mobbed by factory employees when he arrived to make an informal tour as the guest of Mr. Alfred Clark, the H.M.V. chairman. He was at once introduced by Mr. Clark and Mr. Louis Sterling, managing director, to Mr. W. T. Forse, factory controller; Mr. I. Shoenberg, director of research; and Mr. H. W. Healy, works manager.

The Prince first inspected the machine factory and saw many of the millions of parts that were being made in this building. He recognised an escutcheon-plate of the automatic record-changing mechanism.

As In the Royal Set

Picking one up he said: "This is the same as the one I have on my set." Mr. Trowbridge, machine factory manager, explained to the Prince the operation of the new automatic plating machines and the Prince saw metal parts automatically plated by being passed by conveyors through five different baths.

In the record factory, its manager, Mr. S. Willmott, showed the Prince how faults are detected on records, and His Royal Highness inquired how the fact that the labels were placed on the correct sides of the records was ensured.

He then inspected the matrix-making shop, and was cautioned not to breathe too closely to a recorded wax, as the moisture of the human breath could irretrievably ruin it.

After he had seen the various processes of cabinet manufacture, the Prince spent a considerable time in the coil-winding section. "It

seems almost incredible that these girls can handle practically invisible threads with such dexterity," he said to Mr. Clark when the latter told him that the pick-up coils had 10,000 turns of wire round them. The Prince of Wales was very interested when the chairman explained how extremely difficult it was to find girls capable of doing that work and

how the discovery had been made that those who were skilful at needlework were the best operatives.

Mr. Alfred Clark said afterwards that he had been amazed by the Prince's technical interest in the various processes, and that his four-mile tour over the H.M.V. factories was, he believed, the longest ever made by a Royal visitor.



His Royal Highness the Prince of Wales inspecting a coil-winding machine during his lengthy tour of the Hayes factories. On his right is Alfred Clark, Chairman of H.M.V., and on his left H. W. Healy, the Works Manager

Medium-wave Broadcasters

CONSULT THIS LIST OF WAVELENGTHS BEFORE YOU TUNE IN!

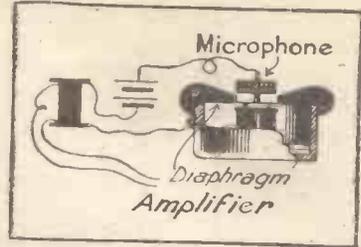
This week we give details of all the important European medium-wave stations. Next week we shall publish a list of short- and long-wave transmitters.

Metres	Kilo-cycles	Station and call sign	Country	Power (Kw.)	Metres	Kilo-cycles	Station and Call Sign	Country	Power (Kw.)
203.5	1,474	Plymouth	Great Britain	.3	304.3	986	Genoa	Italy	10
203.5	1,474	Bournemouth	Great Britain	1	304.3	986	Cracow	Poland	1.7
204.8	1,467.2	Pecs	Hungary	1.25	307.1	977	West Regional	Great Britain	59
206	1,456	Fecamp	France	.2	309.9	968	Grenoble PTT	France	15
207.3	1,447	Miskolcz	Hungary	1.25	312.8	959	Foste Parisien, Paris	France	60
209.9	1,429	Newcastle	Great Britain	1	315.8	950	Breslau	Germany	60
209.9	1,429	Bezlers	France	1.25	318.8	941	Goteborg	Sweden	10
209.9	1,429	Cork	Irish Free State	1	318.8	941	Algiers	North Africa	12
211.3	1,420	Tampere	Finland	1.2	321.9	932	Brussels (2)	Belgium	15
215.4	1,393	Radio Lyon	France	.5	325.4	922	Erno	Czechoslovakia	32
216.8	1,384	Warsaw (2)	Poland	10	328.6	913	Radio Toulouse	France	69
218.2	1,375	Basle, Berne	Switzerland	.5	331.9	904	Hamburg	Germany	100
221.1	1,357	Turin (2)	Italy	.2	335.2	895	Limoges PTT	France	.7
222.5	1,348	Milan Vigentino (2)	Italy	.4	335.2	895	Helsinki	Finland	10
222.6	1,348	Konigsberg	Germany	.5	338.6	886	Graz	Austria	7
222.6	1,348	Dorpat	Estonia	.5	342.1	877	London Regional	Great Britain	50
222.6	1,348	Paris (Vitus)	France	.7	345.6	868	Poznan	Poland	20
222.6	1,348	Dublin	Irish Free State	1	345.6	868	Fredrikstad	Norway	.7
224	1,339	Lodz	Poland	1.7	349.2	859	Strasbourg	France	11.5
224	1,337.9	Montpellier	France	.8	352.9	850	Bergen	Norway	1
225.6	1,330	Hanover and other Hamburg relays	Germany	1.5	352.9	850	Valencia	Spain	.7
227.1	1,321	Magyocrova	Hungary	1.5	356.7	841	Sofia	Bulgaria	1
230.2	1,303	Danzig	Germany	.5	360.6	832	Berlin	Germany	103
231.8	1,294	Linz and other Vienna relays	Austria	.5	362.8	827	Moscow (4)	U.S.S.R.	100
233.5	1,285	Aberdeen	Great Britain	1	364.5	823	Radio LL Paris	France	2
235.1	1,276	Stavanger and other Oslo relays	Norway	.5	368.6	814	Bucharest	Roumania	12
236.8	1,267	Augsburg	Germany	.25	373.1	804	Milan	Italy	50
237.2	1,348	Bordeaux S.O.	France	1	373.1	804	Scottish Regional	Great Britain	50
238.5	1,258	San Sebastian (EAJ8)	Spain	3	377.4	793.8	Lwow	Poland	16
238.5	1,258	Rome (11)	Italy	1	382.2	785	Barcelona (EAJ1)	Spain	8
240.2	1,249	Juan-les-Pins	France	.8	386.6	776	Leipzig	Germany	120
243.7	1,231	Dresden	Germany	.25	391.1	767	Fredrikstad	Norway	.7
243.7	1,231	Nurnberg	Germany	.2	391.1	767	Toulouse PTT	France	.7
243.7	1,231	Gleiwitz	Germany	.5	395.8	758	Midland Regional	Great Britain	25
245.5	1,222	Trieste	Italy	10	400.5	749	Katowice	Poland	12
247.3	1,211.9	Lille PTT	France	1.3	405.4	740	Marseilles PTT	France	1.6
249.2	1,194	Prague Stranice (2)	Czechoslovakia	.5	410.4	731	Munich	Germany	103
251	1,195	Frankfurt-am-Main and relays	Germany	17	410.4	731	Seville	Spain	2
253.2	1,185	Khar'kov (2)	U.S.S.R.	20	410.4	731	Madrid (Espana)	Spain	3
255.1	1,176	Copenhagen	Denmark	10	420.8	713	Tallinn	Estonia	20
257.1	1,167	Monte Ceneri	Switzerland	15	426.1	704	Rome	Italy	50
259	1,158	Kosice	Czechoslovakia	2.5	426.1	704	Stockholm	Sweden	50
261.1	1,149	London National	Great Britain	50	431.7	695	Paris PTT	France	7
261.1	1,149	West National	Great Britain	50	437.3	686	Belgrade	Yugoslavia	2.5
263.2	1,140	Turin (1)	Italy	7	443.1	677	Sottens	Switzerland	25
265.3	1,131	Horby	Sweden	10	449.1	668	North Regional	Great Britain	50
267.4	1,122	Belfast	N. Ireland	1	455.9	658	Cologne	Germany	17
267.4	1,122	Nyiregyhaza	Hungary	6.25	463.6	648	Lyons PTT	France	15
269.5	1,110	Moravska-Ostrava	Czechoslovakia	11	470.2	638	Prague (1)	Czechoslovakia	120
271.7	1,104	Naples	Italy	1.5	476.9	629	Trondelag	Norway	20
271.7	1,104	Madona	Latvia	1	483.9	620	Brussels (1)	Belgium	15
274	1,095	Madrid EAJ7	Spain	1.3	491.8	609	Florence	Italy	20
274	1,095	Vinnitsa	U.S.S.R.	10	499.2	601	Sundsvall	Sweden	10
276.2	1,086	Falun	Sweden	.5	499.2	601	Rabat	Morocco	6
276.2	1,086	Zagreb	Yugoslavia	.75	506.8	592	Vienna	Austria	120
278.6	1,077	Bordeaux PTT	France	13	514.6	583.2	Riga	Latvia	15
280.9	1,068	Tiraspol	U.S.S.R.	4	514.6	583	Agon	France	6
283.3	1,059	Bari	Italy	20	522.6	574	Stuttgart	Germany	100
285.7	1,050	Scottish National	Great Britain	50	531	565	Athlone	Irish Free State	63
288.5	1,040	Leninrad (2)	U.S.S.R.	10	539.6	556	Beromunster	Switzerland	63
288.6	1,040	Rennes PTT	France	1.3	550.5	545	Budapest	Hungary	120
291	1,031	Parade (Lisbon)	Portugal	5	559.7	536	Wilno	Poland	15
291	1,031	Heilsberg	Germany	60	559.7	536	Bolzano	Italy	1
293.5	1,022	Barcelona (EAJ15)	Spain	1	569.3	527	Vilpuri	Finland	10
296.2	1,013	North National	Great Britain	50	578	519	Ljubljana	Yugoslavia	5.3
296.8	1,004	Bratislava	Czechoslovakia	14	578	519	Innsbruck	Austria	5
301.5	995	Hilversum	Holland	20	596	431	Oulu	Finland	1.2
					748	401	Geneva	Switzerland	1.5
					748	401	Moscow	U.S.S.R.	20
					765	392	Ostersund	Sweden	.6
					766	413.5	Boden	Sweden	.6

HOME BROADCASTING

by your family and friends.

MICROPHONE BUTTONS



A wonderfully interesting and useful Transmitter Unit, for fun with your home radio, detectaphones, baby alarm, rat hunts, speech amplifiers, etc. Usual price, 5/-. As supplied to G.P.O. Our price, 1/- only. Post 1d.



ERICSSON PEDESTAL TRANSMITTERS 12 in. high, with mouth-piece, as illustrated. Standard model 4/8. Post 1d.

"A.W." II TABLE HOME BROADCASTING MIKE, containing transformer, switch, and plug; is a marvellous production at a low price. Bakelite square body on bronze base. Worth 2 guineas. Only 15/-. Other types: Leslix No. 10B Pedestal, 10 in. high, 12/6; Leslix Superior No. 12BB, Ring 14 in. Pedestal, 18/6. Hand Mikes in 2-in. case, No. 11 at 5/6; Superior type No. 11A, 7/8.

ELTSEL MIKE. The famous Eltsel public address and hand mike (Reisz principle), 55/-. Highest quality uniform response. Can be obtained from us only. Worth 25, but Our Price 55/-. Stand, 10/- extra. Rereneed Imped. Matched Transformer, 7/6. Ask for Illustrated Mike List of 25 models for all uses. Our famous parts for making your own mike. Carbon Granules in glass capsule, Grade 1, 8d.; No. 2, 1/-; No. 3, fine, 1/8; No. 4, extra fine, 2/-; Black Blocks, 4d.; Diaphragms, 6d.; Button in 1 1/2-in. hard wood case, with 2-in. mica diaph., 2/6; Dito, mounted on pedestal, 3/6.

HEADPHONES. 130-ohm Sullivan Headphones, W.D. model, at a tenth of cost. For circuit testing, fault broadcasting at home. It is a general purpose, robust mike, with solid bakelite body, back terminals, front metal grille. No. 11, new design, finely finished, 5/6. No. 11A, special in solid brass body, unequaled at the price on speech and music, 7/8.

MORSE KEYS. We have the biggest range of Wireless Keys in the country. Twelve models from 4/6 to 30/-. Ask for new illustrated Key List. Cheapest house for all electrical gear. For 1,000 other bargains, send 1d. stamp for New Illustrated Sale List "A." State your requirements.

WET H.T. BATTERY CO., A.W. 95, Dean Street, Oxford Street, W.1. (Note new address)

For DX Fans

ON December 15, the League of Nations stations HBL on 31.27 metres and HBP on 38.47 metres will broadcast a programme dedicated to the International Broadcast DX'ers Alliance. This programme is of special interest to all DX fans, and will be heard from 22.30 onwards.

On December 27—when you have recovered from Christmas!—there is a programme coming to all DX'ers and especially dedicated to the I.D.A., from the medium-wavelength Swiss station Sottens, 443.1 metres.

The above stations wish for reports from all who manage to tune-in their programmes.

Further information on I.D.A. activities can now be obtained from William W. Warner, of 56 East Grove Road, St. Leonards, Exeter, Devon.

Club News

THE Thames Valley Amateur Radio and Television Society held a very enjoyable meeting on November 28 at Kingston. There were over thirty members present to listen to an interesting lecture given by Mr. E. A. Deadman (G2NH) of the Quartz Crystal Company, on the making of quartz crystals and crystal control.

The chair was taken by Mr. Crocker (G2NN). It is expected that the next lecture is likely to take place on January 2, 1935, at 8 p.m., at the Fox Assembly Rooms, Church Street, Twickenham.

New members will be well advised to write to Mr. J. N. Roe, 27 Baronsfield Road, St. Margaret's, Middlesex, who is the Secretary. The fee for joining this very interesting Club is very moderate, being only 3s. 6d.

A Ten Metre Television Receiver

The December issue of Television, now on sale, among many other useful and instructive articles, describes the construction of this Ultra Short-wave Television Set

TELEVISION

December issue—Price 1/-

PREPAID ADVERTISEMENTS

Advertisements under this head are charged **THREEPENCE PER WORD, minimum charge THREE SHILLINGS. DEPOSIT SYSTEM.**

As the publishers cannot accept responsibility for the bona fides of advertisers in this section, they have introduced a system of deposit which it is recommended should be adopted by readers when dealing with persons with whom they are unacquainted. It is here explained.

Intending purchasers should forward to the Publishers the amount of the purchase money of the article advertised. This will be acknowledged to both the Depositor and the Vendor, whose names and addresses must necessarily be given. The deposit is retained until advice is received of the completion of the purchase, or of the article having been returned to and accepted by the Vendor. In addition to the amount of the deposit, a Fee of 6d. for sums of £1 and under, and 1s. for amounts in excess of £1, to cover postage, etc., must be remitted at the same time. In cases of persons not resident within the United Kingdom, double fees are charged.

The amount of the Deposit and Fee must be remitted by Postal Order or Registered Letter (Cheques cannot be accepted), addressed to "Amateur Wireless" Advertisement Department, 58-61 Fetter Lane, London, E.C.4.

PATENTS, Trademarks: Advice Handbook and Consultations free.—King's Patent Agency, Ltd., 146a Queen Victoria Street, London.

REPAIRS TO MOVING-COIL SPEAKERS.—Cones and Coils fitted or rewound. Eliminators and Transformers quoted for. Loud-speakers, L.F. and Speech Transformers, 4/- each, post free. Trade invited. Satisfaction guaranteed. Prompt service.—Loud-speaker Repair Service, 5 Ballham Grove, London, S.W.12. Battersen 1324.

"WIRELESS MAGAZINE" EMPIRE SHORT-WAVER, complete, valves, best components. Seen by appointment.—32 Basildene Road, Hounslow. Tel.: Hounslow 040.

IDEAL EXPERIMENTER'S CHRISTMAS PRESENTS.—500 parcels containing Wireless Components, 30/- value for 5/6, carriage 1/-. Free Valve with orders for two parcels.—Taylor, Macaulay Street, Huddersfield.

HIGHEST POSSIBLE ALLOWANCE made on used wireless goods in exchange for new sets, components, or Peto-Scott kits. All latest receivers supplied on easiest of terms.—R. Wigfield, Furlong Road, Goldthorpe, Yorks.

MICROPHONES, WESTERN ELECTRIC TYPE, perfect, complete with instructions, 2/6 each. Microphone Transformers, 100/1 ratio, 3/6 each, post free.—Electro-micro, 34 Queen Street, Hammersmith.

BANKRUPT BARGAINS.—List free with 3-valve diagram—S.T.300 kit, 30/-; S.T.400, 40/-; S.T.500, 50/-; S.T.600, £3. 3-valve kit, 15/-. Regentone 30-m.a. eliminators, 32/6. P.M.M.C. speakers from 9/6. Dual coils from 1/6. Transformers from 1/6. Mains sets from £4. S.G. 3-valve battery sets, Osrams, M.C., Pertrix H.T. and L.T., £4/17/6. 3-gang coils, Lotus, 10/-. Stal 2-gang 6/9. Lotus 2-gang, 7/6; 3-gang, 10/6. Full range Triotrons from 3/-. All the smaller parts. Part exchange and quick delivery.—Butlin, 143b Preston Road, Brighton Preston 4030.

YOU CAN USE YOUR SPARE TIME to start a Mail Order Business that quickly brings you a full-time income. Follow the lead of others who are averaging £12 per week net profits. Get away from a drudging routine job—join the big-money class. No previous experience necessary. Few pounds capital only needed. No samples or outfits to buy; no rent, rates, or canvassing. New method makes success certain. Write to-day for Free Booklet to Business Service Institute, Dept. 6, Carmelite Street, London, E.C.4.

INFORMATION BUREAU

Will every querist please observe the following revised rules?

Please write concisely, giving essential particulars. A fee of one shilling, postal order (not stamps), a stamped, addressed envelope and the coupon on this page must accompany all queries.

Not more than two questions should be sent at any time.

The designing of apparatus or receivers cannot be undertaken.

Slight modifications of a straightforward nature only can be made to blueprints. For more serious alterations the minimum charge is 2/6.

Blueprints supplied by us will be charged for in addition, but, of course, readers may send their own blueprints for alteration.

Modifications to proprietary receivers and designs published by contemporary journals cannot be undertaken. Readers' sets and components cannot be tested by us. Queries cannot be answered by telephone or personally. Readers ordering blueprints and requiring technical information in addition should address a separate letter to the Information Bureau and should see that their remittance covers the price of the Blueprint and the amount of the query fee.

We do not answer queries in cases where the fee is omitted.

Queries should be addressed to the Query Dept., "Amateur Wireless," 58/61 Fetter Lane, London, E.C.4.

Postcard Radio Literature

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, E.C.4. "Observer" will see that you get all the literature you desire. Please write your name and address in block letters.

Lissen Batteries

BATTERY set users will be pleased to hear that a new range of Lissen high-tension batteries, known as the Lissen Leader, has now been placed on the market. The prices are certainly low, as it is possible to obtain a 120-volt battery for 6s. 6d., or a 66-volt for 3s. 6d. 226

Trix Amplifiers

THE main details of amplifier equipment are contained on the single leaflet issued by The Trix Electrical Company, Ltd. These comprise the undistorted outputs of the various units, together with prices, details of microphones, gramophone turntables, loud-speakers and rotary converters. We understand that a full-detailed catalogue is being prepared and will be ready for distribution in a week or two. 227

Low-tension Chargers

THE numerous advantages of home charging are dealt with in a leaflet describing the range of A.C. chargers produced by T. W. Thompson. A popular model, suitable for charging 2-volt cells at 1/2-ampere is priced at 19s. 6d., while a larger type is available at 35s., this being capable of charging 6-volt cells at 1 to 1 1/2 amperes. A Westinghouse metal rectifier is employed while the transformer is such that a very generous factor of safety is provided. A novel and useful feature is the fitting of an indicating lamp which denotes if the charging is proceeding in a normal manner.

The units are soundly engineered and provide a reliable means of maintaining the low-tension accumulator in a charged condition, thus avoiding those irritating discoveries which always come at the least welcome moment. 228

Interference Elimination

WE have received a copy from Ward and Goldstone, Ltd., of the form they have issued with the object of rendering assistance to those experiencing interference. The form contains numerous questions which, when answered, enable the Goldstone Technical Department to diagnose the cause and form of interference and suggest the necessary steps to remedy it.

This service is not intended to interfere with the local wireless dealers' activities, as the suggestions given can be taken to the dealer who will be able to act thereon. We would like to suggest that dealers could render a universal service by keeping a few of these free forms available for prospective clients. 229

Osborn Cabinets

A THIRTY-TWO page catalogue, profusely illustrated, and containing full dimensions of the various cabinets produced by C. A. Osborn, is available for those interested in providing a well-finished and artistic house for their sets.

Most designs can be obtained in kit form, assembled ready to polish, or assembled and polished, in oak, mahogany, or walnut. We understand that individual designs can be dealt with and an estimate obtained by return of post. 230

PEARL & PEARL

190 Bishopsgate, London, E.C.2. All the following bargains guaranteed new goods. Cash or C.O.D. Carriage Paid.

SPECIAL XMAS BARGAINS

ELIMINATORS.—Special purchase of large quantity of Lincoln-Stewart eliminators enables us to offer them at sacrifice prices. All models K.K. for 200-250V, D.C. 25 milliamperes, 9/11; A.C. 30 milliamperes output with Westinghouse Rectifier, etc., 24/11, or with half-amp Trickle Charger incorporated, price only 37/6. All fully guaranteed.

MICROPHONES.—Super-sensitive mikes, complete on base with built-in transformer. Full instructions included; our price 6/11.

COILS.—Lotus triple ganged band-pass coil unit complete. Suitable for mains or battery sets; comprises 3 screened coils on metal base, wavechange and radio-gramo switch; all terminal connections shown engraved; full instructions with every unit. List 27/6, an outstanding bargain at 12/11 each.

LISSEN LN5181 3-ganged superhet. coil units for A.C. or battery sets, with circuits and diagrams. Over 750 already sold. List price 30/-; now offered at special price, 6/6 only.

LUCERNE COILS.—New Lucerne Dual-Range coils, 1/8 each. Screened Iron-Cored Dual Coils with circuits, 1/11 each.

ALL ABOVE SENT POST PAID

CABINETS.—600 only. Horizontal cabinets (made for Cromwell), 23 in. wide, 8 in. deep, 11 1/2 in. high. Polished walnut veneer, additional baffle behind speaker grille. Our price to clear, 6/6 only. Carriage forward.

LARGE RECEIVER CABINETS, highly polished, as used for "CROMWELL" 8-valve Superhet. Measurements, 22 in. high, 17 in. wide, 11 1/2 in. deep. Finished in contrasting rosewood and walnut veneers. Special additional baffle on speaker fret. Cost over £2 to make. Few only, at 15/- each. Carriage forward.

SPECIAL SUNDRY BARGAINS

All Post Paid, for Xmas

CHRISTMAS Decoration Lamps. Set of 18 complete in assorted colours, any voltage, 4/11. Triotron electrolytic condensers; 8 mfd., 450 volt working, 2/11 each; 25 mfd., 350 volt working, 3/6 each. Triotron Class "B" Valves, type E220B. List 10/6; our price 5/1.

AMPLION Binoocular H.F. Chokes. Totally enclosed in bakelite case. List 4/6. Our price, 2/3. Lots of 3 dozen assorted Dutilleul fixed condensers, 1/9 each lot; 6 for 2/-, 7-pin type, 7d. each, 6 for 3/-. Variable tuning condensers, .003 mfd., 1/- each. Igranite 2-pole rotary switches, 1/- each. Igranite Short-wave chokes, 1/- each. Double reading voltmeters, 1/9 each. Accumulator Hydrometers, complete with float, 1/- each. Sovereign lightning arrestors, 6d. each.

FREE.—Our latest, fully revised Bargain List "A." Now ready; send P.C. for your copy.

All Mail Orders Direct to

PEARL & PEARL

190 Bishopsgate, London, E.C.2.

Tele.: Bishopsgate 1212.

America on Five Metres

Continued from page 627

is at the opposite end of the 5-metre band and stations tuned to this frequency would, of course, miss picking up the Hartford station. The correct method of determining the frequency is to tune in the musical telegraphic note sent out by W2DLG just prior to the schedules listed.

Members of the Garden City Radio Club will appreciate having reports from amateurs who pick up the New York station, particularly when they are located a considerable distance from the Metropolitan headquarters at the Hotel New Yorker. Send them to the Editor of AMATEUR WIRELESS and we will forward them.

The results already obtained indicate that a comparatively low-powered station, strategically located in the centre of New York City, can cover the Metropolitan area on these ultra-short waves, which are ideal for television broadcasting.

While, of course, it is extremely unlikely that the 5-metre transmissions will be picked up here, the 5-metre signals from the Hotel New Yorker will be picked up at Garden City, Long Island, put through a mixing panel, and sent out on 20 metres by a station which is regularly heard in London, i.e., W2CLA. It is hoped that transmissions from London will be similarly picked up and a Duplex test carried out. More about this later. Meanwhile listen in for W2CLA and let us know your results.

Personally, I am particularly interested in these tests, not only because several of the participants are personal friends of mine, but because the great Hotel New Yorker was my home for nearly a year.

Amateur Wireless

FEE 1/-

INFORMATION BUREAU
COUPON

Available until Saturday,
DECEMBER 22, 1934

Printed in Great Britain for the Proprietors and Publishers, BERNARD JONES PUBLICATIONS, LTD., 58-61 Fetter Lane, London, E.C.4, by The Sun Engraving Co., Ltd., London and Watford. Sole Agents for South Africa: CENTRAL NEWS AGENCY, LIMITED. Sole Agents for Australia and New Zealand: GORDON & GOTCH (A'SIA), LIMITED. Saturday, December 15, 1934.

Full-size Blueprints

These blueprints show the position of each component and wire and make construction a simple matter. Copies of "Amateur Wireless" and of "Wireless Magazine" containing descriptions of most of these sets can be obtained at 4d. and 1s. 3d., respectively, post paid. Index letters "A.W." refer to "Amateur Wireless" sets and "W.M." to "Wireless Magazine" sets. Send, preferably, a postal order (stamps over sixpence unacceptable) to "Amateur Wireless" Blueprint Dept., 58-61 Fetter Lane, London, E.C.4.

CRYSTAL SETS

Blueprints, 6d. each.

Four-station Crystal Set	31.3.34	AW427
1934 Crystal Set	4.8.34	AW444
150-mile Crystal Set	27.9.34	AW450

STRAIGHT SETS Battery Operated

One-valvers: Blueprints, 1s. each.

B.B.C. One-valver	28.5.32	AW344
B.B.C. Special One-valver	6.5.33	AW387
Twenty-station Loud-speaker One-valver (Class B)	27.9.33	AW449

Two-valvers: Blueprints 1s. each.

Melody Ranger Two (D, Trans)	13.5.33	AW388
Full-volume Two (SG, Det, Pen)	17.6.33	AW392
Iron-core Two (D, Trans)	29.7.33	AW395
Iron-core Two (D, QPP)	12.8.33	AW396
B.B.C. National Two with Lucerne Coil (D, Trans)	17.2.34	AW377A
Big-power Melody Two with Lucerne Coil (SG, Trans)	17.2.34	AW338A
Lucerne Minor (D, Pen)	24.3.34	AW426
Family Two (D, Trans)	Apr. '32	WM278

Three-valvers: Blueprints, 1s. each.

£8 Radiogram (D, RC, Trans)	21.5.32	AW343
New Regional Three (D, RC, Trans)	25.6.32	AW349
Class-B Three (D, Trans, Class B)	22.4.33	AW386
New Britain's Favourite Three (D, Trans, Class B)	15.7.33	AW394
Home-built Coil Three (SG, D, Trans)	14.10.33	AW404
Fan and Family Three (D, Trans, Class B)	25.11.33	AW410
£5 5s. S.G.3 (SG, D, Trans)	2.12.33	AW412
£34 Ether Searcher: Baseboard Model (SG, D, Pen)	20.1.34	AW417
£34 Ether Searcher: Chassis Model (SG, D, Pen)	3.2.34	AW419
Lucerne Ranger (SG, D, Trans)	3.3.34	AW422
Cosser Melody Maker with Lucerne Coils	17.3.34	AW423
P.V.V. H. Mascot with Lucerne Coils (Det, R.C, Trans)	17.3.34	AW337A
Mullard Master Three with Lucerne Coils	24.3.34	AW424
Pentaquester (HF, Pen, D, Pen)	14.4.34	AW431
£5 5s. Three: De-luxe Version (SG, D, Trans)	19.5.34	AW435
Lucerne Straight Three (D, RC, Trans)	9.6.34	AW437
All-Britain Three (HF Pen, D, Pen)	6.9.34	AW448
"Wireless League" Three (HF Pen, D, Pen)	3.10.34	AW451
Transportable Three (SG, D, Pen)	Feb. '32	WM171
Multi-mag Three (D, 2 Trans)	June '32	WM283
Lucy Harris Radiogram (HF, D, Trans)	Aug. '32	WM254
£6 6s. Radiogram (D, RC, Trans)	Apr. '33	WM318
Simple-tune Three (SG, D, Pen)	June '33	WM327
Tyers Iron-core Three (SG, D, Pen)	July '33	WM330
C.-B. Three (D, LF, Class B)	Sep. '33	WM333
Economy-pentode Three (SG, D, Pen)	Oct. '33	WM337
All-wave Three (D, 2LF)	Jan. '34	WM348
"W.M." 1934 Standard Three (SG, D, Pen)	Feb. '34	WM351
£3 3s. Three (SG, D, Trans)	Mar. '34	WM354
Iron-core Band-pass Three (SG, D, QP21)	June '34	WM352
£5s £6 6s. Battery Three (SG, D, Pen)	Oct. '34	WM371

Four-valvers: Blueprints, 1s. 6d. each.

£5/- Four (SG, D, RC, Trans)	17.12.32	AW370
"A.W." Ideal Four (2SG, D, Pen)	16.9.33	AW402
2 H.F. Four (2 SG, D, Pen)	17.2.34	AW421
Crusaders' A.V.C. 4 (2 HF, D, QP21)	18.8.34	AW445
(Pentode and Class-B outputs for above; blueprints 6d. each)	25.8.34	AW445A

Quadradyne (2 SG, D, Pen)	Feb. '32	WM273
Calibrator (SG, D, RC, Trans)	Oct. '32	WM300
Table Quad (SG, D, RC, Trans)	Nov. '32	WM303
Calibrator de Luxe (SG, D, RC, Trans)	Apr. '33	WM316
Self-contained Four (SG, D, LF, Class-B)	Aug. '33	WM331
Lucerne Straight Four (SG, D, LF, Trans)	Feb. '34	WM350

Five-valvers: Blueprints, 1s. 6d. each.

Super-quality Five (2 HF, D, RC, Trans)	May '33	WM320
New Class-B Five (SG, D, LF, Class B)	Nov. '33	WM340
Class-B Quadradyne (2 SG, D, LF, Class B)	Dec. '33	WM344

Mains Operated

Two-valvers: Blueprints, 1s. each.

Consolectric Two (D, Pen) A.C.	23.9.33	AW403
Economy A.C. Two (D, Trans) A.C.	June '32	WM286

Three-valvers: Blueprints, 1s. each.

Home-lover's New All-electric Three (SG, D, Trans) A.C.	25.3.33	AW383
S.G. Three (SG, D, Pen) A.C.	3.6.33	AW390
A.C. Triodyne (SG, D, Pen) A.C.	19.8.33	AW399
A.C. Pentaquester (HF Pen, D, Pen) A.C.	26.6.34	AW439
D.C. Calibrator (SG, D, Push-pull Pen) D.C.	July '33	WM328
Simplicity A.C. Radiogram (SG, D, Pen) A.C.	Oct. '33	WM333
Six-guinea AC/DC Three (HF Pen, D, Trans) A.C./D.C.	July '34	WM354
Mantovani A.C. Three (HF Pen, D, Pen) A.C.	Nov. '34	WM374

Four-valvers: Blueprints, 1s. 6d. each.

A.C. Melody Ranger (SG, DC, RC, Trans) A.C.	4.3.33	AW360
AC/DC Straight A.V.C.4 (2 HF, D, Pen) A.C./D.C.	8.9.34	AW446
A.C. Quadradyne (2SG, D, Trans) A.C.	Apr. '32	WM279
All Metal Four (2SG, D, Pen) A.C.	July '33	WM329

SUPER-HETS

Battery Sets: Blueprints, 1s. 6d. each.

1934 Century Super	9.12.33	AW413
Super Senior	Oct. '31	WM256
1932 Super 60	Jan. '32	WM269
Q.P.P. Super 60	Apr. '33	WM319

Advantages of the "A.W." BLUEPRINT SERVICE

Every blueprint is a full-size photographic reproduction of the original set as built in our own laboratories.

The positions—exactly—of every component used in the set are clearly shown.

Each wire is numbered in sequence so that you cannot put in an incorrect lead or leave out an essential one. The last number is always indicated on the print.

When the set is of chassis construction the holes through which leads pass from one side to the other are lettered, providing an infallible key to the top and bottom of the chassis wiring.

With a full-size blueprint before you there is a feeling of confidence that nothing short of the presence of the original set can equal.

Considering their good quality and invaluable aid to construction and wiring, the prices of our blueprints are decidedly modest.

"W.M." Stenode	Oct. '34	WM373
Modern Super Senior	Nov. '34	WM375

Mains Sets: Blueprints, 1s. 6d. each.

1934 A.C. Century Super, A.C.	10.3.34	AW425
1932 A.C. Super 60, A.C.	Feb. '32	WM272
Seventy-seven Super, A.C.	10.3.32	WM305
"W.M." D.C. Super, D.C.	May '33	WM321
Merrymaker Super, A.C.	Dec. '33	WM345
Heptode Super Three, A.C.	May '34	WM359
"W.M." Radiogram Super, A.C.	July '34	WM365
"W.M." Stenode, A.C.	Sep. '34	WM370

PORTABLES

Four-valvers: Blueprints, 1s. 6d. each.

General-purpose Portable (SG, D, RC, Trans)	9.7.32	AW351
Midget Class-B Portable (SG, D, LF, Class B)	20.5.33	AW389
Holiday Portable (SG, D, LF, Class B)	1.7.33	AW393
Family Portable (HF, D, RC, Trans)	22.9.34	AW447
Town and Country Four (SG, D, RC, Trans)	May '32	WM287
Two H.F. Portable (2 SG, D, QP21)	June '34	WM362
Tyers Portable (SG, D, 2 Trans)	Aug. '34	WM363

SHORT-WAVERS (Battery Operated)

One-valvers: Blueprints, 1s. each.

S.W. One-valve	23.1.32	AW329
S.W. One-valver for America	31.3.34	AW427
Roma Short-waver	10.10.34	AW452

Two-valvers: Blueprints, 1s. each.

Home-made Coil Two (D, Pen)	14.7.34	AW440
-----------------------------	---------	-------

Three-valvers: Blueprints, 1s. each.

World-ranger Short-wave 3 (D, RC, Trans)	20.8.32	AW355
Experimenter's 5-metre Set (D, Trans, Super-regen)	30.6.34	AW438

Four-valvers: Blueprints, 1s. 6d. each.

"A.W." Short-wave World Beater (HF Pen, D, RC, Trans)	2.6.34	AW436
Empire Short-waver (SG, D, RC, Trans)	Mar. '33	WM318

Super-hets: Blueprints, 1s. 6d. each.

Quartz-crystal Super	Oct. '34	WM372
----------------------	----------	-------

Mains Operated

Two-valvers: Blueprints, 1s. each.

Two-valve Mains Short-waver (D, Pen) A.C.	10.10.34	AW453
"W.M." Band-spread Short-waver (D, Pen) A.C./D.C.	Aug. '34	WM368

Three-valvers: Blueprints, 1s. each.

Emigrator (SG, D, Pen), A.C.	Feb. '34	WM352
------------------------------	----------	-------

Four-valvers: Blueprints, 1s. 6d. each.

Gold Coaster (SG, D, RC, Trans) A.C.	Aug. '32	WM292
--------------------------------------	----------	-------

MISCELLANEOUS

Blueprints, 1s. each.

Short-wave Super-het Converter	23.1.32	AW329
Simple Trickle Charger	16.7.32	AW352
Battery-operated Amplifier	22.10.32	AW362
D.C. High-tension Unit	26.11.32	AW369
A.C. High-tension Adaptor	26.11.32	AW369A
Short-wave Plug-in Adaptor	23.1.33	AW326
"A.W." Push-pull Amplifier	11.2.33	AW376
Short-wave Adaptor	18.3.33	AW382
Super-het Short-wave Adaptor	8.4.33	AW385
Class-B Gramophone Amplifier	10.6.33	AW391
Three Class-B Units	2.9.33	AW400
Universal A.C. Amplifier (3-valve)	18.11.33	AW411
Valve and Set Tester	6.1.34	AW415
Experimenters' D.C. Mains Unit	7.4.34	AW430
Experimenters' A.C. Mains Unit	21.4.34	AW432
Valve Voltmeter	28.7.34	AW442
Add-on Two-valve Amplifier (battery)	28.7.34	AW443
Economy Gramophone Amplifier (battery)	Apr. '32	WM277
Dual-speaker Amplifier (A.C.)	Nov. '32	WM304
A.C. Mains H.T. Unit	Jan. '33	WM310
Five Q.P.P. Output Units	Mcrr '33	WM315
Class-B Mains Unit	June '33	WM324
A.C. Short-wave Converter	Mar. '34	WM353
10-watt A.C. Amplifier	June '34	WM360
"W.M." Electric Gramophone	Sept. '34	WM369

"AMATEUR WIRELESS" BLUEPRINT DEPT., 58/61, Fetter Lane, London, E.C.4.

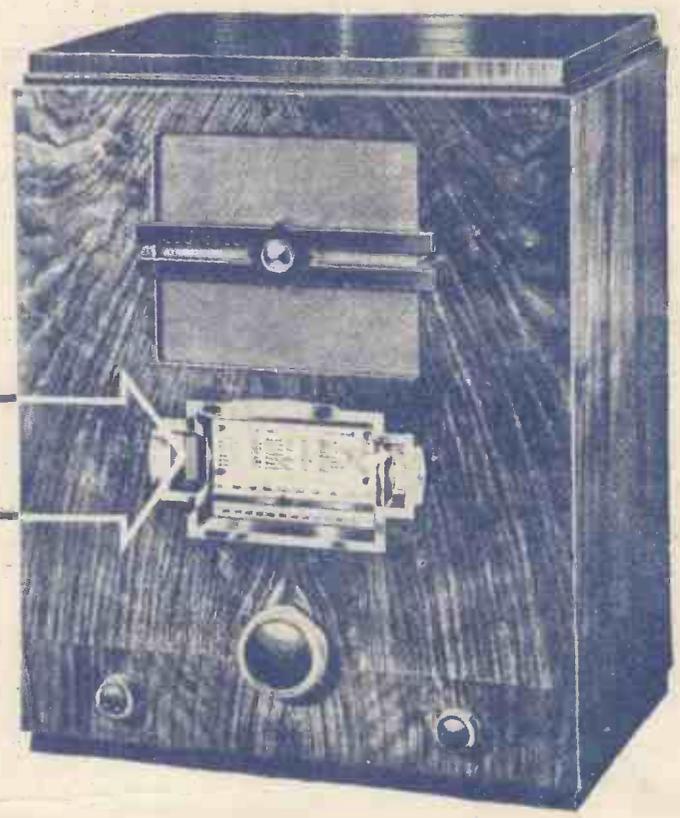


COSSOR

MODEL 535

ALL-ELECTRIC
SUPERHET

with
**NEON
TUNING**



A special compensated circuit is used to eliminate fading from all worth while stations, and is combined with a Cossor Visible Neon Tuning Tube to facilitate accurate tuning and avoid distortion.

ANTI-FADING

The many other advanced features of this remarkable Superhet are fully described in Folder L.120 — send the coupon for your copy.

ABRIDGED SPECIFICATION

All-Electric Superhet Model 535 is equipped with Five Cossor Valves (inc. Rect.); Illuminated Full Vision Scale—Single Knob Tuning—Volume Control with special scale. Tone Control, 8" Energised Moving Coil Loudspeaker. Magnificently finished cabinet, 20" high, 16" wide, 10 1/2" deep. For A.C. Mains only. 200/250 volts (adjustable), 40/100 cycles.

**12
GNS.**

Prices do not apply in I.R.S.

Hire Purchase Terms: 40/- deposit and 12 monthly payments of 20/-.

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

Please send me free of charge, literature giving full particulars of Cossor All-Electric Superhet Model 535.

Name

Address

A.W. 1-12/34

THIS COUPON BRINGS FULL DETAILS

L.120

COSSOR