

TRICKLE CHARGER :: GENERAL-PURPOSE PORTABLE

Amateur Wireless

Every
Thursday 3^d

and
Radiovision

Vol. XXI. No. 527

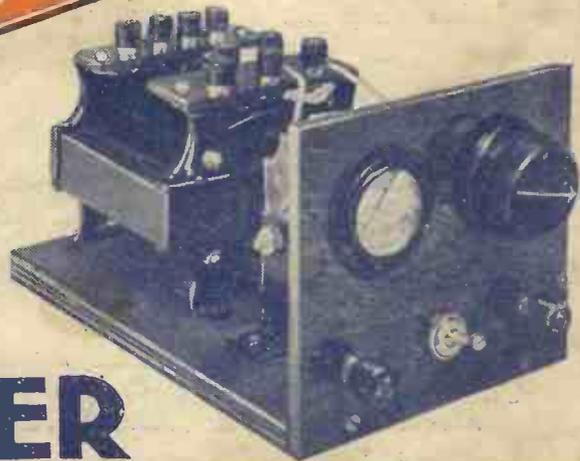
Saturday, July 16, 1932



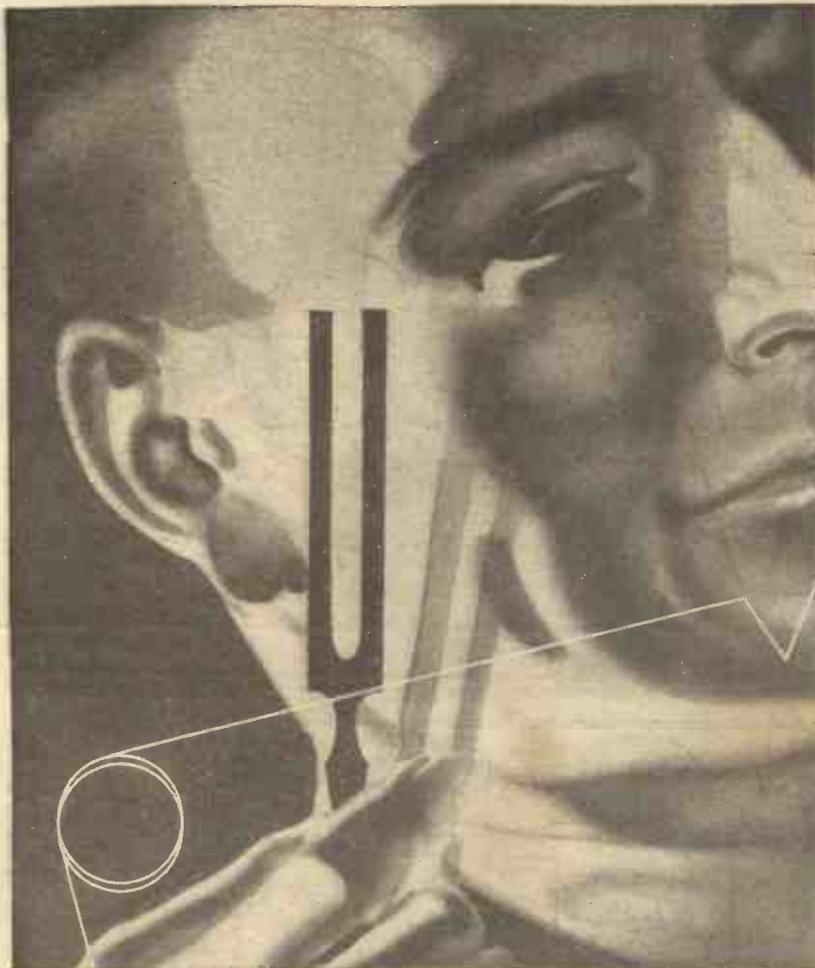
GENERAL-PURPOSE PORTABLE

TWO CONSTRUCTIONAL FEATURES IN THIS ISSUE

SIMPLE BATTERY CHARGER



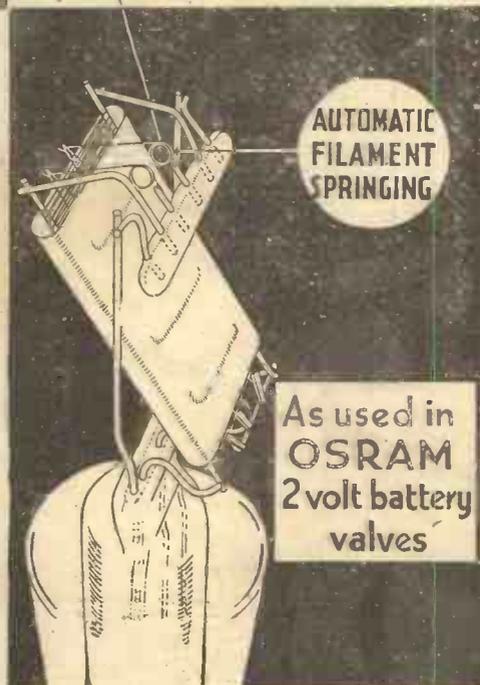
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Amateur Wireless & Radiovision

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

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NEWS & GOSSIP OF THE WEEK

B.B.C.'S NEW SECRET VOICE

TO that select coterie of unknown voices of the microphone will shortly be added the personality hiding under the pseudonym of Francis Iles, author of *Malice Aforethought* and other thrillers. He—or is it she?—will do a broadcast serial during the months of August and September.

THE ROYAL VISIT

The King and Queen at Portland Place

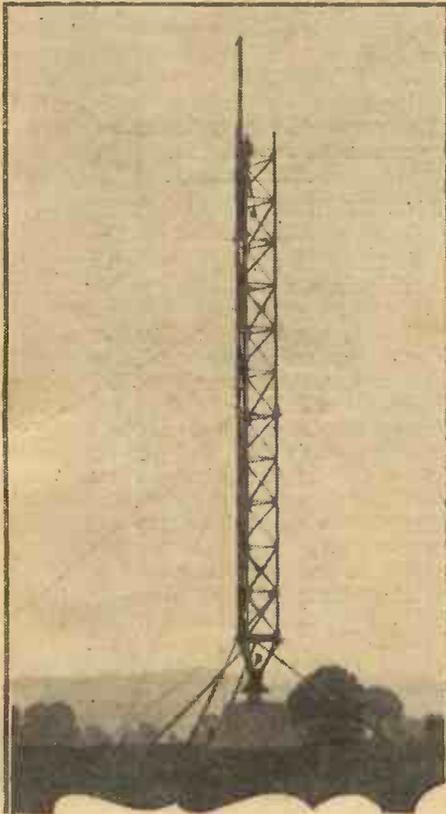
ON Thursday, July 7, the King and Queen and a Royal party visited the B.B.C.'s new home at Portland Place to see the wonders of the Control Tower at Broadcasting House. First came the inspection of the large concert hall, where the whole of the B.B.C. staff was assembled. A great cheer of welcome went up and then the staff sang "God Save the King." The King was especially interested in the Control Room. A special demonstration of the dramatic control panel was staged under the direction of Mr. Val Gielgud. One of the items that gave His Majesty much personal interest was the Blattnerphone record reproduction of a recent speech made by the King at Glasgow. All the effects were demonstrated, including the famous B.B.C. train!

Athlone will be on a par with the strength of Scottish Regional, that is good strength at night, with some fading, but not much, during daylight. The transmitter will have much the same power as London Regional and Beromuenster—about 50 kilowatts. At present it is off the air for the final adjustments and completion of the station building.

IN THE "HAZARD" SERIES

ON July 23, P. C. Wren, the author of the famous "Beau Geste" stories, will come to the microphone to give his talk in the "Hazard" series. The subject will be: "Twenty-four Hours in the Foreign Legion." It should make exciting hearing.

PROGRESS AT WASHFORD CROSS



Work is going ahead at the new West Regional Station—here is one of the 500 ft. masts in the course of erection

CUTTING THE CACKLE!

Fewer Special Service Broadcasts

THOSE who dislike too much talk on the radio will be glad to hear that the B.B.C. has decided to cut down the amount of microphone time previously devoted to some of the special services. The London and New York stock exchange reports are to be discontinued. Fewer regimental re-union announcements will be made. The Parliamentary reports are to be "pepped up" and instead of long verbatim speeches we shall have short and snappy sketches. About time, too!

HOW ATHLONE CAME OVER

FROM recent measurements made by B.B.C. engineers during the tests of the new Irish Free State station at Athlone, an idea of the future range has been gained. Strong signals will certainly be heard in the Isle of Man and in Wales. In London it is expected that the signals from

ADVERTISING THE EMPIRE

PART of the time of the forthcoming Imperial Conference at Ottawa will be devoted to a discussion of the possibilities of making use of the new Empire stations to advertise the Empire's products. It is expected that this new Imperial wireless link will be used as a medium of general trade propaganda and not for the dissemination of sponsored programmes as has been suggested in some quarters.

TELEVISION PLANS

Details of the Sound and Vision Channels

IF possible the B.B.C. will start its new series of television broadcasts on July 20. The apparatus is now being installed at Broadcasting House. A great extension of television activity is indicated by the decision to broadcast four evenings per week, on Mondays, Tuesdays, Wednesdays and Fridays, from 11 to 11.30 p.m. The vision will be on London National and the sound on Midland Regional. These two stations normally shut down during the proposed periods, so there will be ample scope for varying the programme material of the television broadcasts.

NEXT WEEK: THE "MASCOT 2"—A NEW SET BY PERCY W. HARRIS

NEWS & GOSSIP OF THE WEEK —Continued

"THE BROADCASTER"

Eric Gill's Sculpture in "B.H."

AS our representative entered the imposing entrance hall at Broadcasting House the other day he saw Eric Gill putting the finishing touches on the figure erected in the centre to represent "The Broadcaster" pausing in his work of scattering good seed. The day before, according to a commissionaire, workmen had delivered the figure somewhat mysteriously in the usual wrappings, and on being asked who it was one of the men had replied with conviction: "'enery 'all." Which left the commissionaire, like the figure, standing.

LOCKED IN BROADCASTING HOUSE

AN amusing experience befell Henry Hall, the leader of the new B.B.C. dance band, his vocalist Val Rosing, and Noel Gay, the composer, on a recent occasion when all three had stayed rather late in the studio to try over some new numbers. On attempting to get out of Broadcasting House about 12.30 a.m. they found they were locked in. Only by vigorous banging on the massive portals were they able to attract the attention of a passer-by, who rang the night bell and had them released. Usually the last people to leave the building are the engineers of the control room, who get away as soon as Big Ben has chimed out midnight.

NEW VAUDEVILLE PRODUCER

FOLLOWING the resignation of Bertram (Jack) Fryer, the B.B.C. has brought down from Edinburgh Martyn Webster, who will assist the vaudeville department

to produce programmes for Londoners. He has had considerable experience in Edinburgh and Glasgow.

BALANCE AND CONTROL CHANGES

A NEW policy will soon come into operation at Broadcasting House in connection with the engineers responsible for the balance and control of the programmes sent out from the studios in the Control Tower. Until recently there has been a squad of engineers taking over any programme control at will, but in future the engineers will specialise in each type of programme. In this way greater *finesse* will be exercised, with resulting improvement in the light and shade of the broadcasts.

IN THE DEBATES STUDIO

Home Truths From the Talks Department

RECENTLY a group of engineers, anxious to test the "atmosphere" of the Debates Studio at Broadcasting House, asked two or three of the "high-brow" members of "Talks" to carry on an animated discussion as a test. Apparently what the engineers heard on their pilot loud-speaker was not good enough and one of them popped his head in the studio and told them to "get on with it." Still the right idea was not forthcoming, so a senior engineer laid down his slide rule and patiently implored the talks laddies to do their stuff. When the engineer returned to the distant loud-speaker he found the others convulsed with laughter. Apparently as he had left the Debates Studio one Talks man had turned

to the others and remarked: "Well, anyway, he was much more of a gentleman than the last one!"

HENRY HALL'S SINGERS

TO assist Val Rosing, the official vocalist of the new B.B.C. dance orchestra, Henry Hall frequently engages outside vaudeville singers. The recent quartet singing was done by four members of the B.B.C.'s Wireless Chorus. The deep-voiced vocalist who sang "Drums In My Heart" so well the other evening was George Baker, who will frequently be heard in the future.

A MATTER OF TACT

GOOD relations have been established between the B.B.C. and its neighbour, All Souls, Langham Place, by the recent broadcasting of a service by the Reverend Arthur Buxton. This was a tactful move, to say the least of it, when we remember that the chimes of the All Souls' bells are frequently heterodyned by the raucous loud-speaker reproduction of Big Ben from the roof of Broadcasting House!

CONCERT HALL EXPERIMENTS

AFTER the recent Saturday night vaudeville concert from the large Concert Hall at Broadcasting House engineers decided that the experiment of erecting a temporary proscenium had proved a success. Later a trio and soloist were tried out and direct listening tests were carried out to see how this type of broadcast would suit an audience. Surprisingly enough, the studio has been found very successful for the trio.

MORE ELECTRICAL INTERFERENCE

ALTHOUGH complaints of poor reception form a very small proportion of technical correspondence now received by the B.B.C., the number of letters asking for advice on curing electrical interference noises is considered much too high—200 a week. The B.B.C. anticipates that this form of trouble will be on the increase during the next winter, owing to the spread of the grid system and the increasing use of electrical appliances in the home. Listeners are warned to try out these labour-saving devices when the set is on, in order to see whether reception will be spoiled by their installation.

RIDGEWAY'S RETURN

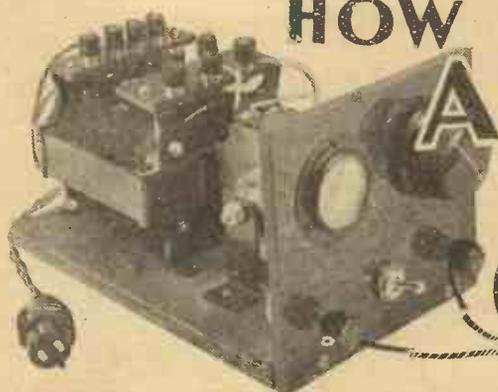
LOOK out for the Ridgeway Parade on July 19 on the National and July 20 on the Regional. Described as a song-and-dance show, the Parade will include excerpts from the stage show that has been on tour during the past five months. The Ridgeway Girls will take part in the show, which will be supported by the B.B.C. Theatre Orchestra, conducted by Leslie Woodgate.

Philip Ridgeway tells us that he is looking forward with great zest to his microphone return. "You will like the show!" he said.



The latest edition of the Baird Televisor makes use of an extended screen, the image having a black-and-white texture; it is a great advance on the machine first put on the market. This photograph shows John L. Baird with his new television receiver, which will shortly be placed on the market

HOW TO MAKE A TRICKLE CHARGER



End your charging worries with this easy-to-make unit which will keep the filament battery in a fully-charged condition and at negligible expense

FOR those using some form of high-tension eliminator on A.C. mains the trickle charger shown by the illustrations will be specially useful. With this simple little unit you can make an end to accumulator charging worries. At negligible cost you can run the accumulator and have the satisfaction of knowing that it is always fully charged.

low voltage with the result that the wattage consumed is very small, being the product of the charging current and the charging voltage—5 or 6 watts at the most.

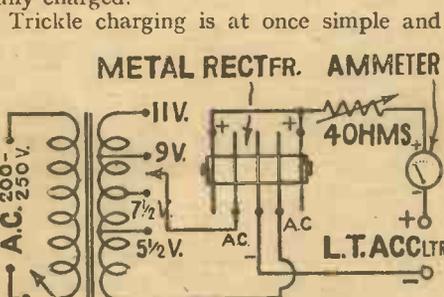
Another advantage of the trickle charger is its foolproof maintenance. It is almost impossible to go wrong once the charger has been installed. When correctly connected to the accumulator the charger may be left connected, even when the mains are switched on. There is no need to disconnect the accumulator from the set every time it has to be charged.

It will be seen that there is a tapped mains transformer suitable for A.C. mains between 200 and 250 volts.

In addition to the tappings on the primary, to make the unit suitable for all the normal mains voltages we have tappings on the secondary winding. These are needed to make the charger useful for 2-, 4-, or 6-volt accumulators.

The Heayberd type W36 transformer has been specially designed to work with the LT2 rectifier and is provided with the

(Continued at foot of next page)



The circuit of the Trickle Charger

inexpensive. Simple because with the modern metal rectifier a minimum of apparatus is required to convert the A.C.-mains current into low-voltage direct current. Inexpensive because the charging current, say .5 ampere, is delivered at

The End of Charging Worries

In general the idea of trickle charging is suggested by the name—you allow a trickle of mains current to keep the accumulator up to the mark, usually by putting on the charger for about the same number of hours as the set is in use.

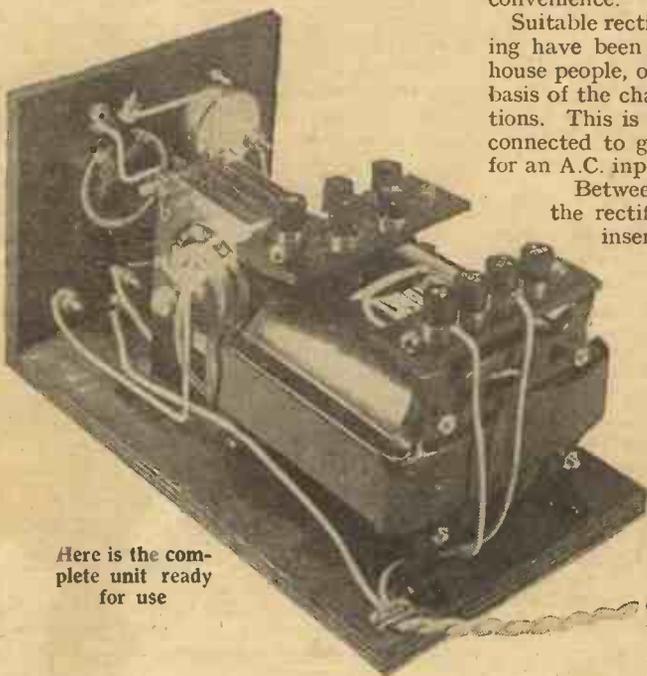
With a .5-ampere charging rate, as in this charger, you put into the accumulator in one hour about the same amount of energy that is taken out by an hour's total filament current consumption. The charger can either be put on for a few hours every night or left on all night for two or three nights a week—it is purely a matter of convenience.

Suitable rectifiers for accumulator charging have been produced by the Westinghouse people, one of whose units forms the basis of the charger shown by the illustrations. This is type LT2, which is bridge-connected to give a direct-current output for an A.C. input.

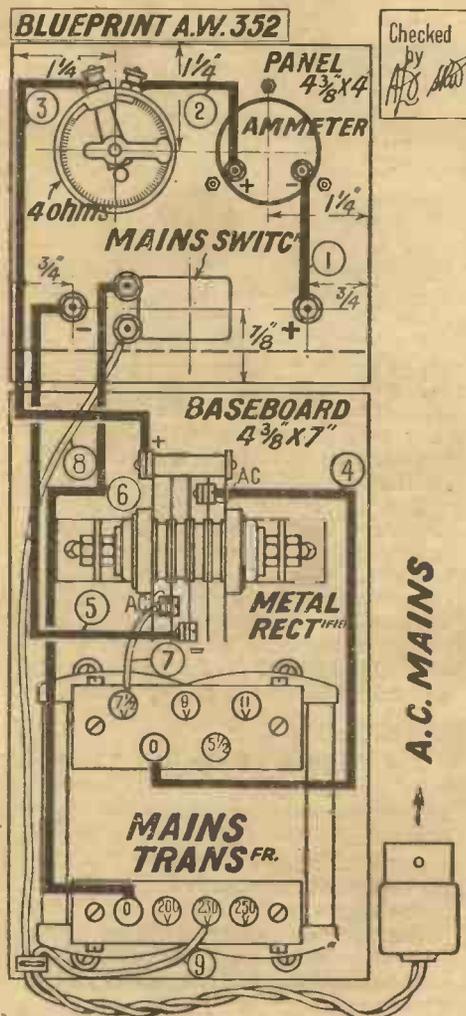
Between the input terminals of the rectifier and the mains must be inserted a transformer, otherwise the rectifier will be heavily overloaded.

Between the D.C. output terminals of the rectifier and the battery being charged must be connected a ballast resistance, the value of which is stipulated by the makers.

Apart from these simple points there is nothing in the design of a charger likely to cause the amateur any trouble. The charger we have produced has the circuit shown by the diagram.



Here is the complete unit ready for use



The layout and wiring diagram. A full-size blueprint is available, price 1/-

WHAT IT IS FOR

LOW-FREQUENCY DE-COUPLING

THE idea behind de-coupling, as applied, for example, to the anode circuit of the detector, is to prevent the common impedance of the high-tension power supply, which may be a battery or a mains unit, from forming a coupling between one valve stage and another.

A voltage will develop across any impedance such as a high-tension battery. So it is quite possible for a voltage developed in the later stages of the set to be handed back to the earlier stages by battery-impedance coupling, with resulting instability and distortion.

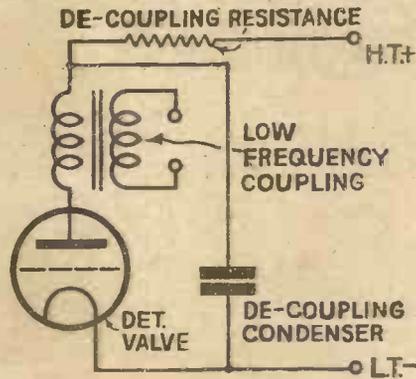
To prevent this form of undesirable coupling we usually connect a fixed resistance in series with the low-frequency impedance—anode resistance or primary winding.

This fixed resistance will offer an impedance to the passage of low-frequency current but we must offer it an alternative path. We connect a fixed condenser of low impedance between the junction of the anode impedances and earth.

The impedance of the de-coupling resistance must be high with respect to two other points, one being the power-supply impedance and the other the by-pass condenser impedance. We must not make the resistance of the de-

coupling component any higher than is necessary, otherwise undue high-tension anode voltage will be dropped across it.

How, then, do we arrive at a suitable value for the resistance? In this way:



This diagram show' the main essentials of low-frequency de-coupling. As explained in the text, the values of the resistance and condenser must be carefully chosen to conform with impedance requirements

we first of all determine what capacity condenser will effectively pass all the low frequencies with which the amplifier is capable of dealing. Then we find out what the impedance of the condenser is

at the lowest frequency and choose a resistance having an impedance of at least ten times that of the condenser.

An example will help. A 1-microfarad condenser has an impedance of 3,200 ohms at a frequency of 50 cycles, which is as low as most amplifiers and loud-speakers will go. A suitable de-coupling resistance would be one between 30,000 and 40,000 ohms.

If this resistance were too high for the anode voltage requirements we could arrange for a lower anode voltage drop by using a condenser of a lower impedance. A 2-microfarad condenser has an impedance of only 1,600 ohms at 50 cycles: With this a de-coupling resistance of 20,000 ohms would be quite suitable, with the advantage of a smaller voltage drop across it.

Where a high anode voltage is essential, as with power-grid detection, it pays to use a large de-coupling condenser, since this enables a smaller value of de-coupling resistance to be used.

The above considerations show how important it is to follow a designer's circuit values. Often, as with de-coupling, there are several conflicting points that finally determine the value chosen.

HOTSPOT.

"HOW TO MAKE A BATTERY CHARGER"

(Continued from preceding page)

correct secondary voltage tapplings for the different voltage accumulators. The only point is that the correct secondary terminals must be connected up before attempting to charge an accumulator.

The makers suggest a fixed ballast resistance in series with the tapped secondary and the accumulator, but for convenience we have used a variable 4-ohm resistance.

The importance of having the correct secondary voltage is twofold. Firstly, we have to make sure that the charging voltage is greater than the back voltage of the accumulator being charged. Secondly, we have to choose a voltage that will enable the charging rate of .5 ampere to be maintained for the different voltages of the accumulators, that is 2, 4 or 6 volts.

The Charging Rate

The function of the variable ballast resistance is to adjust the charging current to the correct rate so as to make up for any slight variations in the input voltage from the mains. It does not matter much about under-charging, but it is important not to over-charge.

Because this matter of charging rate is rather important we have included in the unit a simple Bulgin ammeter reading from 0 to 1 ampere.

The practical layout of the charger can easily be followed from the illustrations. The great point to note is that the rectifier

is vertically mounted to give it as much air cooling as possible.

The transformer and rectifier are mounted on a small wooden base, with an ebonite panel to carry the variable resistance, ammeter, mains on-off switch and accumulator.

Wiring

Care should be taken when wiring up the charger. This work can be done with insulated tinned-copper wire although it is convenient to make the mains input connections of flex, this wire also being useful for the variable secondary voltage tapping. Note that the mains switch is connected in series with the primary of the transformer and the mains leads.

The rectifier's A.C. input and D.C. output terminal tags are clearly marked, the only point being to make sure the positive and negative tags are connected

to their correct panel terminals.

The ballast resistance, ammeter and accumulator are connected in series across the D.C. output of the rectifier. And that completes the job. As it is advisable to give the charger plenty of air the covering might well be of perforated metal.

In operation the charger is entirely fool-proof. All you have to do is to connect the secondary flex under the appropriate terminal for the 2-, 4-, or 6-volt accumulator and then, having switched on the mains, move the ballast-resistance knob on the panel until a charging rate of .5 ampere is registered on the meter.

The route used for relaying the speeches of Prince George and other eminent people on Dominion Day was from the Savoy Hotel by means of local broadcasting circuits to Broadcasting House and from there to the Radio Terminal of the General Post Office Trunk Exchange. Thence the circuit passed to Rugby Radio Station for short-wave transmission to the Yamachichi receiving station of the Canadian Marconi Company, near Montreal.

At the National Radio Exhibition which opens at Olympia on August 19, the B.B.C. will be represented by some specially interesting exhibits. One which is certain to attract wide attention is a model of Broadcasting House, the new headquarters of broadcasting in Britain. The organisers of the exhibition are arranging for fifty miniature theatres, all sound-proof, in which manufacturers can demonstrate their sets.

COMPONENTS REQUIRED

- Ebonite panel, 4½ in. by 4 in. (Lissen, Peto-Scott).
- Baseboard, 4½ in. by 7 in. (Camco, Peto-Scott).
- Mains transformer (Heayberd, type W.36).
- Metal rectifier (Westinghouse type L.T.2).
- 4-ohm variable resistance (Colvern type E.R.).
- 0-1 Ammeter (Bulgin type D.M.5).
- Single-pole toggle switch (Agranic, Bulgin, Ormond, Claude Lyons).
- Two terminals, marked L.T.+ , L.T.- (Belling-Lee Elex, Clix, Bulgin).
- Connecting wire and sleeving (Lewcos, Jiffilix, Quickwire).
- Length twin flex (Lewcos).
- Mains plug (Bulgin, Goltone).

Here are the technical details of the experimental ultra-short wave transmissions now being



made by the B.B.C. with the Marconi plant at the top of Broadcasting House in London.

THE B.B.C. ON SEVEN METRES

BROADCASTS are now being made at intervals with the 7.5 metre transmitter at the top of Broadcasting House, so it is time to get out your ultra-short wave sets and pick up the B.B.C. transmissions! This is the first time that the B.B.C. engineers have experimented with ultra-short wave transmissions, and it is anticipated that the field in this direction may be considerably extended.

Now that the first transmissions are "on the air" there is no point in keeping the technical details secret. Moreover, "A.W." readers will want to know the power and wavelength range of the new gear so that they can make use of single-valve ultra-short wavers or super-het. adaptors.

The gear, which the B.B.C. is using can tune from 6 to 8.5 metres and the 7.5-metre transmission is the most general one.

An input of 1.2-kilowatts to the final amplifier stage has been allowed for. This is a relatively high power, so far as ultra-short-wave transmissions are concerned.

The engineers find it very difficult to measure accurately the H.F. power output in the aerial, but they know that it is something in the nature of 300-watts.

between the two 35-ft. masts on the roof. These are steel masts, but it is found that no damping is caused. Two half-wave aerials are used.

Critics have maintained that Broad-



For ultra-short wavelength transmissions only the "OPTICAL" range can be used and this photograph taken from the roof of Broadcasting House gives some idea of what this will be in one direction

When Broadcasting House was first opened, the copper aerial lead containers had been fixed on the roof and arrangements were then being made for the transmitter panels to be installed.

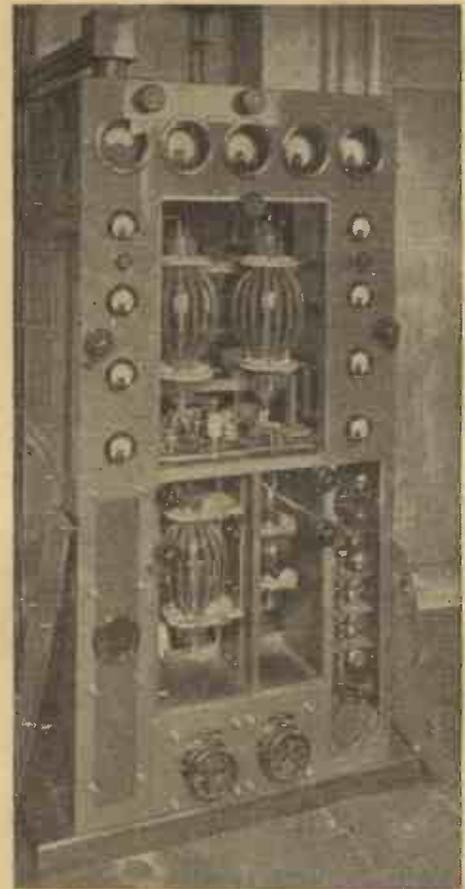
The 7-metre Transmitter

The transmitter itself is in the room immediately beneath the Clock Tower of Broadcasting House, that is on the seventh floor. There are four panels, one being the rectifier for the power supply from the mains, the second an auxiliary rectifier, the third the modulator, and the fourth the oscillator.

The 450-volt A.C. mains supply provides the "juice" for the transmitter. This is stepped up by a power transformer and rectified by three valves. The actual H.T. supply on the short-waver is about 4,000 volts. Care is taken to keep the voltage absolutely constant. There is, as a matter of fact, an induction regulator. Voltage variation would cause fading.

Many amateurs have wondered how it is possible to work a transmitter constantly and with accuracy on such a short wavelength as 7.5 metres. A master oscillator valve of the Franklin type is used to keep the transmitter steady. This is worked at what—if it were a transmitter—would be a wavelength of 139.5 metres. Frequency doublers and amplifiers are connected up to this, which pick up various harmonics, 46.5, 15.5 and 7.75 metres. All these circuits can be retuned so that the B.B.C. can broadcast on any wavelength between the limits of 6 and 8.5 metres.

The Franklin type aerial is supported



The 7-metre transmitter which has been installed at Broadcasting House

casting House is not an ideal centre for the short-wave transmissions as the optical range is limited. A B.B.C. official says that the normal optical range extends to about Hampstead, the Crystal Palace, the Tower of London and Kensington, in the north, south, east and west directions respectively.

PERCY W. HARRIS ON—

STRANGE FAULTS, AND HOW TO CURE THEM

NOTHING is more annoying than to find after several evenings' hard work that a new receiver is, to use a popular expression, "not a patch on the old one." You would not mind so much if you got no signals at all, for then you would be sure that something was wrong, and that sooner or later you would find the fault. The real worry is when you get signals which are poor in quality, selectivity, or strength, or perhaps in all three.

In an experience spread over many years I have met a number of such cases, and in curing them have discovered all kinds of strange and unexpected faults. Some of the most interesting have been where really big mistakes in wiring up have been made, and where, on inspection, any expert would be prepared to swear that nothing could come through. And yet results have been such that the builder has been inclined to believe that everything was all right. I remember one case, for example, where a reader was getting quite good results although he had entirely forgotten to wire up the filament circuit of the high-frequency valve! This was in pre-screen-grid days when oscillation was prevented by a neutralising circuit. In this case I recognised the symptoms at

once, as actually the signals could be conveyed from the aerial circuit to the detector circuit by way of the unbalanced capacity between the grid and plate of the H.F. valve.

A Puzzling Case

One of the most puzzling cases I came across, however, arose from a number of faulty valve-holders in which the plate and grid terminals were connected to the filament socket and vice versa. You can have quite an interesting time in drawing out the circuit to see what will happen when you switch on in these circumstances. On another occasion, after trying to assist a reader through the post he sent me the cause of his trouble—a valve (of foreign manufacture) in which the plate and grid connections had been reversed.

Cases such as the above are in the nature of freaks and occur so rarely as to be negligible. There are, however, one or two faults which occur fairly regularly and are generally among the chief causes of trouble in the cases of those sets where, as I have said, you get signals which are poor. A very large number of faults in wireless sets are due to bad contact, and because many home constructors do not realise just

what happens at a bad contact, they often think there is nothing wrong with the connection. To understand the position remember first of all that wireless signals can be conveyed through a set conductively—that is to say, by direct contact between two conductors—inductively, by means of a magnetic field across the space between the conductors—and capacitatively, by an electrostatic field between two conductors. If you take a loop of clean wire and screw it underneath a clean terminal you will get a satisfactory joint, the resistance at the contact being negligible. We will imagine the lead in question goes from the top of a tuning coil to the grid of a valve, and if everything else in the circuit is satisfactory you will get good signals.

Effect of Poor Contact

Let us now see what will happen if you have not a clean wire and if you do not screw it firmly underneath the clean

terminal. Let us imagine you are using ordinary bell wire, for example, which has a cotton covering, and often on the surface of the wire itself a very thin skin of semi-transparent rubber. We will assume that you have removed the cotton covering but have not noticed the presence of this thin rubber. With a pair of pliers you bend a loop and then screw this loop underneath the terminal. Again we assume everything else in the set is right, and you switch on. Although the wire is completely insulated from the terminal you will probably get good signals from the local station, although they will be by no means up to the strength you ought to get. "How is this?" you will say. "If the wire is insulated from the terminal how can any signals get through?"

A Small Condenser

The answer is that you have made a very neat, if small, condenser in series with the grid of the valve, consisting of the loop of wire as one plate, the terminal as the other, and the thin rubber as the dielectric. The capacity will be very small, but not by any means too small to pass a radio-frequency signal.

If the rubber is good rubber of high insulation the grid will now be isolated from the filament (or cathode in the case of a mains valve) and after receiving speech or music for a short time the valve will "pack up" or choke, giving a kind of strangled signal due to the accumulation of a negative charge on the grid.

Other Capacity Effects

It is only in grid connections of a valve that this fault can happen, for if you make such a connection to the plate circuit, no high-tension current will flow through the valve and similarly in the filament circuit the insulation will stop the current. Signals will still come through, however, if you have a connection of this kind from the aerial to a tuning coil, and with most of the tuning coil connections. A similar capacitative connection is sometimes found in a badly-soldered set where the constructor has used the soldering iron just hot enough to melt the solder but not sufficiently hot to tin the lug and make a good connection. Inexperienced solderers sometimes try to make up for lack of heat in the iron by the superfluity of flux which often consists of an insulating jelly with which have been mixed certain chemicals. What is thought to be a soldered contact is sometimes a large blob of solder on the end of a wire, this blob being separated from the lug by a layer of soldering flux acting as an insulator and therefore as a dielectric in a small condenser.

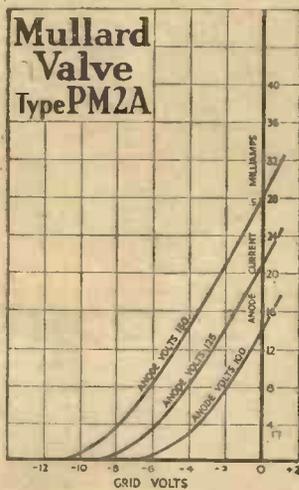
Always check up all of your connections carefully. Remember that the grid circuit of a valve is operated by very small charges of voltage and often signals will come through a sensitive set not merely with a bad contact between the wire which is supposed to join the grid terminal of the coil and the grid itself, but even when this wire is as much as an inch away from the valve terminal! It is for just such reasons as this that those of us who design sets take a great deal of care in the disposition of our leads, and always try to impress upon the reader the importance of following exactly the method of wiring shown.



Miss Dorothy Ward, the popular actress, with her Marconiphone Autogram—a six-valve super-het instrument



IT IS MOST REMARKABLE . . .



OPERATING DATA

- Max. Filament Voltage - 2.0 volts
- Filament Current - 0.2 amp.
- Max. Anode Voltage - 150 volts

Characteristics

- (At Anode Volts 100; Grid Volts Zero)
- Anode Impedance - 3,500 ohms
 - Amplification Factor - 12.5
 - Mutual Conductance - 3.5mA/volt

Remarkable for its tremendous popularity, remarkable for its performance, remarkable for its economy in consumption.

The P.M.2A power valve is designed for use in 2-valve and 3-valve receivers with one L.F. stage, and gives excellent volume for the average-sized room.

Price 8/9d.

MADE IN ENGLAND

The following Mullard valves are specified for the General-purpose Portable, described in this issue: one PM12, one PM1HF, one PM1HL, one PM2A. The following rectifying valve is specified for the Percy Harris Mains Unit, described in the issue of July 2: one DW2.

Mullard

THE MASTER VALVE

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

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

ACCURACY GUARANTEED TO

$\frac{1}{2}$ m.m.f. \pm $\frac{1}{2}$ per cent.

British Radiophone ganged Condensers are used by discerning amateurs and Set designers in preference to all others because of their extreme accuracy—the trimmers being first adjusted, our guarantee is for a maximum error of $\frac{1}{2}$ m.m.f. \pm $\frac{1}{2}$ per cent.

This unequalled precision is achieved by virtue of sound mechanical construction which maintains the electrical characteristics at fixed values under the most exacting conditions.

Built up from sheet steel and treated with a special anti-corrosive medium, the cases resist all tendency to distort or rust—an important factor where high and lasting accuracy is concerned.

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The values of British Radiophone Ganged Condensers are as follows:—

Minimum Capacity	26 m.m.f.
Total variation of trimmers	60 m.m.f.
Total variation in capacity	500 m.m.f.

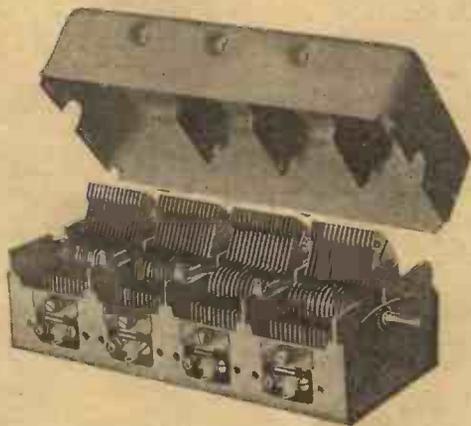
The maximum capacity is therefore greater than 500 m.m.f. according to the amount of minimum capacity introduced, ensuring knife-edge selectivity.

PRICES:

- 2-Gang Condenser, 15/-; Dustproof Metal Cover, 2/6
- 3-Gang Condenser, 25/-; Dustproof Metal Cover, 3/-
- 4-Gang Condenser, 30/-; Dustproof Metal Cover, 3/6
- Drum Drive, 8/6.

Oxidised silver escutcheon and drive assembly, complete with pilot lamp attachment, 5/-.

Write for details.



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THE BRITISH RADIOPHONE LTD. Aldwych House, Aldwych, W.C.2.

Now! for your BENJAMIN TRANSFEEDA!



11s. 6d.



Write for This

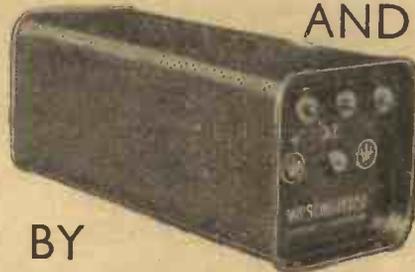
Wherever an L.F. Transformer can be fitted a Benjamin Transfeeda will give you what you have been looking for—wonderfully pure and powerful reproduction with a uniform response throughout the audible scale right down to the deepest bass. The Transfeeda will be the making of your receiver giving you luxury transformer results for the modest price of 11/6.

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H.T.

AND



L.T.

BY

METAL RECTIFICATION

How much better would you enjoy your wireless if you could dispense with the troubles and expense of accumulator charging and battery renewals?

With the advent of the new WESTINGHOUSE METAL RECTIFIERS, it is now possible to convert your present battery set to mains operation by means of an eliminator for the H.T. and a trickle charger for the L.T. supply. And . . . the initial cost is very low—less, in fact, than you would normally spend on renewals and charging during a year.

Take the first step towards the removal of your wireless troubles by sending for "The All-metal Way" NOW. It costs only 3d., and contains a mine of information on mains working.

COUPON

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Please send me a copy of your booklet, "The All-Metal Way," for which I enclose 3d. in stamps.

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ADDRESS

A.W. 16/7/32

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

On Your Wavelength!

NEW SEASON'S GOODS

OWING to the early date of this year's Wireless Exhibition, some of next season's goods are already making their appearance on my test bench, though 1932 is only just half over. They are not yet, of course, available for the public to purchase, and most of them won't be until the Exhibition. Those that have come my way are mostly very attractive. I haven't yet seen anything spectacular in the way of inventions, and I don't think that we are going to have anything revolutionary in the way of circuits or parts—no sensations, I mean, like the screen-grid valve and the pentode, each of which astonished the world of wireless in its season. But it is going to be a year of good components and of remarkable efficiency.

THE NEW SETS

THIS year our set manufacturers seem to have been competing with each other to be first out with next season's sets. The result is that several of our largest concerns have already announced their new lines and many of the new sets are actually on the market.

As I anticipated there is nothing very startling but the detailed improvements on existing technique are nevertheless important. For example, the widespread adoption of the variable- μ valve in the screen-grid stages must mean great improvements not merely in selectivity but in control of volume.

Probably the most important development of the coming season will be the super-het., which seems likely to become the standard type of multi-valver of the de-luxe console type. Such sets will be a boon to those suffering—and who will not be suffering?—from intense foreign-station jamming. Provided the price can be brought down to the means of the man in the street next season may well be known as the super-het. year.

TAKING IT KNEELING DOWN

ONE or two firms pay me the compliment of sending me, in what we may call soap-box form, preliminary models of their new season's sets asking for candid criticism. Sometimes a designer is so taken up with the circuits and general appearance of his set that he quite forgets about the fellow (or lass) who will have to operate it. Here is a queer instance. The other day I was asked to cast my critical eye over the first model of a big pedestal radiogram. Before asking for any demonstration of sensitiveness, selectivity, and quality—all of these were found subsequently to be excellent—I said to the proud designer, who was standing beside me, fondly surveying his beautiful set: "Would you mind just going across to

the set and tuning it to 261 metres or any other wavelength you like?" Rather puzzled, he went over and proceeded to make the required movement of the single knob. Then, looking round with a smile, he remarked: "That was a simple enough business, anyhow." I asked him not to move, but just to take careful note of exactly what his position was. Actually he was kneeling (very much kneeling) on the carpet. The control knobs have been so placed that it was impossible to tune the set without assuming an undignified position!

WHAT'S YOUR VIEW?

THE position of the tuning controls is one of the problems in pedestal sets, whether radiograms or purely wireless receivers. I always think that the best place for them is under the lid, but many feel that they should be at the front of the cabinet and near the top; you can then tune either sitting in a chair or standing up. I am quite sure, though, that they should not be placed half way down the front of the cabinet or quite near the bottom, as is too often done, for there is simply no way of getting at them in any position that is at all comfortable. Certainly they should not be lower than the height of the average table top.

ASKING FOR IT?

IN these columns I showed recently how limited the market for big mains sets must necessarily be and said what a pity it was that nobody ever thought of making a large and economical set for the man who must use batteries. I am wondering whether our manufacturers have not gone slightly mains mad, for of the new season's set programmes that I have seen most seem to contain a positive spate of mains sets of all kinds and sizes, whereas I have not yet come across anything bigger than a four-valve battery set and very few with more than three valves. It seems to me that unless the manufacturers realise that the market for mains sets is not the only one, they are in real danger of over-producing, on the one hand, and under-producing, on the other. And I would beg them to remember that there are at least two big sets for battery operation of American make which are stated to have been designed specially for the European market. Both of these are eight-valve super-hets, and it would be a pity if they swept the board because we had no home-produced sets in the same class.

A WORD VERY MUCH IN SEASON

HOT weather is thirsty weather, not for the wireless man only, but for his accumulator H.T.B. Don't forget that irreparable damage can be done in a very short time if you let the electrolyte sink below the tops of the plates. Small accumulator cells hold so

little liquid that it doesn't take long for this to happen in hot weather if you don't keep an eye on them. Buy a bottle of distilled water and purchase at the same time what is known as a pipette. This is simply a glorified fountain-pen filler and it is by far the handiest thing to use for topping-up purposes. If you try to pour the water in you will find that it immediately forms a bubble across the orifice of the cell, which eventually prevents anything from going in. Owing to their larger size, filament batteries are not so prone to lose undue amounts of electrolyte through evaporation; still, they should be looked at every now and then in summer time.

A MOVING-COIL YEAR

THIS is going to be a moving-coil year, for there is sure to be a tremendous run on the moderately priced but very satisfactory instruments of this kind that have been brought out. The M.C. loud-speaker could never have achieved wide popularity had it not been for the development of the permanent-magnet type. Only those with suitable electric-lighting mains could operate economically the instruments requiring energising current. I have had several battery models, but found all of them too expensive to run. On the average, they needed for really good quality a good three-quarters of an ampere at 6 volts! This means $4\frac{1}{2}$ watts, and it seems rather fierce to have to put this into the magnets alone for a total output of half a watt or so. Equally absurd, too, was the fact that the speaker required more accumulator current than did the combined filaments of the set. The permanent-magnet instrument costs exactly nothing to run, since it needs no energising current at all. Early P.M. models were not too satisfactory, owing to the very small volume that they could handle. This year's, though, will deal faithfully with all the volume that you are likely to want.

WATCH YOUR WATCH

YOU can best realise the strength of the permanent magnet of a good loud-speaker by laying a screwdriver on the palm of your open hand and moving its point slowly towards the middle of the magnet at the back. You may be surprised to find how big a distance it will jump. Incidentally, you can kill two birds with one stone in this way, for you will very rapidly magnetise the screwdriver and enable it to hold steel screws firmly when you are putting them into awkward corners. Beware, though, of bringing a wrist or other watch too close to the magnet. Unless it happens to be of magnet-proof type, you can easily make a mess of it by magnetising the springs, spindles and other steel parts. What's that? Oh, yes; I have done it.

On Your Wavelength! (continued)

GREASING THE WHEELS

DON'T neglect your gramophone or radiogram motor, whether it is of the electric or of the clockwork kind. Many people, I find, regard these motors as things which require no attention at all. They let the poor things run as long as they like without ever giving them so much as a spot of oil. They don't require a great deal, it is true, nor do they need it very often; but it does pay every now and then to cast an eye over the motor and to apply a little oil to the pinions and the governor. Be on the look out for those bits of fluff (goodness knows where they come from or how they get there) which seem to have an uncanny way of insinuating themselves into the best-fitting cabinets and, once there, of attaching themselves with a loving embrace to the works of motors. The best lubricant for gramophone and radio-gram motors is sewing-machine oil of high quality.

TELEVISION AGAIN

THE latest demonstration by the Baird people has re-awakened interest in television. I hope I shall not be considered unkind if I suggest that such was the intention! I mean, while progress must apparently be very slow, it is necessary to give the public an occasional reminder that television is coming, be it ever so far away.

This time I think there has been a real advance. For one thing the picture is much bigger. More important the tone is very much better, the images being in black and white.

Added to the success of this demonstration is the increased activity on the part of the B.B.C. It is significant of the new importance that is being attached to television at Portland Place that television broadcasts are shortly to be given four evenings a week.

What is not so generally understood is that these broadcasts are being conducted entirely by the B.B.C. engineers. Correctly described, these should be called B.B.C. television broadcasts—by the Baird process. This procedure is not a mere quibble, for it means that the B.B.C. is open to

try, if not immediately to broadcast, any other system of television that may happen along.

Some sort of guarantee to purchasers of the Baird apparatus is obviously only fair and the B.B.C. has made quite a long-term promise to stand by the Baird system of television transmission. No one can pretend that the present owners of Baird "televisors" enjoy anything like a television service, so that if at some future time a really foolproof television system were developed and made commercially practicable it is not likely that existing apparatus would get a great deal of consideration.

Meanwhile the main hope of television seems to rest in short-wave transmission around the 7-metre band. The 1¼-kilowatt transmitter is now testing on top of Broadcasting House and there is no knowing when the B.B.C. may attempt to broadcast its television on 7 metres. Real success in this direction would mean a considerable speeding up of a nation-wide participation in television because the cost and maintenance of these ultra-short wave stations is quite small. Moreover, the service area of each such station is limited to about 12 miles, so there would be no interference.

PICK-UPS AND BASS

PROBABLY you know that the grooves on a gramophone record do not form quite a truly proportioned portrait of the sounds made in the studio. The trouble is mainly with the deep notes, which would require grooves of comparatively enormous width to record them at their full value. The well-designed pick-up acts as an automatic corrector. It is so made that it has a much greater response to low frequencies than to high. If the balance is just right it is able to play records *via* the valves and the loud-speaker in such a way that the bass comes out at its proper strength. Tastes in the matter of bass vary very considerably. Some people like an extra large share, whilst others prefer to have hardly any at all. Remember, when you are choosing a pick-up, that there are patterns on the market to

suit every taste. Hear several of different makes tried—or, better still, arrange for a demonstration with your own set—and you will find one which just suits your own preferences in the matter.

AN INTERESTING COMPETITION

I WAS an interested spectator a week or two ago at the annual direction-finding competition of the Golders Green Radio Society. This event seems to grow more popular each year and there were ten or a dozen teams competing. The usual stunt, of course, is the location of a hidden transmitter, but this year as a variant the transmitter was made mobile for part of the tests and the various reception teams, who were all assigned their positions beforehand, took bearings on the transmitter at three distinct times, the location being different each time. Finally, more to collect the troops for tea than anything else, the transmitter parked itself in a convenient field near Shenley and the various teams set out to locate it and track it to its lair in the best style.

A SUGGESTION TO WIRELESS CLUBS

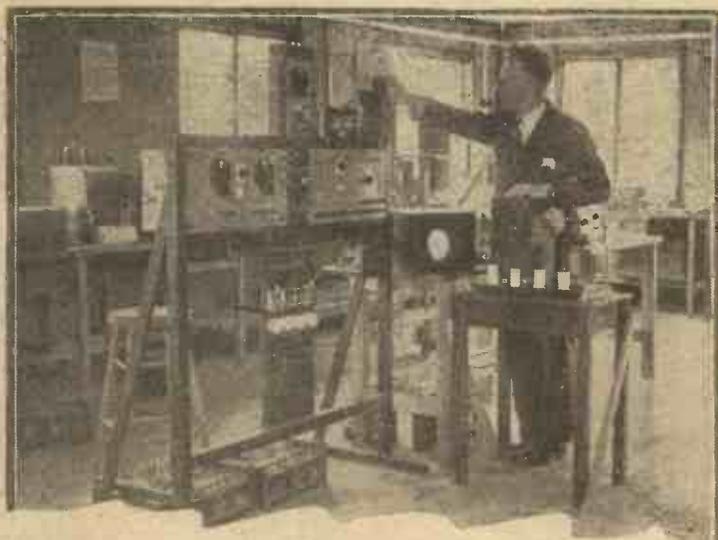
I WATCHED the group of judges, one of whom was our Technical Editor, busy with compasses and protractors, finding out the error between the observed bearing and the true position. Incidentally, this error proved very small in the majority of cases, many bearings being accurate to one degree. Considering that the gear used was all amateur constructed this is very good. All the equipment seemed to be thoroughly up-to-date, screened frames being in evidence on practically all the sets. The receivers varied from a detector, using an old Cosmos Blue Spot, followed by two note mags, to screen-grid threes of the latest design. One is bound to say that both types of set were successful in locating the transmitter. All told, I found the afternoon much more enjoyable than I had anticipated. Direction-finding is a simple hobby and one which is worthy of more attention by the keen amateur.

PERSONALITIES IN THE WEEK'S PROGRAMMES



ON THE TRACK OF THOSE RADIO ECHOES

How an intensive year's study of the upper layers of the atmosphere will be carried out at Tromso, in the Arctic Circle, is explained in this interesting article by ALAN HUNTER



MOST wireless amateurs have heard of the layer of ionised atmosphere that reflects wireless waves shot upwards from the transmitter. Rightly named this is the Kennelly-Heaviside layer jointly discovered by Oliver Heaviside in England and Kennelly in America. These two scientists had their theory confirmed when Professor Appleton, working with the Radio Research Board at Slough, proved the existence of the layer beyond all dispute.

Not only did Professor Appleton determine that the Kennelly-Heaviside layer existed at about 60 miles above the surface of the earth, but also that a second layer existed some 150 miles high. Further experiments have now shown that wireless waves below 100 metres tend to be reflected by the upper layer after passing through the lower layer, while waves above 100 metres are reflected by the lower layer and never get any higher.

At short distances, such as in the service area of a broadcasting station, we are not concerned with reflected rays from the upper atmosphere, because the energy is received by the direct or ground ray. For long-distance transmission, especially on short waves, we are very definitely at the mercy of the reflected rays.

Special Lines of Inquiry

Because of this it is obviously of great interest to determine just how wireless waves are reflected and under what conditions the maximum reflection takes place. As is fairly well known, the reflecting effect is produced by ionisation of the upper atmosphere. Under the influence of electric and magnetic forces a considerable quantity of free electrons are created.

What causes these ionised layers has not exactly been determined as yet, but

it is thought that one layer is due to the effect of ultra-violet light and the other layer to small particles or corpuscles shot off by the sun.

An expedition will shortly leave for the Arctic Circle to advance our knowledge of these reflecting layers, these experiments being a part of a very extensive international scientific effort to be spread over a period of time known as the "second polar international year" which means 13 months as from August Bank Holiday.

The exact location of the expedition will be at the Norwegian town of Tromso, to which point Professor Appleton and his party sailed from Newcastle on July 9.

During a recent visit to the Radio Research Board's laboratories at Slough I had a chat with the station's superintendent, Mr. R. A. Watson Watt, who has

knowledge of the 'ionosphere' with the aid of what we have called a radio polarimeter," explained Mr. Watt.

"The first object of the expedition is to measure the heights of the two regions. With our apparatus we hope to measure also the electron density per cubic centimetre—to measure how many electrons are present in a thimbleful of air at these regions."

I asked how these long-distance measurements could possibly be made with an earth-bound receiver. Mr. Watt clearly explained the scheme.

"The way we measure the effect on wireless waves of these upper regions is rather interesting. First we send out a signal from a transmitter. We then receive the direct ray and also all the other rays that have been up and down through the ionised regions. We are able to measure the time taken *en route* and thereby to determine how far the various up-and-down rays have travelled."

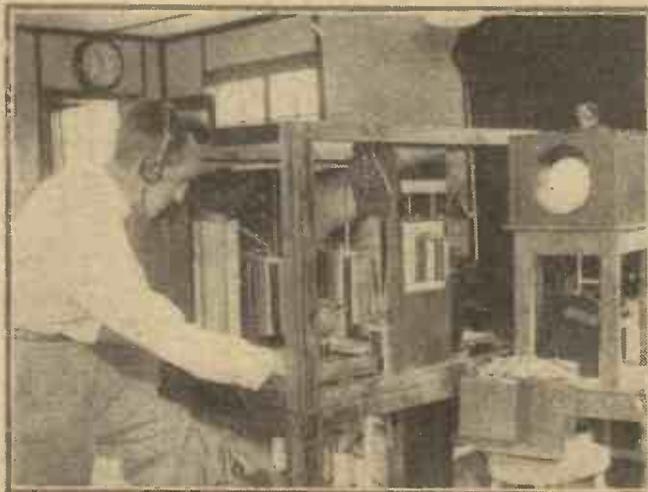
The Apparatus Used

For the Radio Board's experiments the main receiving station will be located at Tromso and the transmitter will be 12 miles away at Simavik, where the power for the town of Tromso is generated.

At Slough I saw the apparatus that is to be taken out for these Polar experiments. The main receiver is a super-het, but instead of a loud-speaker there is a cathode-ray oscillograph. This instrument makes use of a fine beam, or jet, of electrons, producing on a white screen a bright trace of light.

As demonstrated to me the beam of light was turned into a circle retracing its path every fiftieth of a second. Various signals were tuned in and it was possible to see the effect of wireless echoes—rays arriving perceptibly later than the direct ray—as noted by sharp deviations in the circumference of the circle of light.

In addition to the apparatus being taken out to Tromso for scientific purposes the expedition will be equipped with short-wave transmitting and receiving gear, by means of which contact with Slough will be maintained. Experiments have already shown that the short-wave transmissions from Slough can be received by an amateur in Bergen.



Here is Mr. Brown, the designer of the special transmitter to be erected at Simavik for transmitting to Tromso in the forthcoming polar ionisation experiments.

already made a preliminary survey of Tromso and a nearby point called Simavik, where a special transmitter is to be erected.

"We hope to add materially to present

TELEVISION: THE FACTS TODAY
IN AN INTERESTING ARTICLE IN NEXT
WEEK'S ISSUE ALAN HUNTER WILL
OUTLINE THE PRESENT POSITION OF
TELEVISION IN THIS COUNTRY

THE main construction of the "General-purpose Portable" is extremely simple, but there are one or two points which should be noted, especially by those who are making up this set as a first attempt in home construction.

The cabinet can be bought complete or can be made up from stout plywood.

The cabinet front carries the set controls, and at the back of it is a box-like formation on which are wound the frame aerial turns.

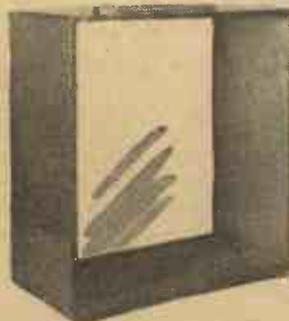
The set itself is supported on wooden ledges on the sides of the frame aerial box and beneath there is space for batteries or a mains unit, the latter for use when the set is worked indoors. The speaker is mounted on the fret of the cabinet front, and is butted up against a ring of felt. It needs no other support. The set is made up on a plywood panel and baseboard. Thin plywood is used for the panel, but this can be removed when all the parts are wired up and the three condensers and two switches mounted direct on the front of the cabinet—the thin temporary plywood panel being used as a drilling template.

A Compact Layout

The set layout is compact as the whole equipment for the four-valve circuit is grouped on the one small baseboard! Stability is ensured by having a vertical screen between the H.F. valve side and

Building The

Constructional details of the portable set introduced in the middle



GENERAL-PURPOSE PORTABLE



AN EFFICIENT AND EASILY-CONSTRUCTED PORTABLE SUITABLE

board and drilled the eight small holes on the panel, screw the two parts together. The piece of foil should be stretched quite flat and tacked to the right-hand side of the baseboard, looking at the set from the back. Make sure that the foil is not lacquered, as earth connections have to be made to it. Next mount the vertical screen, screwing it firmly down to the foil and baseboard. The major parts, such

of spaghetti resistances at two points in the circuit eliminates a number of short connections.

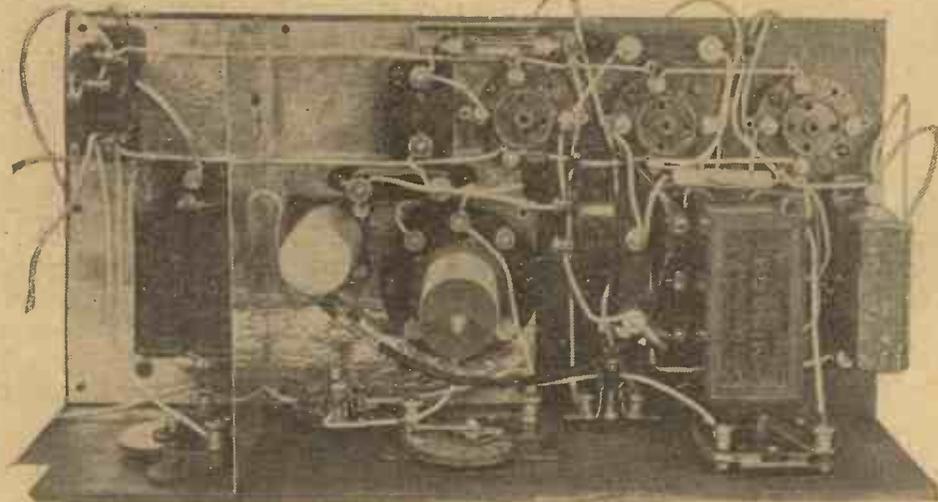
Simple Construction

There are no snags in the construction, but you will see that at one or two points short wires from components are connected to the foil on the baseboard. These wires should be clamped under washers, pressed

up with the frame aerial turns. These should be left loose until the set is later to the three terminals of the frame aerial box.

The Frame Aerial

The frame aerial must be made up before you can try out the set. The frame aerial box are



This plan view will be helpful in studying the layout and wiring diagram given last week

the rest of the circuit and by putting metal foil on that part of the baseboard covered by the screen-grid and detector valve components. The first job therefore is to cut the panel and baseboard according to the overall size given by the blueprint.

For ease in working you should get the full-size blueprint, which can be obtained, price 1s. 6d. post free from our Blueprint Department, AMATEUR WIRELESS, 58-61 Fetter Lane, London, E.C.4. This gives the set full size and shows all the wiring, and also there is a sketch of the cabinet and frame aerial box, which will enable you to make these parts if you do not buy the cabinet complete.

When you have cut the panel and base-

as the four valve holders, the tuning coil and one or two of the smaller condensers can be screwed down.

It is not advisable to mount all the parts before some of the wiring is completed. The layout is compact and some of the leads are very short. There is no space to spare, and if you wire up the main parts before the rest are screwed in place you will find it much easier to connect up the wires and get a pair of pliers on the terminal heads to make tight connections.

It is recommended that tinned copper wiring, enclosed in insulated sleeving, should be used for the main connections. Battery flexes, of course, are taken direct from the various terminals and the use

of spaghetti resistances at two points in the circuit eliminates a number of short connections.

Simple Construction

There are no snags in the construction, but you will see that at one or two points short wires from components are connected to the foil on the baseboard. These wires should be clamped under washers, pressed to the foil by woodscrews, which should be done up quite tightly. The low-tension negative battery lead is anchored under one woodscrew which holds down the screen-grid valve holder. Make sure that there is a good connection here, for otherwise the valves will not light. There is another junction point, not connected to the foil, on the other side of the baseboard, where one grid bias lead is anchored. The grid bias positive lead and the H.T. negative lead come from one terminal of the fixed condenser on the extreme left of the set looking at it from the back.

There are three small flexes which link

COMPONENTS REQUIRED

- Portable cabinet (Camco "Carrier").
- Two .0005-mfd. bakelite dielectric variable condensers (Lissen, Polar, Telsen, Peto-Scott, Readi-Rad).
- .0003-mfd. reaction condenser (Telsen, Polar, Readi-Rad, Peto-Scott).
- Three-point shorting switch (Bulgin "Junior," Lissen, Readi-Rad, Telsen, W.B.).
- Filament switch (Bulgin "Junior," Lissen, Readi-Rad, Telsen, W.B., Lotus).
- Horizontal mounting valve holder (W.B., Lissen, Telsen, Parex).
- Three four-pin valve holders (W.B., Lissen, Telsen, Lotus, Benjamin, Wearite, Igranic).
- Dual-range coil (Lissen).
- Screened high-frequency choke (Wearite).
- High-frequency choke (Lissen, Telsen, Lewcos, Lotus, Igranic, Sovereign).
- Three 1-mfd. fixed condensers (Telsen, Lissen, T.C.C., Dubilier, Sovereign).
- .0002-mfd., .0003-mfd., and .006-mfd. fixed condensers (T.C.C., type 34, Lissen, Dubilier, Telsen, Sovereign).
- .0003-mfd. fixed condenser (small type) (T.C.C., type S, Dubilier, Ormond, Formo).
- Low-frequency coupling unit (Bulgin "Transcoupler").
- 20,000-ohm and 50,000-ohm spaghetti resistances (Lewcos, Lissen, Telsen, Igranic, Bulgin, Varley, Sovereign).
- 2-megohm grid leak (Dubilier, Lissen, Telsen, Sovereign, Graham-Farish).
- 5-megohm grid leak with wire ends (Lissen, Dubilier).
- Grid-leak holder (Readi-Rad, Lissen, Telsen, Bulgin).
- Aluminium partition screen, 6 in. by 4½ in., with hole for S.C. valve (Peto-Scott, Parex).
- Piece of aluminium foil for baseboard, 7½ in. by 6 in. (Peto-Scott, Parex).
- Thin ply sub-panel, 12½ in. by 4½ in. (any timber shop).
- Connecting wire and sleeving (Lewcos).
- Three yards thin flex (Lewcos).
- Anode connector (Belling-Lee).
- Two spade terminals marked H.T. +1, H.T. +2, G.B. +1, G.B. +2 (Belling-Lee, Ealex).
- Six wander plugs marked H.T. +1, H.T. +2, G.B. +1, G.B. +2 (Belling-Lee, Ealex).
- 25-yard reel of No. 27/40 stranded frame-aerial wire (Lewcos).
- 75-yard reel of No. 9/40 stranded frame-aerial wire (Lewcos).
- Loud-speaker unit (Lissen, Telsen, Ormond).
- Sheet of cone paper (any radio dealer).
- Three ½-in. bolts and six nuts (any radio dealer).

ACCESSORIES

- 108-volt H.T. battery (Drydex "Blue Triangle," C.A.V., Lissen, Ever-Ready).
- 9-volt grid-bias battery (Drydex "Green Triangle," C.A.V., Lissen, Ever-Ready).
- 2-volt accumulator (C.A.V., type 2VN3-3, Exide, Ever-Ready, Lissen).

PURPOSE



FOR INDOOR OR OUTDOOR USE

ial windings and
se when the set is
ction being made
als on the frame

be wound before
t. Dimensions of
given in the small
sketch on the
next page.

The two wind-
ings are put on
at that side of
the former re-
mote from the
front of the
cabinet. There
is a small space
between the
windings, both
windings being
in the same
direction. The
medium-wave
winding consists
of 15 turns of
27/40 wire and
the long-wave
winding of 40
turns of 9/40
wire. The
medium and
long-wave wind-
ings are joined
together, the
ends of the
windings being
anchored under
the shank of a
small terminal
to which one of
the set's flexes
is connected.

In a set of
this description
it should be
unnecessary
to emphasise
the importance

of checking over all the wiring before you mount the set in the cabinet and connect up the batteries. Checking is not an irksome job if you have the blueprint at your side. It is certainly a safety measure.

Assembling

When you are sure that everything is O.K., then you can slide the set into its compartment in the frame aerial box and if necessary the thin plywood panel of the set can be removed so that the switch and condenser spindles project sufficiently through the cabinet front. If the front panel is removed, then take care that you do not disturb any of the wiring when clamping the condensers and switches to the actual front of the cabinet.

Make the connections to the frame aerial as shown on the blueprint. You will see that one wire from the three-point switch goes to the centre terminal of the frame aerial group.

The accessories need careful choosing if the most is to be made of the available battery-compartment space. A 108-volt dry battery and a 9-volt grid-bias battery will be needed when the set is worked out of doors. There is plenty of room for an average size mains unit if you want to work the set from the mains when it is at home. A compact accumulator, such as the C.A.V., type 2VN9/3 or an equivalent type by Exide, Ever Ready or Lissen, should be used. Valves of the PM12, PM1HF, PM1HL and PM2A type are suitable, that is an ordinary screen-grid valve, a fairly high impedance detector, a medium-impedance L.F. valve and a standard type of 2-volt power valve.

Connections are simple. There is only one high-tension tapping for the

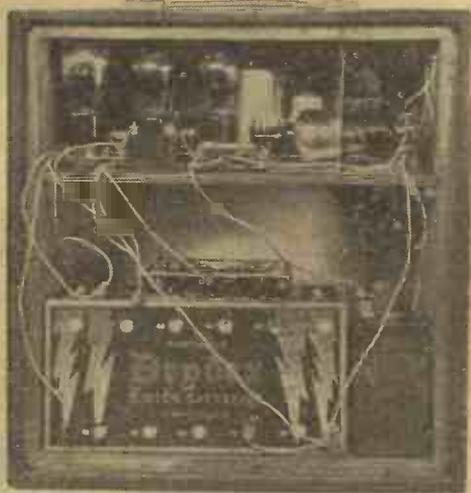
pages last
week: ins-
tructions
for testing
and operat-
ing are
also given

anodes of all four valves, and the H.T.2 wander plug should be taken to the maximum voltage tapping on the battery or mains unit. The H.T.+1 lead should be taken to about 70 or 80 volts on the battery, or to the variable control of a unit. This is for the screening grid of the H.F. valve.

Operating the Set

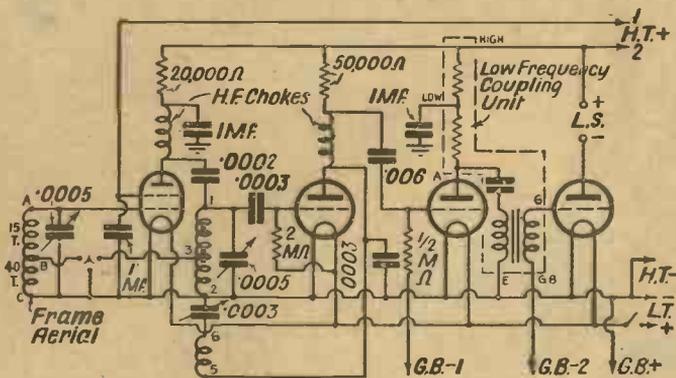
Control is easy. The three-point switch on the left switches both the coils and the frame aerial turns on to the medium or long waves. The on-off switch on the right controls the whole set. When the set is first adjusted the loud-speaker cone should be pushed gently on to the rod of the driving unit and clamped so that the cone presses gently against the felt ring. Adjustment of the unit for armature clearance can be made from the outside. There are no circuits to gang in the "General-purpose Portable."

The two tuning condensers control individually the frame-aerial windings and



This rear view shows the disposition of the set, speaker and batteries

the H.F. coupler coil. A short test will enable you to find the tuning points of both circuits and the dial readings for a number of stations can be logged. Generally speaking, the frame aerial has a marked directional effect. The plane of the windings



The circuit embodies all the most desirable portable-set features

MY WIRELESS DEN

Weekly hints—constructional and theoretical — by W. James.

USE NON-INDUCTIVE

THERE is always the chance of trouble in circuits having resistances and condensers which are not practically non-inductive.

The resistances generally used consist of a wire wound upon a thin core and are therefore slightly inductive. A short straight rod of carbon or other material is, however, non-inductive for practical purposes. Condensers may be inductive or practically non-inductive according to how they are made. Some of the so-called non-inductive types, while being better than the old-fashioned condensers, are not truly non-inductive. This is a pity, as a user may easily be misled.

Volume control resistances of the wire-wound type are often inductive. If shunted by a non-inductive condenser the results are usually satisfactory. A grid leak is non-inductive. A by-product may be sufficiently inductive to cause trouble and in any case it may have a magnetic or electric field that couples with another circuit and produces instability or other difficulties.

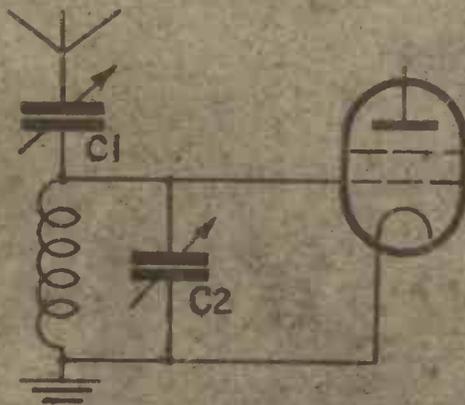
A CONDENSER DETAIL

THE capacity of any variable condenser is usually about 100 micromicrofarads with the vanes shut. Thus a condenser of 10005-microfarads capacity has a minimum capacity of .0003 or .0005 respectively.

Now it is sometimes almost as important to know the capacity of a condenser with the vanes open. This minimum value of capacity is of particular importance when the range of the capacity variation shall be the maximum. You can see how it is of importance by referring to the

accompanying sketch. Condenser C1 is in the aerial circuit and is used as a volume control.

If the range is from .00002 to .0003 the variation obtained is naturally very much greater than when the minimum capacity is .00005. Further, it might not be possible to reduce the strength of the



This illustrates the point about condensers raised in the accompanying paragraph

powerful local station. If the minimum is .00002 instead of .00005, in this illustration the value of the minimum is clearly of great importance.

Now when the coil and the circuit will not tune to below 200 metres. This may be because the minimum capacity of the condenser is not low enough. The chances are that if you fitted a different condenser having a smaller minimum the circuit would tune down to 200 metres.

Of course, the actual capacity in the circuit with the condenser removed might be too great. The valve, its holder, the coil and wiring, all have capacity. But there remains the fact that unless the minimum capacity of the tuning condenser is low enough the results may not be satisfactory.

A TRICKY BUSINESS

HAND effects may be very serious. You know what is meant by hand effects? You adjust the tuning condenser, for example, to get the station nicely and then, when you take your hand away, the station gets weaker or a howl appears.

Obviously your hand has played a part in the tuning and it is not supposed to. If your hand comes into contact with an earthed part or lies near a part joined to earth it can have no effect. But if your hand is placed near the grid of the valve, or to a part joined to the grid, then the capacity of the circuit is changed when the hand is removed.

It is, therefore, clear that the parts which the hands must touch or go near during tuning must be earthed.

By earthed is meant, strictly speaking, a point of fixed potential. Thus the battery is, in this sense an earth point. As there are two terminals to a tuning or tuning condenser, the one joined to the spindle ought to be joined to earth or to the point of fixed potential. This simple rule if carried out, will result in the avoidance of hand effects.

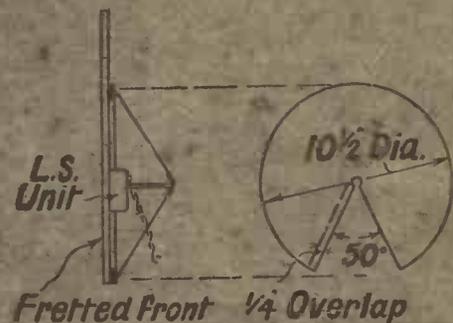
It is true that in some cases the spindle of the condenser cannot be earthed. An example is when a frame aerial is being used, the mid-point of which is earthed. In this example the two wires to the tuning condenser ought to be tried connected first to the terminal in one sense and then in the reverse.

Do not use a dial having much metal in it unless the metal part can be earthed and thus be used as a shield. If there is a knob well away from the panel, so much the better as the hand will then be as far as possible from the spindle and plates of the condenser.

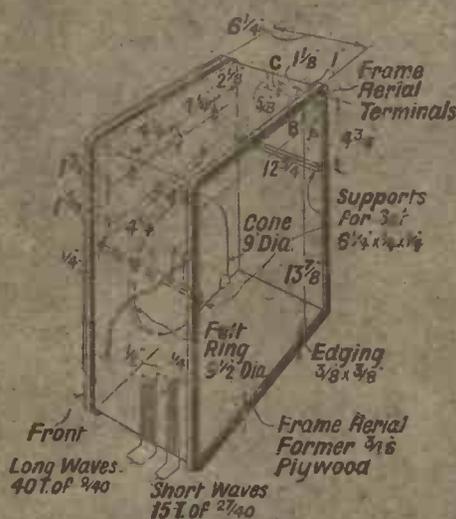
BUILDING THE GENERAL-PURPOSE PORTABLE

(Continued from preceding page)

should point towards the station being received. You will find this a help in cutting out unwanted stations.



These diagrams show the details of the speaker cone and the frame aerial winding.



ON THE SHORTER WAVES

ONE of the points in favour of moving on to the present broadcast waveband higher up the frequency scale is that it will open up more room, not only for broadcasting, but also for television. For instance, between 200 and 600 metres there is a gap of only one million cycles (or 100 kilocycles) which gives accommodation for one hundred transmitters, provided these are spaced apart by the regulation 10 kilocycles. Now between 50 and 150 metres there is a frequency gap of no less than four million cycles—or sufficient to provide elbow-room for twice the present number of broadcast transmitters, and still leave half the available wave-band free for television. B.A.R.

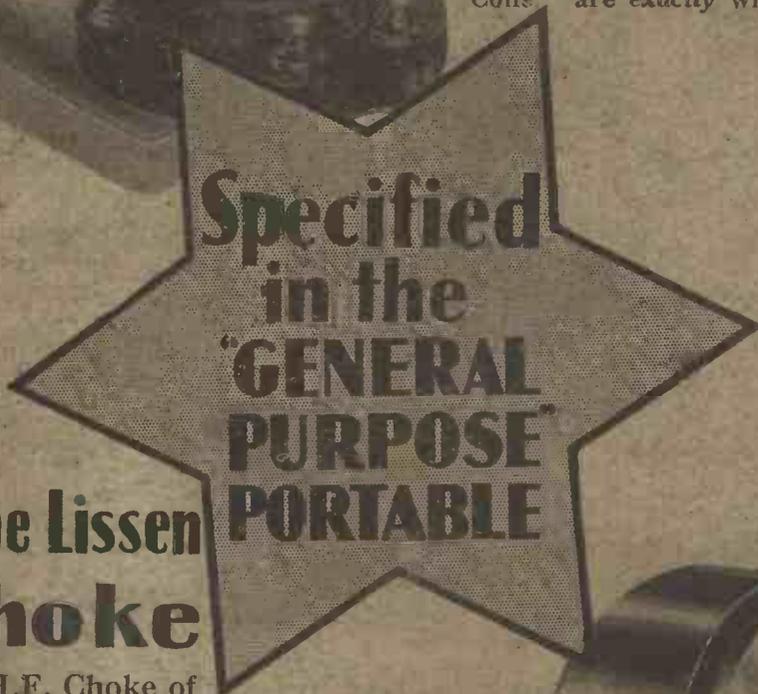
An eye-witness account of the Test Trial Match at Carlisle will be relayed from the Western Region to National listeners on July 21.

Huge Success of Lissen Coils!

EVERY DESIGNER NOW USING THEM



Barely three months ago the Lissen Shielded Dual Range Coil was produced. At that time Lissen claimed "For every set and every circuit!" NOW LOOK AT RECENTLY PUBLISHED CIRCUITS — the constant use of Lissen Coils proves beyond doubt that here, with their interchangeability, their precise matching, their electrical efficiency, their complete and modern shielding, these Lissen Coils are exactly what every designer wanted.



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Our Broadcast Critic

TALKS ABOUT

A LATE EVENING CONCERT



NORMAN ALLIN,
The well-known operatic singer

THIS week I came across my title accidentally and perhaps undeservedly. I had been listening during the early part of the evening, but had switched off shortly before nine to do some other work. Glancing at the clock, I saw it was well after ten, and I realised I was too late to hear much of the recital by Eda Kersey and Norman Allin. At the same time, I noticed that the Dominion Day speeches were being relayed from the Savoy Hotel. Knowing that that kind of broadcast generally holds up the following item, I switched in. Prince George was still talking, so I was in time after all.

I listened to Miss Kersey with interest. I thought Sammartini's *Passacaglia* a sensible work to broadcast. Not too difficult of appreciation except, perhaps, for those who never even try to understand good music. Also, I liked her playing; sympathetic.

I do not remember having heard Norman Allin in better voice. I generally hear him when he is fighting his way through an orchestra at Covent Garden or Queen's Hall. Whether our conductors have mistaken him for a broadcasting Cyclops—he is big enough—I cannot say, but they seem to think it does not matter how much noise they permit in the band when he is singing. So they bully him—big as he is—and make him roar. I think it is a shame.

On this occasion he was treated more humanely; a piano accompanied him. He probably went home without a sore throat. He sang peacefully and, for the first time, I heard his rich voice to advantage. I was momentarily angry with the accompanist for not keeping with him in the first of the Purcell songs; otherwise there was nothing but pleasure to be obtained from such a performance. Thank you, sir!

There were two light shows this week. They were circular shows, round shows, spherical shows. They must have been because one was called *Whirligig* and the other *Merry-Go-Round*. At all events, they are successful shows. There are thousands of people who need light entertainment—people who work hard in

town and city and who look to wireless for the lightest of recreation only. What appeals to them does not appeal to everyone.

These shows were well designed for the purpose. They were really jolly. They had lively songs in them and some inconsequent patter. A little plot, a little love-making. I thought them both very suitable for a summer evening.

When I first began listening for this page I took a different view. I wondered why anybody should be expected to sit out such shows. The answer is, of course, that there is no necessity to do so. I have recently changed my opinion, because I am definitely persuaded that the value of light broadcasting is very high. These shows are a logical reply to a great demand.

The critic's personal point of view does not signify. His business is to discover the purpose of a particular type of broadcast; having done so, his further business is to discover whether that purpose has or has not been carried out.

As I write these words the Saturday night Music Hall has just finished. My impression is that the B.B.C. has done well to revert to this old-time form of entertainment. Given a reasonably strong cast, the hour goes very quickly.

In this particular vaudeville there was

PROGRAMME POINTERS

Programme-making is a psychological activity. Probably nobody at Broadcasting House will thank me for pointing out what must be an obvious fact. At the risk of boring the programme department, I point this week to a psychological situation engendered by the late evening concert with Eda Kersey and Norman Allin as soloists. Perhaps the chief reason I, personally, enjoyed their programme was because it was short and because it came last thing at night. Not being one of those enthusiasts who listen each night to dance music until Big Ben strikes twelve I appreciated something more to my taste at ten-fifteen. I fancy I am not alone in that. At all events I offer the suggestion that, on two or three nights a week, a good singer might be asked to sing for twenty minutes or so between the hours of ten and eleven. Often there is good music on at that time, but my suggestion is for a feature of brief duration with a personal touch about it. There is something very pleasant (particularly on a summer night, when one listens by an open window or perhaps in a garden) in hearing a programme of an intimate character. A singer would probably be more popular than a player, so long as the songs were carefully chosen and sung in English. It seems to me that nothing too modern nor yet too classical would supply the need I feel to exist.

a liberal supply of comedians. They made interesting contrast, a compliment to the producer who foresaw that they would combine successfully in the contrasting sense. Taking them in no particular order, I am inclined to regard them from the standpoint of the listening public and to discount entirely the studio audience. Although studio audiences have probably come to stay, no criticism can be broadcast criticism if it considers them in the least. A studio audience is there solely to help the actors entertain wireless listeners; no other excuse can be made for it.

Consequently, I am constrained to grumble a little at Collinson and Dean. They seemed to me to be playing to the studio audience and (as a wireless listener) I have some blanks to record. It is not good enough. I appeal to Messrs. C. and D. to remember the fact the next time. Their material was good.

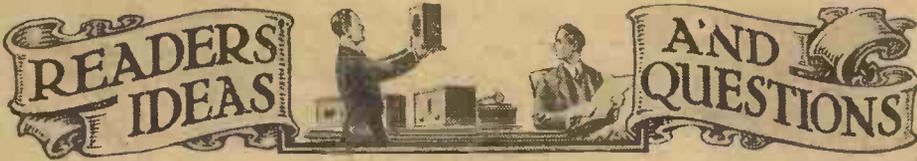
Norman Long is, of course, an experienced broadcaster. His jokes are always new and consist of simple, direct narrative leading quickly to a climax. They could all be written down, reading as effectively as he speaks them; hence, perfect for broadcasting.

Lily Morris gave us songs in the real music-hall style. She discussed (as she sang) the important question of how a fly keeps his weight down, when he is eating all day, with considerable conviction. She pointed out that when he weighed himself on the butcher's scales he found he was the same weight as last year. I cannot say I was quite so interested in her second song, in which she broadcast a pathetic complaint that she was always the bridesmaid and never the blushing bride. It appears she had been through the experience no less than twenty-two times. Naturally, she felt strongly about it. She is a good broadcaster.

Charles Higgins was very funny and contrived to keep the invisible audience in his mental eye, even if he could not see any member of it with his physical optic. He taught me something I never knew before that it is only the hairs on a gooseberry that keep it from being a grape. One does learn something from these people.

The *Submarine Hazard* was an amazing story. Admiral Gordon Campbell's account can hardly be surpassed for sheer solid heroism. His story will have made some of us long for world disarmament.

WHITAKER-WILSON.



Potentiometer Noises

SIR,—I have a high-grade potentiometer acting as a volume control. This has worked entirely satisfactorily for about a year, but now causes grating noises in the receiver whenever it is adjusted. I have had the instrument out of my receiver and pressed down the contact arm on to the sheet of flexible metal with which it makes contact. This has not proved to be a success. The resistance element is quite sound and there does not seem to be a faulty contact when tested with a small battery and meter. Can you account for the grating and suggest how I may remedy it?
J. F. (Norwood).

The instruments in question usually have a blunt steel point attached to the end of the rotating arm and this point presses down upon the steel contact plate. If there is no lubrication between the two steel surfaces, grinding will be in evidence and this will account for the crackling. You are advised to make up a mixture of grease graphite and apply this very thinly to the contact-arm track on the contact plate. Powdered lead pencil mixed with a little vaseline will be found effective.—ED.

Moving-coil versus Cone-type Speakers

SIR,—Why is it that moving-coil speakers are considered to be so far in advance

of the ordinary cone-speaker and why cannot a cone-speaker be made equally as good, for reproduction, as a moving-coil speaker?
G. T. (Tamworth).

It is possible to make cone-speakers reproduce as well as some moving-coil speakers, but, generally speaking, the moving-coil speaker is superior on account of there being no moving iron in its construction and having hardly any natural frequency period of its moving parts. The ordinary type of speaker employing a cone usually has some form of reed which is attached to an iron yoke. The reed tends to vibrate at its own natural period and consequently gives rise to sounds which are not the same as those being put into the speaker electrically.—ED.

The "Short-wave 3" in the Tropics

SIR,—As a builder and operator of your "World-wide Short-wave 3," I feel it my duty to let you know of its very satisfactory performance abroad. Being a seafarer and continually sailing in tropical waters, where reception on medium waves is poor, I made the above set with the object of keeping in touch with home.

On the route towards South America, my best received stations were Boundbrook, Schenectady, Pittsburg, Zeesen, and Rome. Boundbrook, especially, is very strong, and I have always received it free of fading effects. Unfortunately, the

25-metre band has not been well received lately, but it now shows signs of improving. Other transmissions heard have included Moscow, Chicago, Springfield, Buenos Aires, Ottawa, and Rabat.

S. S. M. (Glasgow).

The "Century Super"—a Wonderful Set

SIR,—I really must thank Mr. James and AMATEUR WIRELESS for this wonderful set.

Since building this set last year I have added several gadgets, i.e., gramophone pick-up, switches for remote speakers and headphones, and switch to change over from frame to indoor aerial and earth for "S.W." I have only just started "S.W." listing, my aerial being 14 ft. of electric bell wire round the picture rail.

A few stations received, all on L.S., are W1 XAZ, W2 XAF, Zeesen (DJA), PRXA, etc.
J. W. B. (London), S.W.

The "Mascot"

SIR,—Wishing to bring my three-valve set up to date and remembering a set Mr. Harris designed a little while back, I turned up my old numbers of AMATEUR WIRELESS, Nos. 509 and 510 (March 12 and 19), which gave full particulars of the "Mascot 3."

As the necessary coils for the band-pass tuning were described in detail, I found no difficulty in making these. The actual building of the set was so simple, that it calls for no remarks other than thanks for

(Continued on page 75)



Holidays!

Fine weather? If so, you'll want your portable—in a Camco "Riverside", a sturdily built Cabinet finished in fine blue leatherette. With inner frame, baseboard, panel, etc. Complete as specified 45/-. Order now and send for the Camco Catalogue.

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A.W. 37

A NEW "AMATEUR WIRELESS" HANDBOOK
The HOW & WHY OF
RADIO

By ALAN HUNTER
2/6 NETT.

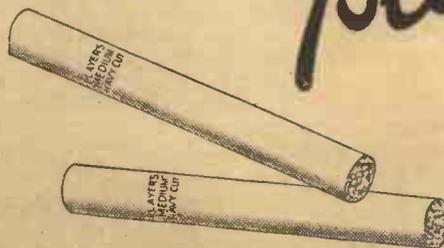
This book has been expressly written for beginners. It provides a clear conception of the general theory and practice of wireless reception in simple non-technical terms. It has been mainly compiled from the series of articles in "Amateur Wireless"—"The How and Why of Radio"—which proved so popular during the past twelve months.

Of all Newsagents and Booksellers, or 2/9, post free, from "Amateur Wireless," 58/61 Fetter Lane, London, E.C.4

THE MILLIONS WHO
SMOKE THEM
MUST BE RIGHT

They say

Player's
Please



The Quality and Quantity Cigarette

NCC 104 B

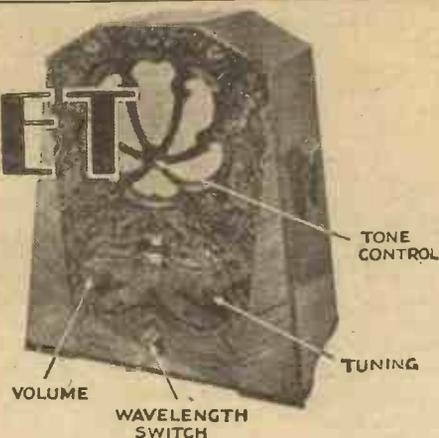
Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention

SETS of DISTINCTION

FERRANTI SUPER-HET CONSOLE

Makers: Ferranti Ltd,

Price: 22 Guineas



ALTHOUGH I ought to be hardened by now to wireless reception, I must confess that I enjoyed a new thrill when I tried out this Ferranti set. "In this one set," say the makers, "is united every single quality sought by the most exacting purchaser of an up-to-date radio receiver." I agree, without any reservation whatever.

This is a super-het consolette. Everything except the aerial and earth is inside the cabinet, which is itself beautifully fashioned. The seven-valve chassis, with its rustless cadmium and tin-plated steel parts, takes up the lower part of this cabinet. The moving-coil loud-speaker is fitted in the top section, with the back left open to ensure an unrestricted action.

An A.C. Super-het

The instrument is designed to work entirely from A.C. mains. The standard model is for 200- to 250-volt supplies, but with the addition of a special transformer it is possible to work on 100 to 125 volts. On normal supplies the running cost is very low, the total consumption being less than 60 watts.

In its technical conception the Ferranti super-het is ultra-modern. Built to meet the exacting needs of to-day it also anticipates the needs of the immediate future. The super-het system decisively combats the congestion of the ether, enabling high-power stations to be separated and received without mutual interference.

Looking over a blueprint of the circuit I see that the sequence comprises a first stage of amplification before the frequency-changing stage, first detector and separate oscillator, intermediate high-frequency stage, power-grid detector and transformer-coupled power output stage, with a valve for rectifying the mains supply.

Simple Control

Most of the valves are of Ferranti manufacture, the exceptions being the variable-mu screen-grids, which are Osram. The full-wave rectifier is a Ferranti R5, giving 60 milliamperes at 250 volts. The oscillator valve is a Ferranti D4, as is the second detector. It is interesting to see that the first detector is a screen-grid valve. The power-output valve is a Ferranti P4, giving about 1,000 milliwatts undistorted power to the loud-speaker.

So much for the bare circuit details. Needless to say, there is ample de-coupling at every point throughout the sequence.

Although relatively complicated in its circuit the control of this set is really the

last word in simplicity. By the use of a very high-grade gang condenser of Ferranti design the tuning is reduced to one knob control. Apart from the tuning knob there is a volume control, a combination switch knob and a tone control.

These controls are simply arranged on the front of the figured-walnut cabinet, as can be seen from the illustration. The knob on the right works the gang tuning and also the illuminated wavelenght scale mounted behind the escutcheon.

The knob on the left is for volume control, which is effected by varying the grid bias of two of the variable-mu screen-grid valves.

At the centre of the loud-speaker fret is a small knob for the tone control, which



This rear view of the Ferranti Super-het shows the neat layout and adequate screening

takes the form of a filter across the loud-speaker to cut down the high notes.

The switch knob at the bottom is cleverly designed and works an indicator on the tuning escutcheon in addition to performing the wavelenght changing and mains switching.

On test, I was immediately impressed with the ease of control. No *finesse* is required to get wonderful results with this set. All you do is turn the tuning knob, with the volume half-way on—and the stations roll in.

The scale moves horizontally and the wavelenght markings are clear and accurate. Stations can be immediately identified by this means.

The tone control exerts a remarkable effect on reception. It cuts down the high notes at will. In doing so, it cuts down much of the background noise experienced in receiving many of the distant stations at this time of year, as well as moderating the intensity of heterodyne whistles. I should say that this tone control will prove invaluable in the winter.

Volume and Quality

With the full tone there is really brilliant quality, with more than enough volume for ordinary requirements. Thanks to the extremely effective action of the volume control good quality is obtained from the powerful locals as well as from the foreigners available at this season.

You cannot fail to be impressed with the selectivity of this set. I got Mühlacker clear of London Regional. Who could ask for more? This was on a 60-foot aerial, but by withdrawing the aerial plug a mains aerial comes into action and I got the German equally well that way.

True band-pass tuning is obtained. Stations have an appreciable spread around their wavelenght marking, but fall away rapidly at the spread limits.

Considering the relatively complicated tuning arrangements of the circuit the action is remarkable, there being no trace of "double-humping" or of any other troubles so frequently encountered. The medium-wave selectivity is rather better than that on the long waves, but everywhere from the top to the bottom of the broadcasting gamut, there is an ease of tuning that cannot be too highly praised.

I consider this set is a great triumph of radio engineering skill and of manufacturing organisation. It provides de luxe reception at an extremely moderate cost.

SET TESTER.

A feature of this year's broadcasting in Scotland has been the successful relays from the concert parties entertaining at the holiday resorts. A very good show of this kind will be broadcast on July 30, when listeners will have a chance of hearing Popplewell's "Gaiety Whirl," from the Gaiety Theatre, Ayr. It is produced by Frankland Gray, and includes such stars as Dave Willis, Marie Nyman, Betty Jumez, and Benny Loban.

WITH the reorganisation of the broadcasting system in Spain and its consequent development, there is a strong possibility that we shall witness a number of alterations in the wavelengths used by the new transmitters. So far as is known at present, the 120-kilowatt high-power station destined to relay the Madrid programmes will take one of the longer channels, namely, between 1,334 and 1,396 metres; Bilbao will work on 229 metres, Seville on 263 metres, Valencia on 349.3 metres, or roughly where we now find Barcelona (E.A.J.), and this station will move up to 368 metres. The lower powered Madrid station, for the benefit of local listeners, will revert to its original 424 metres.

In the meantime, in Spain a drive is being carried out to rope in radio pirates, of which there is an increasing number, and much assistance is being given to the authorities by the Union Radio Association, which, with a view to securing a sole concession in that country, is anxious to increase the number of

OUR LISTENING POST

By JAY COOTE

licence holders without delay. One rule which has lately been strictly enforced by the Spanish studios is aimed at all dramatic artistes, singers, instrumentalists, and, in fact, everybody who may be engaged or invited to broadcast. In every instance they are required to prove possession of a listening licence and satisfy the authorities that they have owned a radio receiver for a period of at least three months. Such a measure is a perfectly fair one and might well be copied in other countries.

During the last few weeks Spanish studios have increased their hours of transmission. On some days Madrid has given a non-stop programme, doing away with all intervals by linking up items with gramophone records.

American Reception

At this period of the year the reception of American stations working in the medium wave band is peculiarly fitful; on some nights—or, rather, in the early mornings—between 2 and 3.30 a.m., it is possible to pick up faint transmissions; on others we can barely hear a carrier wave. Possibly within the next week or so greater success may crown our efforts, as I understand that both KDKA (East Pittsburgh) and WGY (Schenectady) towards 5 a.m. B.S.T., or at the end of the day's programme, will test at high power. It is not a question of adding a few kilowatts, but something much bigger; in fact, their ambition is to boost up their signals to anything between 100 and 200 kilowatts! The channel used by KDKA is 306 metres (980 kilocycles), WGY putting out

these experimental broadcasts on 790 kilocycles (or 380 metres) and 660 kilocycles (or 454.3 metres). For these special transmissions the usual KDKA and WGY call-signs will not be used, but instead WX8AR and W2XAG. It will be interesting to learn whether any readers pick up these tests in the British Isles.

Do you recall the broadcasts made by Stuttgart and Radio Toulouse when the first trips of the *Graf Zeppelin* to the United States and South America were undertaken? Stuttgart proposes to carry out an experiment on similar lines towards the end of the summer, but in this case from an aeroplane travelling between its home city (Stuttgart) and Geneva, Marseilles and Barcelona. It will be equipped with transmitting and receiving apparatus, and during the journey will get into touch with Stuttgart, Frankfurt-am-Main, Basle, Geneva, Marseilles, Radio Toulouse, and any other transmitter which may succeed in communicating with it. The stunt should prove an interesting one to European listeners, as the two-way conversations and a running commentary from the aeroplane will be re-broadcast by the land stations.

I have pleasant news regarding the Copenhagen programmes. Generally speaking, although only rated at 7 kilowatts, transmissions from Kalundborg, except during the summer months, have been fairly well received on this side of the North Sea. It has proved one of the "star" stations in listeners' logs. The new 60-kilowatt, for which the plant is being supplied by a British firm, will also work on 1,153 metres, and consequently should provide even better signals throughout the year. To replace the old Copenhagen station a new 10-kilowatt transmitter will be erected at Glostrup, some six or eight miles west of the Danish capital; although built mainly for the convenience of listeners in Copenhagen, there is little doubt that it may still turn out to be a good alternative.

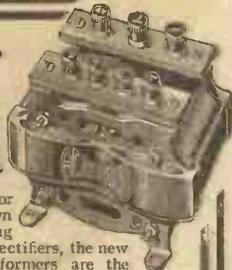
"READERS' IDEAS & QUESTIONS"

(Continued from page 73)

the very lucid instructions given with the full-size setting out of the components and wiring diagram.

But what does call for comment is the result obtained with this set. Living as I do on the Northern Heights and within such short distance from Brookman's Park, it has always been almost impossible to separate London National from London Regional. The "Mascot 3" does it and does it completely, besides giving surprising volume and fine tone. It is, in fact, all you claim for it. A. G. A. (London, N.).

NEW L.T. MAINS TRANSFORMER



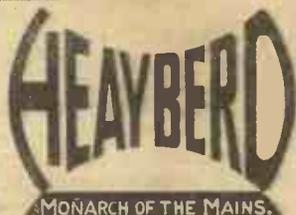
Designed for the constructor wishing to make his own L.T. Charger, incorporating the latest Westinghouse Rectifiers, the new Hayberd L.T. Transformers are the natural choice of the Radio Technicians. That is why AMATEUR WIRELESS have chosen model W36 for their excellent Battery Charger described in this issue.

List No.	For use with Rectifier	Voltage	Trans. Tappings	Price
W. 36	L.T. 1	5.5, 7.5,	9	19/-
	L.T. 2	7.5, 9,	11	
	L.T. 4	7.5, 9,	11	
W. 37	L.T. 5	15, 18,	22	25/-

CUT OUT AND POST NOW

Send me List 964 describing fully, with special circuit diagrams, the construction of chargers using these new Transformers.

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Address _____
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One Minute from Moorgate Und. Stn.

No cutting of flex..No stripping of thread

(Patent)

The whole flex gripped—copper, rubber and braiding. No sharp cutting edge; no loose straggling ends.

No jagged saw-cuts or cross holes to strip the thread inside the cap.

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David Cleghorn Thomson

on the

SCOTTISH PROGRAMMES



In this article, the Scottish Regional Director, David Cleghorn Thomson, outlines his ideals for the Scottish programmes under the new Regional conditions

IF it were not for the limitations of the wavelength situation, and other conditions imposed by circumstances of geography and population, it would be possible in working out the final putting into practice of the Regional policy to make it not only a series of alternative programmes partly drawn from regional sources, but a series of complete alternatives. Just as the best Scottish and Welsh newspapers have their own leaders commenting on British politics from a regional or national point of view, and their own reviews on the books chosen by the Book Society, the Welsh, Irish and Scots programmes might quite well include news, book reviews, and talks on men and affairs based on the characteristic and historical outlook of the listeners in the areas served; but this is not either possible or desirable in the conditions as they exist at present. In the circumstances, however, the regional scheme (as it is being put into operation in Scotland) affords opportunities for a most interesting and significant contribution to Scottish life on the part of our programme makers.

Scotland's Many Demands

Our task, it is a platitude now to repeat it, is manifold, and absorbing, whether it be in the sphere of perfecting a new brand of Scots vaudeville entertainment, fostering bee-keeping and forestry in the rural districts or giving a platform to the most stimulating and authoritative commentators on public affairs in the country to-day.

Scotland was the first broadcasting area in Great Britain to be regionally co-ordinated from a programme point of view; it is also one of the most difficult to cover geographically from the point of view of reception. We are only too conscious of the fact that it is a peculiarly anomalous position to have to admit that still the most fertile sources of our character programmes—the Highlands, the Islands, and the remoter parts of Galloway and the Borders—are unable to listen really well to programme fare which is drawn from their midst. Suffice it to say here that no effort is being spared to overcome this difficulty, and that definite schemes are under consideration at the moment to this end.

When Twin Wavelengths are Available

To take programmes for sectional groups first, we propose, after September, when

the twin wavelengths should both be in operation from Westerglen, not only to maintain the services already instituted for gardeners, bee-keepers, fishermen, school children, adult groups, Gaelic enthusiasts and followers of various sports, but to increase the time afforded to them by substitution for periods formerly taken from London. Programme features of a definitely national character, such as recitals of Scots psalms, Scots country dance transmissions, Highland "Ceilidhs,"



This map, showing the service area of the new Falkirk station makes it clear that there is still a large part of Scotland which is without an adequate broadcasting service

Deeside "Chaumer" concerts, and regular bagpipe programmes will be arranged at hours when a completely contrasted alternative is available. On the other hand, we are not forgetting that part of our duty and privilege is to succour the cause of serious music of a non-Scottish character. We shall be relaying during the autumn and winter months all the Symphony Concerts of the Reid Orchestra, five concerts of the Scottish Orchestra, and five of the Scottish Philharmonic Orchestra, most of the latter from country centres which are seldom if ever able to make visits of a large orchestra financially feasible. Our aim in this orchestral policy has been to do everything in our power to hasten the establishment of a real National Orchestra, which will at one and the same

time keep a strong pool of first-class professional musicians resident in the country for at least nine months of the year, and send this body into the smaller provincial centres to co-operate with good choral bodies, where financial assistance is limited. Chamber music and the activities of the best choral societies will also be borne in mind to fill their due place in the programmes.

Vaudeville Developments

One sphere where considerable extension of activity is anticipated is that of vaudeville and variety—both in the way of studio shows and outside broadcasts. With the assistance of our old friend, Andrew P. Wilson, who used to be a "right-hand man" of Sir Oswald Stoll in the matter of Scots turns—we are concentrating on an extension and revival of this type of programme "with a difference"—and the microphone is also touring to a much larger number of provincial centres of entertainment in search of fresh talent and ideas. The "Radioptimists," who have held the boards for some years unchallenged as a radio concert party, have now serious rivals in the "Silver Citizens" in the "Granite City," and in Ernie Gower, Guy Daebnitz, Jimmy Ross, and Bunny Gordon we have a group of young and vital composers ready and willing to provide those companies with material.

Local Talent

We do not anticipate, at any rate for some time to come, filling 100 per cent. of our Regional wavelength with locally produced material. We shall supplement from other Regional sources—the Northern and the Midland Regional programmes, and the Belfast and Dublin ones too. But as the talent presents itself in increasing amount and steadily improving quality, we are ready and anxious to make way for it. Such an increase is almost inevitable following the increase of opportunity. It is lack of opportunity and demand for first-class musical and dramatic talent which has for so long impoverished Scotland and Scottish wireless programmes by tempting artistes to leave us for London and New York.

So we hope that this new era of Regionalism will usher in a good time not only for Scottish artistes, composers and writers, but also for the steadily increasing body of listeners.

WE TEST FOR YOU

A weekly review of new components



and tests of apparatus

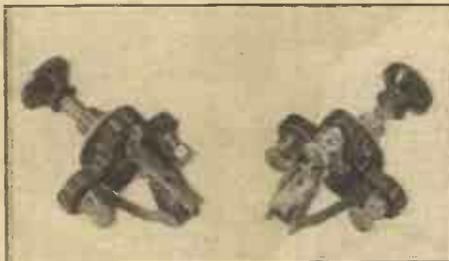
Conducted by J. H. REYNER, B.Sc., A.M.I.E.E.

NEW BULGIN SWITCHES

ONE of the components in a radio receiver which does not always receive the attention that it should is the switch. This is not good policy, as some very annoying troubles may be caused by badly made switches.

We have recently tested three types made by Messrs. A. F. Bulgin & Co.; the first two types are very similar, the only difference, in fact, being that one is arranged with two contacts and the other with three. The switches, are of the push-pull type having a spring-controlled action similar to that used in toggle switches. The central spindle is not insulated, this forming the third contact in the one case, a point which should be remembered if a metal panel is used. The switches are built up on small bakelite mouldings, and arranged for one-hole fixing.

The remaining switch is of the quick-make-break type, and is suitable for controlling 750 watts at 250 volts maximum. The mechanism is enclosed in a small bakelite moulding, the whole making a



Two new Bulgin switches

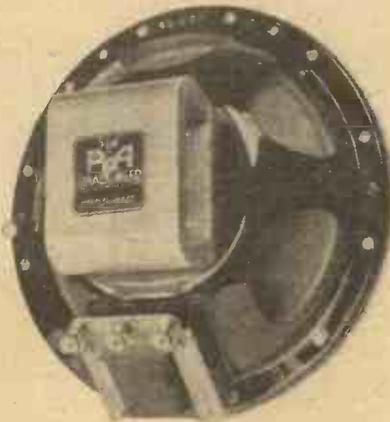
very small and neat job. Single hole fixing is again employed, and a face plate indicating on and off positions is included.

R. & A. CHALLENGER MOVING-COIL SPEAKER

WE have tested this week the new R. & A. Challenger moving-coil loud-speaker. This speaker employs a somewhat squat E-shaped permanent magnet, which is bolted to the back of the metal chassis which forms the frame of the speaker. The 6-inch paper diaphragm is suspended from the metal framework, the actual suspension being formed from the outer edge of the diaphragm, this being turned over and corrugated concentrically to give the necessary flexibility.

A low-resistance moving-coil is fitted, the necessary input transformer being mounted on the framework. This transformer is tapped to make it suitable for use with all types of power valves, including pentodes. The usual web type centering device is fitted.

The performance of the speaker on all types of signal was good, the response to the upper frequencies being especially marked. The sensitivity was also quite



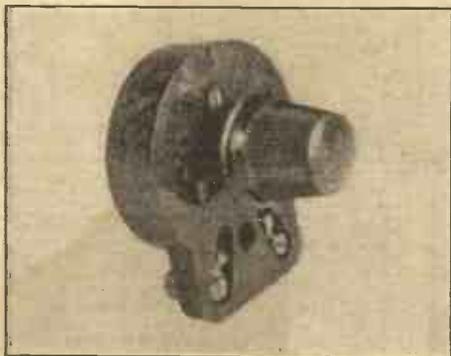
The R. & A. Challenger speaker

satisfactory, and very nearly as good as that of our standard energised model.

WATMEL WIRE-WOUND COMPONENTS

A RANGE of nicely made wire-wound potentiometers, of which we have tested one sample this week, is that manufactured by The Watmel Wireless Co. Ltd.

These potentiometers can be obtained in all normal values up to 50,000 ohms. They are built up into moulded bakelite bodies which are finished a mottled brown colour. A small face plate also of moulded bakelite is provided giving an indication of the minimum and maximum positions.



Watmel wire-wound resistance

The resistance element is wound on fibre and located just inside the rim of the cup-shaped body. The contact to the element is made by a spring-type moving arm which rides lightly on the wire.

The control tested was rated at 25,000 ohms, the actual value being 27,000-ohms.

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Exact to Specification

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Kit "A" Author's Kit, with Ready Drilled Panel, less Valves, Cabinet and Speaker Equipment.

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or 12 monthly payments of 6/4.

Selected C.O.D. lines—You pay the postman—we pay post charges on orders value over 10/-.

KIT BITS	
1 Camco Carrier Cabinet (oak)	1 15 0
3 Mullard Valves	1 12 3
1 Lissac No. 1 Speaker Unit	12 6
1 Sheet of Kraft Con. Paper	1 0
2 Reels of Leveco Finest Aerial Wire	1 0
1 Bulgin Transcoupler	11 6

3 VALVE RADIO-GRAMOPHONE

Described in "A.W." 21st May, 1932.

Kit "A" Author Kit, with Ready drilled Panel, less Valves, Cabinet, Motor, Pick-up and Speaker and Batteries.

CASH or C.O.D. **£2 16 6**

or 12 monthly payments of 5/2.

Selected C.O.D. Lines—You pay the postman—we pay post charges on orders value over 10/-.

KIT BITS	
1 Petco Scott Tablegram cabinet	1 10 0
1 R. & A. loudspeaker, 8-in. diaphragm (Type 53)	18 6
1 Babart triple-spring motor	1 15 0
3 Valves as specified: 1. P.M.H.F.; 1. P.M.3D.F.; 1. P.M.2	1 2 9

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JUST RELEASED COSSOR MELODY MAKER MODEL 335

Complete with Valves, Speaker and Cabinet. Employs Cossor Variable-Mu S.G., H.F. stage, Detector and Power Valves. Cash Price £7/17/6. Balance in 11 monthly payments of 14/6.

Send 14/6 only

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

Send 4/10 only

EPOCH "20 C" PERMANENT MAGNET MOVING-COIL SPEAKER. With 3-ratio input transformer. This speaker will handle up to 5 watts. Cash Price £1/15/0. Balance in 5 monthly payments of 6/6.

Send 6/6 only

ULTRA IMP PERMANENT MAGNET MOVING-COIL SPEAKER, with input transformer. Cash Price £2/15/0. Balance in 11 monthly payments of 5/-.

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W.B. PERMANENT MAGNET MOVING COIL SPEAKER. Type P.M.4. Complete with Transformer. Cash Price £2/2/0. Balance in 7 monthly payments of 5/9.

Send 5/9 only

BLUE SPOT SPEAKER UNIT AND CHASSIS, TYPE 100U. Cash Price £1/19/6. Balance in 7 monthly payments of 5/6.

Send 5/5 only

ATLAS ELIMINATOR, TYPE A.G.244. Three tappings S.G., detector and power. Output, 120 volts at 20 mA. Cash price, £2/19/6. Balance in 11 monthly payments of 5/6.

Send 5/6 only

GARRARD INDUCTION GRAMOPHONE MOTOR. For A.C. Mains. Model 202. Mounted on 12-inch Nickel Motor Plate with fully automatic electric starting and stopping switch. Cash Price, £2/18/6. Balance in 11 monthly payments of 5/4.

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Parts as indicated.

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BROADCASTING STATIONS

Broadcasting Stations classified by country and in order of wavelengths. For the purpose of better comparison, the power indicated is that of the carrier wave.

Kilo-Metres	Station and Call Sign	Power (Kw.)	Kilo-Metres	Station and Call Sign	Power (Kw.)	Kilo-Metres	Station and Call Sign	Power (Kw.)
GREAT BRITAIN								
25.53	11,751 Chelmsford (G5SW)	10.0	329.7	910 Poste Parisien	85.0	NORWAY		
211.3	1,420 Newcastle	1.2	345.2	869 Strasbourg (PTT)	11.5	235.5	1,274 Kristiansand	0.5
214.3	1,400 Aberdeen	1.0	368.9	813 Radio LL (Paris)	1.0	240.1	1,249.2 Stavanger	0.5
242.3	1,053 Belfast	1.0	also on 33m. (9000 Kcs.)			364	824 Bergen	1.0
261.0	1,147 London Nat.	50.0	384.4	779 Radio Toulouse	8.0	307.6	816 Fredrikstad	0.8
288.5	1,040 Swansea	0.12	447.1	671 Paris (PTT)	8.0	493.4	663 Trondheim	1.2
288.5	1,040 Plymouth	0.12	465.8	644 Lyons (PTT)	1.5	1,083	277 Oslo	00.0
288.5	1,040 Bournemouth	1.0	500.1	527 Grenoble (PTT)	2.0	POLAND		
288.5	1,040 Scottish National	50.0	1,445.7	207.5 Eiffel Tower	13.5	214.2	1,400 Warsaw (2)	1.9
288.5	1,040 Newcastle (temp.)	1.0	1,725	174 Radio Paris	75.0	235	1,283 Lodz	2.2
301.5	995 North National	50.0	GERMANY			312.8	959 Cracow	1.5
309.9	963 Cardiff	1.0	1,250	240 Luxemburg (temp.)	1.0	335	896 Poznan	1.9
355.9	843 London Regional	50.0	GERMANY			380.7	788 Lvov	16.0
376.4	797 Scottish Regional	50.0	10,737	15,200 Zeesen (DJB)	8.0	403	734 Katowice	12.0
398.9	752 Midland Regional	25.0	51,389	9,560 Zeesen (DJA)	8.0	563	533 Wilno	16.0
480	625 North Regional	50.0	217.1	1,384 Königsberg	0.9	1,411.8	212.5 Warsaw	120.0
1,564.4	193 Daventry (Nat.)	30.0	218.5	1,373 Flensburg	0.6	PORTUGAL		
AUSTRIA			232.2	1,292 Kiel	0.25	241.0	1,241.8 Oporto	0.25
218.5	1,373 Salzburg	0.5	238.9	1,256 Nürnberg	2.0	282.2	1,063 Lisbon (CTIAA)	2.0
245.9	1,220 Linz	0.5	245.9	1,220 Cassel	0.25	also on 31.25 m.		
263.5	1,052 Innsbruck	0.5	253.1	1,185 Gleiwitz	5.0	ROMANIA		
352.1	852 Graz	7.0	259.3	1,157 Leipzig	2.0	391	761 Bucharest	12.0
453.2	662 Klagenfurt	0.5	269.8	1,112 Bremen	0.2	RUSSIA		
518.5	578 Vienna	15.0	276.5	1,085 Heilsberg	00.0	348.8	860 Leningrad RV70	20.0
also testing on 1,252.6 m. from 7.0 p.m. (Mon., Wed., Sat.)			283.6	1,053 Magdeburg	0.5	358	838 Moscow (Exp.)	15.0
BELGIUM			283.6	1,053 Berlin (E)	0.5	389.6	779 Stalino (RV26)	15.0
207.3	1,447 Franchimont	0.2	283.6	1,053 Stettin	0.5	473.2	770 Archangel	10.0
209	1,435 Antwerp	0.4	318.8	941 Dresden	0.25	502.4	634 Sebastopol	10.0
210.1	1,428 Liege (Serain)	0.15	325	923 Breslau	60.0	644	597 Nijni Novgorod	10.0
215.3	1,393 Chatelineau	0.2	376.6	832 Mühlacker	00.0	720	465.8 Kazan (RV17)	10.0
215.5	1,393 Bruxelles	0.2	372.2	806 Hamburg	1.5	842.4	416.6 Sverdlovsk (PTT)	20.0
Conference 0.2			389.6	770 Frankfurt	1.5	849	344 Sverdlovsk RV5	50.0
215.5	1,392 Liege	0.1	389.6	770 Leipzig (testing)	120.0	937.5	353 Rostov (Don)	4.0
230.3	1,304 Radio Wallonia	0.3	419.9	776 Berlin	1.5	1,000	300 Leningrad	100.0
239.5	1,258 Binche	0.3	453.2	662 Danzig	0.5	1,032.8	290.5 Kiev	25.0
241.5	1,447.8 Liege (Exp.)	0.1	472.4	635 Langenberg	00.0	1,071.2	250 Itilis	35.0
245.9	1,220 Radio Schaarboek	0.3	532.9	563 Munich	1.5	1,117.4	268.5 Moscow Popoff	75.0
250.3	1,158 Liege (Cointe)	0.4	559.7	536 Kaiserslautern	1.5	1,171.5	256 Tashkent	25.9
283	1,060 Brussels (SBK)	0.5	568	530 Hanover	0.3	1,260	238 Bakou	35.0
337.8	888 Brussels (No. 2)	15.0	569.3	527 Freiburg	0.25	1,271.5	236 Minsk (RV10)	35.0
509	590 Brussels (No. 1)	15.0	1,620	185 Norddeich KVA	10.0	1,304	230 Moscow (Trades Unions)	165.0
BULGARIA			1,634.9	183.5 Zeesen	60.0	also on 50 m. (6,000 Kcs.)		
318.8	941 Sofia (Rodno Radio)	1.0	2,525	119.3 Königswusterhausen (press)	15.0	1,380	217.4 Novosibirsk	100.0
CZECHO-SLOVAKIA			2,900	103.5 ditto	15.0	1,481.5	202.5 Moscow RV1	100.0
58	5,172 Prague	0.5	4,000	75 ditto	15.0	also on 48.6 m. (6,438 Kcs.)		
249.6	1,201.8 Prague (2)	5.0	HOLLAND			1,010.8	157 Sverdlovsk (RV38)	20.0
263.9	1,136.7 Moravska Ostrava	11.0	296.1	1,013 Huizen	8.5	SPAIN		
279.2	1,074 Bratislava	14.0	1,071.4	280 Scheveningen Haven	10.0	252.3	1,189 Barcelona (EAJ15)	3.0
293	1,022 Kosice	2.5	1,875	160 Hilversum	8.5	287.6	1,121 Valencia	8.0
341.7	878 Brunn (Brno)	35.0	HUNGARY			348.8	860 Barcelona (EAJ1)	8.0
488.5	614 Prague	120.0	211.7	1,416.8 Budapest (2)	3.0	563.1	815 Seville (EAJ5)	1.5
DENMARK			550	545 Budapest (1)	18.5	411.4	729.2 Madrid (EAJ7)	2.0
281.2	1,067 Copenhagen	0.75	also relayed on 75 m.			424.3	707 Madrid (Espana)	2.0
1,153	260 Kalundborg	7.5	ICELAND			456.0	557 San Sebastian (EAJ8)	0.6
also on 31.51 m. (9,520 Kcs.)			1,200	250 Reykjavik	21.0	SWEDEN		
ESTONIA			224.4	1,337 Cork (GCK)	1.2	231	1,301 Malmö	1.2
298.8	1,004 Tallinn	11.0	413	725 Athlone	60.0	257	1,166 Hörby	10.0
463.8	644 Tartu	0.5	IRISH FREE STATE			307	977 Falun	0.5
FINLAND			25.4	11,810 Rome (2RO)	15.0	321.9	932 Göteborg	10.0
291	1,031 Viipuri	13.0	247.7	1,211 Trieste	10.0	435.4	689 Stockholm	55.0
368.1	815 Helsinki	12.0	273.7	1,096 Turin (Torino)	7.0	541.5	554 Sundsvall	10.0
555.5	543 Tampere	1.0	280	1,071 Bari (testing)	20.0	770	389 Östersund	0.6
1,796	167 Lahti	54.0	312.8	959 Genoa (Genova)	10.0	1,220.5	244 Boden	0.6
FRANCE			318.8	941 Naples (Napoli)	1.5	1,354.4	212.5 Motala	30.0
219.9	1,363.7 Béziers	0.5	332.2	903 Milan	7.0	also on 49.46 m. (6,065)		
225.8	1,328 Pécamp	10.0	368.1	815 Bolzano	1.0	SWITZERLAND		
236.1	1,270 Bordeaux-Sud-Ouest	2.0	441	680 Rome (Roma)	50.0	244.1	1,279 Basle	0.5
249.3	1,203 Juan-les-Pins	0.5	500.8	599 Florence (Firenze)	20.0	245.0	1,220 Berne	0.5
254.7	1,177.2 Foulouse (PTT)	1.0	528	570.3 Palermo	3.0	403	743 Sottens	25.0
265.4	1,130 Lille (PTT)	1.3	LATVIA			459.4	653 Beromünster	60.0
271.4	1,103 Rennes	1.2	198.5	1,510 Riga (tests)	10.0	760	395 Geneva	1.25
286	1,049.1 Montpellier	0.8	525	572 Riga	15.0	TURKEY		
291.7	1,028 Radio Lyons	10.0	LITHUANIA			1,200	250 Istanbul	5.0
293.7	1,021.5 Limoges (PTT)	0.5	1,935	355 Kaunas	7.0	1,538	195 Ankara	7.0
304.0	984 Bordeaux (PTT)	13.0	NORTH AFRICA			YUGOSLAVIA		
307.3	976 Radio Vitus	1.0	364	825 Algiers (PTT)	16.0	307	977 Zagreb (Agram)	0.75
also on 43.75 m. (6,865 Kcs.)			410	721 Radio Maroc (Rabat)	6.0	430.4	697 Belgrade	2.5
315	950 Marseilles	1.6	and 32.26 m. (9,300 Kcs.)			574.7	522 Ljubljana	2.5

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MURPHY ALL MAINS 3-VALVE SET, Model A3. Cash Price £17/11/-. And 12 monthly payments of 29/4. **37/-** With order

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WHEN SUBMITTING QUERIES

Please write concisely, giving essential particulars. A Fee of One Shilling (postal order), a stamped addressed envelope, and the coupon on the last page must accompany all letters. The following points should be noted.

Not more than two questions should be sent with any one letter.

The designing of apparatus or receivers cannot be undertaken.

Modifications of a straightforward nature can be made to blueprints, but we reserve to ourselves the right to determine the extent of an alteration to come within the scope of a query. Modifications

to proprietary receivers and designs published by contemporary journals cannot be undertaken.

Readers' sets and components cannot be tested at this office. Readers desiring specific information upon any problem should not ask for it to be published in a forthcoming issue, as only queries of general interest are published and these only at our discretion. Queries cannot be answered by telephone or personally.

Readers ordering blueprints and requiring technical information in addition, should address a separate letter to the Query Department and conform with the rules.

On July 27 Mr. Cyril Wood will present a programme for West Regional listeners called "Gaffer and Gavotte." It is a West Country programme of humour, song, and dance, and will include West Country

dialect sketches by F. Marriott Watson and G. Edmund Hall. The cast includes T. Hannam Clark, Daisy Cull, George Holloway, Osborne Leach, and Daniel Roberts, all of whom at West Country.

Postcard Radio Literature

GET THESE CATALOGUES FREE.

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

Tone Control

EVERYBODY is talking about the Multi-tone system of tone control and if you want to get the most up-to-date information on this, then write for a free copy of an interesting booklet produced by the Multitone Electric Co., Ltd. This gives circuits, curves, and full details. **794**

Tungstram Prices

New literature about Tungstram valves has been produced following the price reductions a month or so ago. It pays every valve user to keep up-to-date with regard to valve prices and data and I advise you to get a free copy of the new Tungstram folder. **795**

The Kenwell Power Pack

The Kenwell Power Pack, a new idea, is a mains-energised moving-coil speaker, complete with a useful H.T., grid-bias, and L.T. trickle-charging unit. Full details can be obtained free through my Catalogue Service, from Kenwell Radio, Ltd., and I feel sure that it will interest mains users. **796**

Mullard PM13

Information has been released by the Mullard Wireless Service Co., Ltd., regarding the PM13 screen-grid valve. This takes 4 volts low-tension. Particulars can be obtained through the Catalogue Service. **OBSERVER. 797**

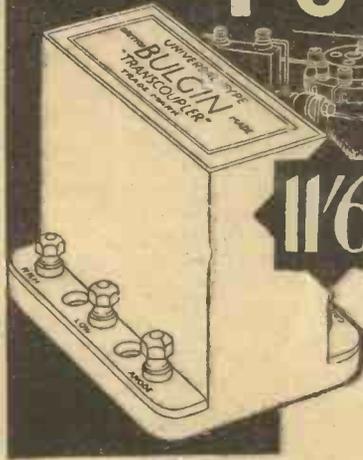
"SUPER POWER FROM BATTERIES"

With reference to the article on "Super Power from Batteries" in **AMATEUR WIRELESS** No. 524, the diagram, Fig. 2, showed the position of the milliammeter incorrectly. This should be inserted in the anode lead, as explained in the text, and not in the lead to the auxiliary grid.

London Radio Supply Co. have been appointed official Murphy dealers, and the terms of the Murphy All-Mains 3-Valve Set advertised in **AMATEUR WIRELESS**, July 9, should have read 37s. with order and 12 monthly payments of 29s. 4d. Cash price 17 guineas.

Some of the most beautiful songs by Richard Strauss will be heard when Percy Underwood gives a song recital from Midland Regional on July 30. The programme includes the "Dream in the Twilight," "All Souls Day," and ends with the well-known "Serenade."

— PUT "IT" HERE

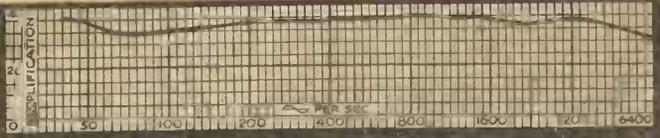


11/6



"TRANSCOUPLER"

ANOTHER CURVE TAKEN UNDER WORKING CONDITIONS. (Following a value of 10,000 ohms impedance.)



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WHAT "IT" IS - The new Bulgin "TRANSCOUPLER" incorporates a complete Parallel-fed Transformer arrangement in one unit. It consists of an Anode Resistance—tapped for use after both high and low impedance valves—Coupling Condenser, and high primary-inductance nickel-core L.F. Transformer, the whole unit enclosed in a handsome Bakelite case.

WHAT "IT" DOES - The Bulgin "TRANSCOUPLER" gives practically uniform amplification over the whole range of musical frequencies, the primary inductance of 50-100 henries giving a remarkable performance to match modern high efficiency valves. Substitute a "TRANSCOUPLER" for your present transformer and note the difference.

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- Photo Cells, R.C.A. Talkie type, UX847, at quarter price, 25/-.
- Brit. Talk. Ples., King type, 15/-.
- Guaranteed.
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Permanent Magnets, Cobalt steel. Powerful horseshoe, 5in., No. 1 is 1 lb., 2/6; 4in., No. 2, 1/2 lb., 2/-; No. 3, 1/2 lb., 1/6; No. 4, 1/2 lb., 1/-.
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A.W. 16/7/32

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Intending purchasers should forward to the Publisher 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.

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WIRELESS AS A CAREER.—Those already engaged in the radio industry and those who would like to obtain employment in this interesting profession should write for a copy of our booklet, sent post free without obligation.—Northern Counties Wireless School, 55-57 Guildhall Street, Preston.

ENGINEERS, if you wish for something more than a "bread and butter" job, you owe it to yourself to investigate our service. On request we will send you a free 200-page handbook, which will explain many ways in which well-paid careers, carrying salaries of £4, rising to £20 per week, can be followed. The book also gives details of all leading examinations (A.M.I.Mech.E., I.E.E., G.P.O., etc.) and outlines Modern Home-study Courses in all branches of Elec., Mech., Motor, Radio, Talkie Engineering, etc. Do not miss this opportunity—send for your free copy of our Handbook Now.—British Institute of Engineering Technology, 100 Shakespeare House, 29-31 Oxford Street, London.

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MARCONI VALVES, as new, in original cartons, every valve guaranteed. Super Power P2B, 2 v., cost 12/-, our price 5/-; H1210, 2 v., cost 7/-, our price 4/-; H210, 2 v., cost 7/-, our price 4/-; only a limited number left; cash with order, postage free.—Ross, 13 Harpur Street, London, W.C.1. Holborn 0887.

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MAGNAVOX.—Nine only, 7 in. X core, 200-250 volts D.C., with speech transformer, in original boxes, 25/- each. Mains 2-1 Step-up or Step-down Transformers, 70-watt rating, in metal cases, 10/6 each.—Radio Service, 106 Roundwood Road, Willesden.

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RADIOGRAMS

ANOTHER revue by Archie de Bear will be broadcast on July 26 on the Regional wavelengths and on July 28 on the National wavelengths. "Back to Listeners' Inn" is a new version of "Listeners' Inn," and it will be produced by Gordon McConnel.

The Birmingham Military Band, conducted by W. Arthur Clarke, will give a concert on July 24 for Midland Regional listeners, with John Williams and Alfred Wheatcroft as solo artists. Hely-Hutchinson's "Old Mother Hubbard" will be among Mr. Williams' songs. A group of Chopin waltzes is a feature of Mr. Wheatcroft's programme.

A communication received by Henry Hall from a well-known gramophone company on the question of the public's attitude toward music and melody in dance music as opposed to the "hot" style indicates a marked change in the popular taste. It is stated that the increasing output of records by the B.B.C. Dance Orchestra definitely shows that the general public, which pays the piper and has a right, therefore, to call the tune, chooses the musical and melodious in preference to the "hot" type of record. Two records which may be regarded as tests of the public reaction are "Speak to Me of Love" and "Heidelberg." The sales of both these records stand out predominantly. They are essentially records which call for a musical performance, and in this gramophone company's opinion, no other band could have produced records in the style which has proved so successful.

"Amateur Wireless and Radiovision." Price Threepence. Published on Thursdays and bearing the date of Saturday immediately following. Post free to any part of the world: 3 months, 4s. 6d.; 6 months, 8s. 9d.; 12 months, 17s. 6d. Postal Orders, Post Office Orders, or Cheques should be made payable to "Bernard Jones Publications, Ltd."

General Correspondence is to be brief and written on one side of the paper only. All sketches and drawings to be on separate sheets. Contributions are always welcome, will be promptly considered, and if used will be paid for. Communications should be addressed, according to their nature, to The Editor, The Advertisement Manager, or The Publisher, "Amateur Wireless," 58-61 Fetter Lane, London, E.C.4.

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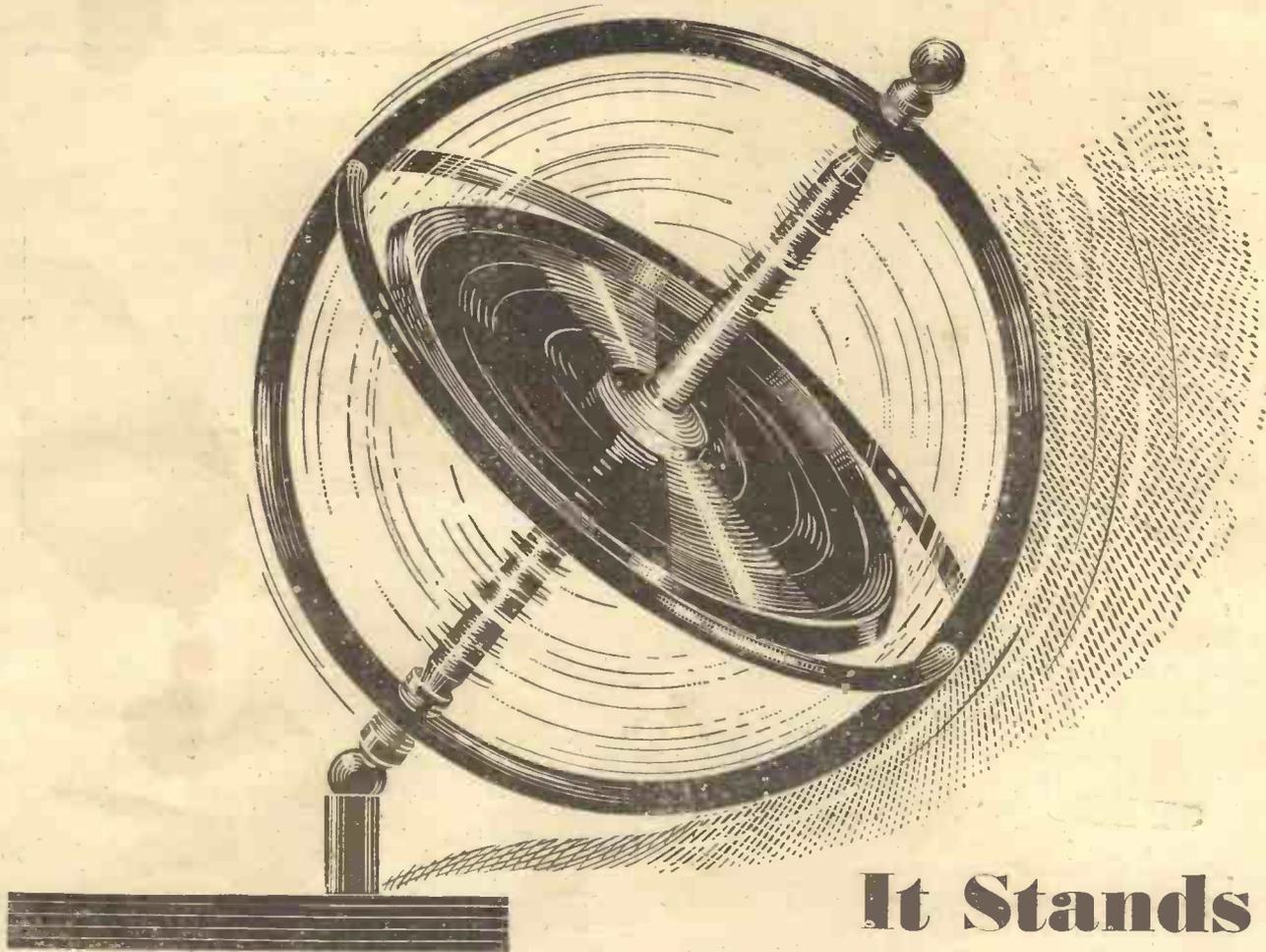
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Home-lover's All-electric 3 (SG, D, Trans.) AW335
The P.W.H. "Mascot" (D,RC, Trans) AW337
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Copies of the "Wireless Magazine" and of "Amateur Wireless" containing descriptions of most of these sets can be obtained at 1s. 3d. and 4d. respectively, post free. Index letters "A.W." refer to "Amateur Wireless" sets and "W.M." to "Wireless Magazine." Address letters.
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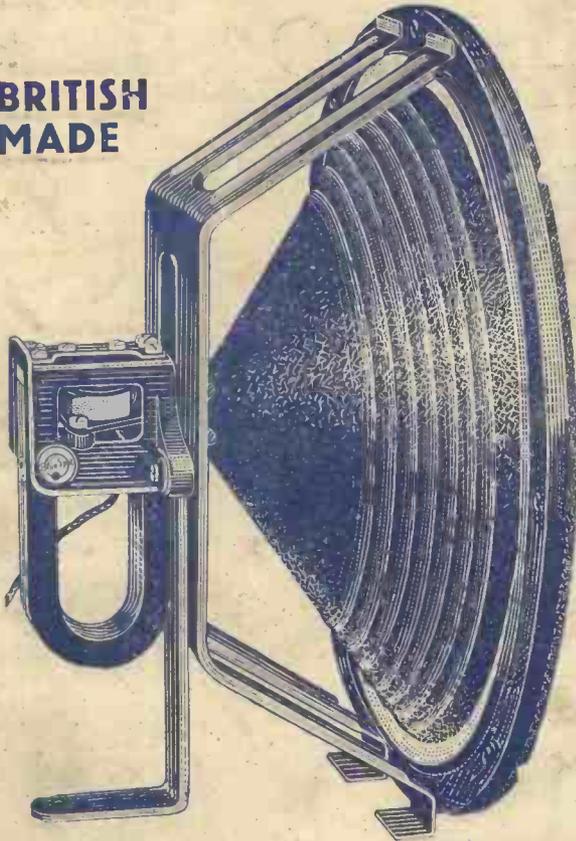
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For the man who wants a really good top notch speaker 100U provides good Moving Coil quality at economy price.

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