

The
Queensland

L. L. Shill

RADIO NEWS



*London
on the Loud Speaker*



A MAGAZINE *for the*
SET CONSTRUCTOR &
BROADCAST LISTENER

6^d

SEPTEMBER 1st 1928

VOL. IV.

NO. 8

FAMOUS • AMPLION • SPEAKERS REDUCED IN PRICE ♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦

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N.

A Resume of 4QG September Programmes

SATURDAY, September 1st.—A radio play, "A Son of His Father," followed by Speedway broadcasts and Lennon's ballroom.

SUNDAY, September 2nd.—Early morning and morning services from St. Barnabas' Church of England; afternoon, Danish Church and band concert; night, All Saints' Church of England, and band concert.

MONDAY, September 3rd.—A recital from the studio by Miss Gladys (piano) and Lena Hammond (contralto), followed by a radio play "Her Other Husband."

TUESDAY, September 4th.—A concert from the White House, Woolloongabba. The second half of the programme will comprise an entertainment by the Cadenza Plectral Club and Banjo Band.

WEDNESDAY, September 5th.—The usual dance night by Alf. Featherstone's Studio Syncopators.

THURSDAY, September 6th.—Brief relay from the Holywood Theatre, Greenslopes, followed by a relay of the Jubilee Dinner held at the Wattle Cafe in connection with the Defence Lodge (I.O.G.T.).

FRIDAY, September 7th.—The complete concert relayed from the Buranda Methodist Church Hall.

SATURDAY, September 8th.—Tivoli Theatre Orchestra, followed by a song recital by Mr. Sidney Calland and Miss Eileen Boyd (from 2FC and 3LO).

SUNDAY, September 9th.—Morning and evening services from the City Congregational Church. Usual band concerts, afternoon and evening.

MONDAY, September 10th.—Federal Band recital, 8 p.m. to 8.30 p.m., followed by a special popular programme arranged by Mr. Jack Ellis, and concluding with a brief studio entertainment.

TUESDAY, September 11th.—An excellent programme by Mr. Sydney May's talented party.

WEDNESDAY, September 12th.—The opening of the Presbyterian General Assembly from St. Andrew's Church, Creek Street, interspersed with musical items from the studio. From 9 p.m. to 10 p.m. the Cadenza Plectral Club will give an entertainment.

THURSDAY, September 13th.—Studio programme followed by a dramatic opera, "La Boheme" by Miss Alice Raven's party, concluding with a brief recital by the Brisbane Excelsior Band.

FRIDAY, September 14th.—The arrival of the Papal Legate relayed from the Central Railway Station, followed by special service from St. Stephen's R.C. Cathedral.

SATURDAY, September 15th.—Studio entertainment, Tivoli

Operatic Orchestra, Speedway broadcasts, and dance music from Lennon's ballroom will comprise the programme for the evening.

SUNDAY, September 16th.—Morning service from St. Stephen's Roman Catholic Cathedral, with His Eminence Cardinal Cerretti officiating. In the afternoon the laying of the foundation stone of the new Holy Name Cathedral will be relayed. In the evening the service from St. Andrew's Presbyterian Church will be broadcast.

MONDAY, September 17th.—Speeches from the public meeting held in connection with the Papal Legate's visit will be relayed from the Exhibition Hall. A studio programme of music will be interspersed throughout the proceedings.

TUESDAY, September 18th.—A relay of the Australian Inland Mission. Demonstration in connection with the Presbyterian General Assembly, followed by a studio programme and the first series of gardening talks in connection with 4QG Free Flower Seed Scheme.

WEDNESDAY, September 19th.—A dance night by the Studio Syncopators.

THURSDAY, September 20th.—A studio programme by 4QG artists.

FRIDAY, September 21st.—A special programme by the Silkstone Apollo Club, followed by the Studio Orchestra.

SATURDAY, September 22nd.—Savoy Theatre Orchestra, from 8.0 to 8.30 p.m., followed by an entertainment by The London Trio.

SUNDAY, September 23rd.—Morning service from St. Andrew's; service from St. Stephen's R.C. Cathedral.

MONDAY, September 24th.—A recital by Gladys Frost (piano) and Lena Hammond (contralto), followed by a studio programme.

TUESDAY, September 25th.—Mr. Sydney May's party will give a special programme from the studio.

WEDNESDAY, September 26th.—Usual dance night by the Studio Syncopators.

THURSDAY, September 27th.—A flute recital from the studio and the Savoy Theatre Orchestra.

FRIDAY, September 28th.—Popular concert relayed from the Acacia Gardens.

SATURDAY, September 29th.—Masonic social evening, relayed from Toowong Masonic Hall, followed by Speedway and Lennon's.

SUNDAY, September 30th.—Morning and evening services from its Tabernacle, band concerts afternoon and evening.

A GOOD SET NEEDS AN EXIDE BATTERY

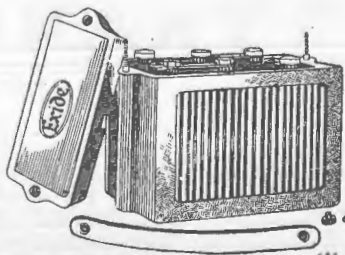
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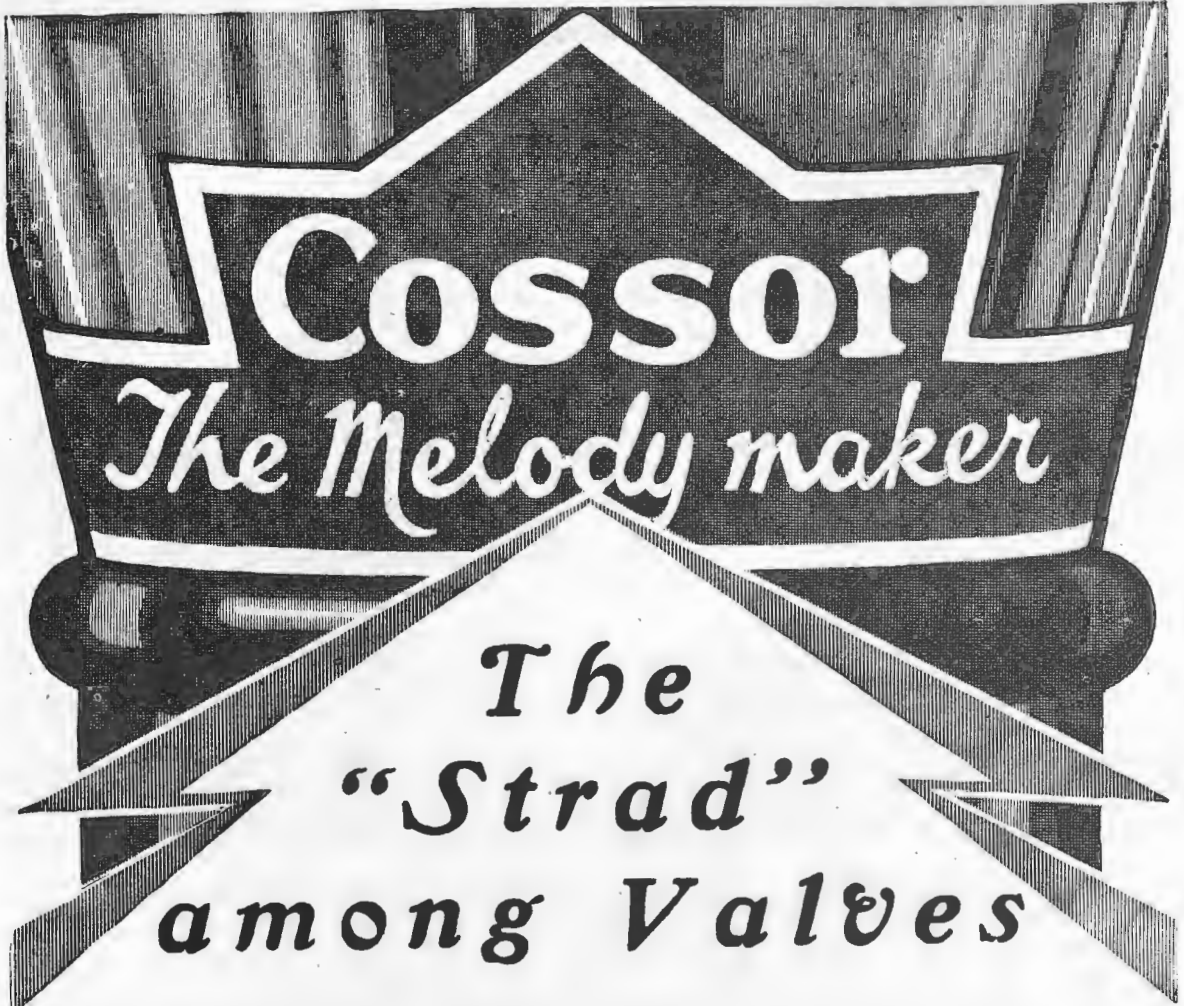
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ALFRED T. BARTLETT
Editor

LEIGHTON GIBSON
Technical Editor

RN

The
QUEENSLAND
RADIO NEWS

SATURDAY, 1st SEPTEMBER, 1928.

The Need For Relay Stations



SOME weeks ago, a would-be humorist forwarded an egg of doubtful integrity to a Southern broadcasting station with a request that they should relay it. That egg came from a district where reception of the station was poor, and it became immediately apparent to the officials that the locality was a "dead area" for eggs as well as for wireless reception, and they wisely agreed that a similar remedy would apply in both cases.

Despite the excellent pioneering work that has been rendered by the "A" stations of the Commonwealth, the broadcasting services to distant listeners still have many shortcomings. The bugbears of atmospherics and fading are responsible for much dissatisfaction. Unfortunately, the broadcasting stations have no control over, or power to overcome, the vagaries of Nature. The efforts of the greatest scientists along these lines have so far been hopelessly defeated, and by all indications, are likely to remain in that state for some time to come.

The only successful method of overcoming these great obstacles is by the establishment of a chain of relay stations of moderate power around the Commonwealth, so that "dead areas" may be penetrated, fading eliminated, and static, to a great extent, overpowered.

With its boundless spaces and scattered population, Australia's need for relay stations is indeed vital. It has been stated by responsible broadcasting authorities that the effective day and night range of any big broadcasting station is not greatly in excess of 25 miles. Whilst this, to the layman, may appear to be an ultra-conservative estimate, it nevertheless goes to prove that without the aid of relay stations, the "A" class stations can never hope to serve Australia's listeners as they should.

It may be argued that the costs of erecting and maintaining relay stations are excessive. Admittedly, the costs would not be light, but there is not a doubt that the resulting increase in licenses would justify the expense. At the present time nearly 80 per cent of the listening public of Australia is resident in or around the capital cities. Why? Simply because small set owners—who are of necessity greatly in the majority—can receive the broadcast concerts with ease. Thus relay stations would open up the small set market in the country, and increase the popularity of radio among those who could afford more powerful receivers.

With Government ownership of wireless looming in the distance, some move may soon be expected in the establishing of relay stations. The Prime Minister has stated that the matter is "on the programme," and for the sake of country listeners, we trust that it is planned for attention early in the piece.

QUEENSLAND RADIO NEWS

A Most Amazing Short Wave Receiver!

London on the Loudspeaker
—even on an Indoor Aerial!

The

GLOBE-TROTTER

DESIGNED AND CONSTRUCTED



HERE is something irresistibly fascinating to most radio enthusiasts in the thought of being able to sit in one's chair in an Australian home, and tune in to a programme transmitted direct from London. A concert from the Wigmore Hall; a lecture from the 2LO Studio at Savoy Hill; dance music from the famous Hotel Cecil—what a vibrantly living link it forms with the Capital of the British Empire! Needless to say, the wonderful receiver described in this article does not concentrate its attention on London alone. Stations in Holland, Russia and the United States of America are well within its reach, and headphones are virtually unnecessary, so tremendously sensitive is it to weak signals. Morse

stations—commercial and amateur—simply boom in from all over the world, and small amateur telephony transmitters in the Southern States come in at full loudspeaker strength.

It is the advent of the screen grid valve, which was described in our July issue, that has made such remarkable reception possible. Hitherto, it has been considered that amplification of short waves at radio-frequency was practically an impossibility, and the "old reliable" regenerative detector followed by one or two stages of audio-frequency amplification has been standard equipment in the majority of amateur stations. This circuit was outperformed only by one receiver—the Super-Heterodyne, using seven or eight valves, and not always an ideal proposition in inexperienced hands. The great obstacle to efficient short-wave r.f. amplification always has been the extreme difficulty of suppressing self-oscillation in the r.f. amplifier circuit due to the feed-back effect through the inter-element capacity of the valve itself. The Super-Het. overcomes the trouble by changing the wavelength of the incoming signal, transferring it to such a high value that it is possible for an ordinary r.f. amplifier to deal with it efficiently.

With the screen grid valve (used as a radio-frequency amplifier), this is not necessary. By means of an ingenious method of interposing an electrostatic shield between the grid and the plate, the internal capacity of the valve is reduced to a surprisingly low value, with a corresponding freedom from self oscillation. When correctly designed and constructed, the stability of a single-stage screen grid amplifier is so complete that no neutralising or other system of controlling oscillation is required.

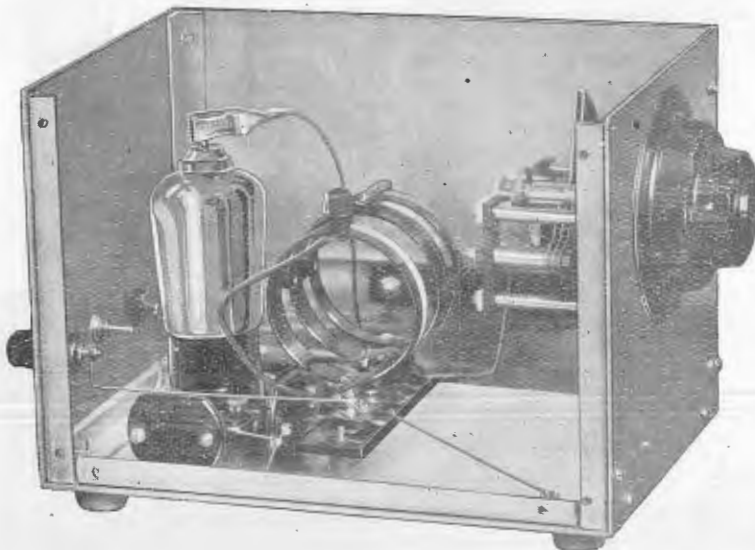


FIG. 2.—The Radio-frequency Unit, with side and top removed from the shielding. The screen grid valve may be clearly seen.

A view of the three units, plugged together to form the complete Globe-Trotter Four. From left to right are the screen grid radio-frequency unit, the detector unit, and the two-stage audio unit.

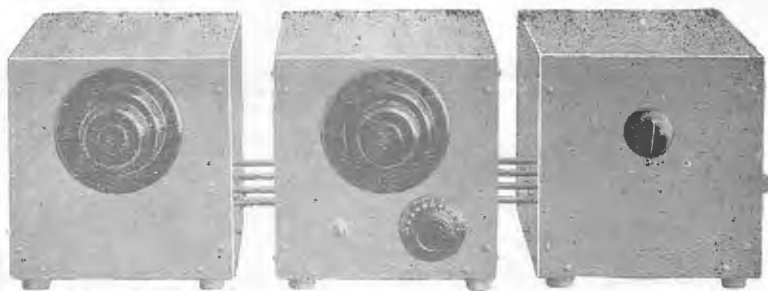


Figure 1

Screen Grid Four

BY THE TECHNICAL STAFF

Features of the Screen Grid Four.

In the design of the Globe-Trotter Screen Grid Four, we have taken into consideration the fact that the financial status of the average radio enthusiast is quite often far from imposing. The more-or-less constant state of impecuniosity under which the majority of radio men struggle along has become almost as much of a standing joke as the fisherman and his stories. Although the complete Globe-Trotter Screen Grid Four is not by any means an expensive proposition, we thought it would be a distinct advantage if it could be divided into three units, each unit complete in itself, and each the very best of its kind that could be built. Accordingly, the detector unit was constructed first—the middle unit in Fig. 1. It is a complete one-valve short-wave receiver, totally shielded, and designed to give the absolute maximum that can possibly be extracted from one valve.

A sensitive detector valve of the ordinary three-electrode type is used, and the circuit is very little different from the "Schnell" arrangement, which has enjoyed such wide popularity during the last few years. This one-valve receiver is capable of bringing in the English station itself; the volume on the headphones is not great, it is true, but there is no difficulty in following the announcements, for all that. Thanks to the aluminium box in which the parts are assembled, body capacity—that great annoyance with most short-wave receivers—is quite absent, and tuning is a real pleasure. This detector unit (Fig. 2) is fitted with terminals for the battery connections, and is also equipped with four small sockets in each side, most of these being insulated from the metal shielding, as will be explained later.

After the detector unit had been thoroughly tested, the two-stage audio amplifier was assembled. In design, it is not at all novel, but again every care was taken to produce a unit which would be the absolute best of its kind. Apart from the use of a new type of valve in the last stage—a valve giving tremendous amplification with high quality of reproduction—there is really nothing in this two-stage amplifier essentially different from the transformer-coupled amplifier of standard design. Complete shielding in this case is not strictly necessary, but an aluminium box was utilised in order to have uniformity as re-

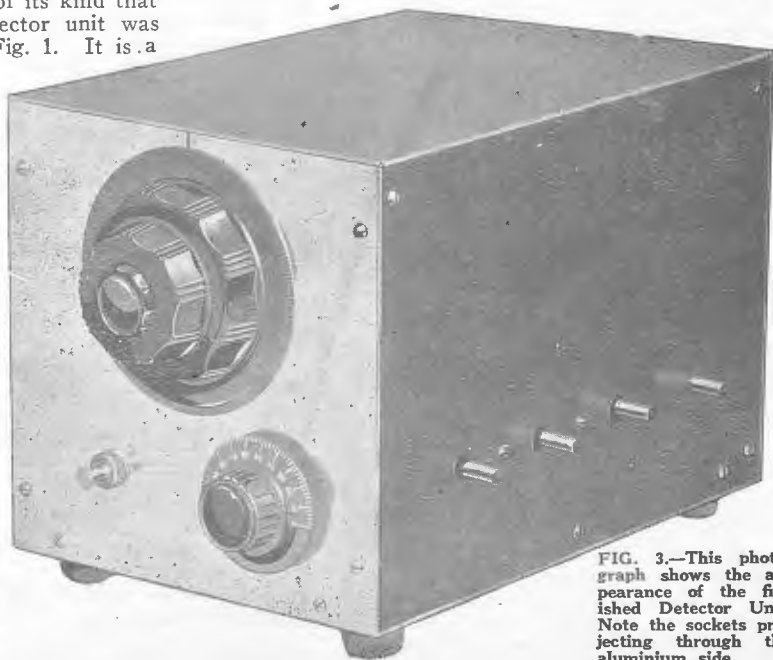


FIG. 3.—This photograph shows the appearance of the finished Detector Unit. Note the sockets projecting through the aluminium side.

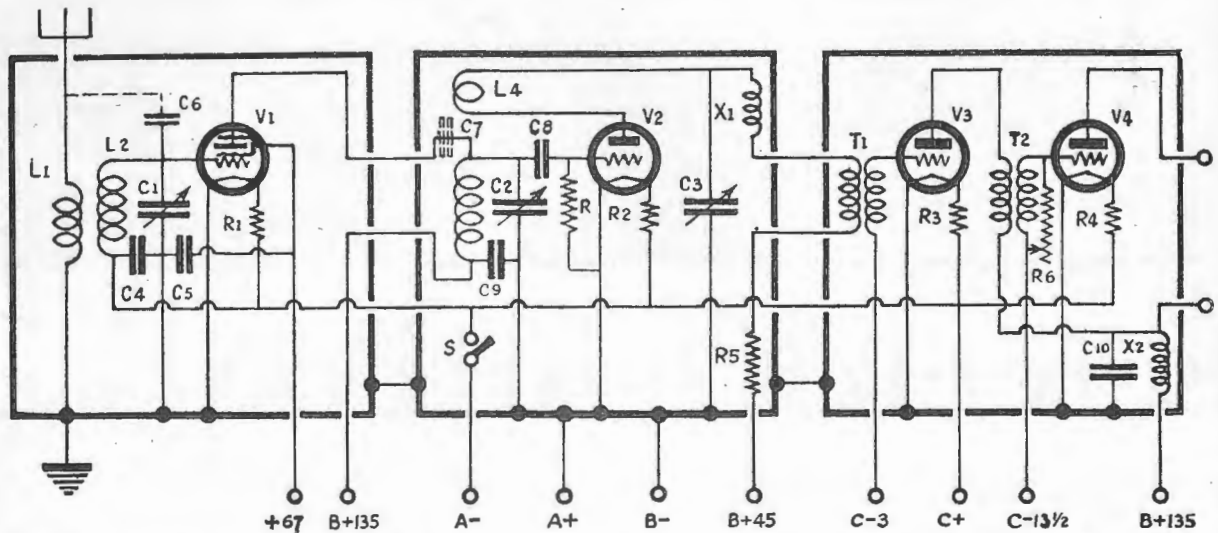


FIG. 4.—The heavy black lines in this circuit diagram represent the aluminium shields. V1 is the screen grid valve. The battery terminals are not shown in their correct relative positions. Note the connections joined to the shields.

gards appearance. This amplifier unit is equipped on one side with plugs, which correspond in position with the sockets on the detector unit. It is simply lined up against the detector unit, the plugs pushed into place, and we have a three-valve short wave receiver. The only extra connections that must be made are those to the "B" and "C" batteries and the loud-speaker or phones. The three-valve set thus formed operates splendidly, and is quite capable of tuning-in the London programmes at fair loudspeaker strength, and with excellent headphone volume.

Now comes the "star performer" of the whole assembly—the agent that transforms distant stations, to all intents and purposes, into "locals," and a mere whisper into a roar. The third unit to be built is the screen grid radio-frequency amplifier (the left-hand unit in Fig. 1). It is a complete single-stage radio-frequency amplifier, and may be added to any existing short-wave receiver of the ordinary type with but slight alteration to the latter. The heart of this unit is the new Philips A.442 screen grid valve, having an amplification factor of 150.

As in the case of the detector and audio-frequency sections, this r.f. unit is totally shielded, and is fitted with plugs, which enable it to be plugged into connection with the detector unit, thus making a complete four-valve receiver of the most modern design—one stage of screen grid radio-frequency amplification,

regenerative detector, and two-stage high-quality audio-frequency amplifier.

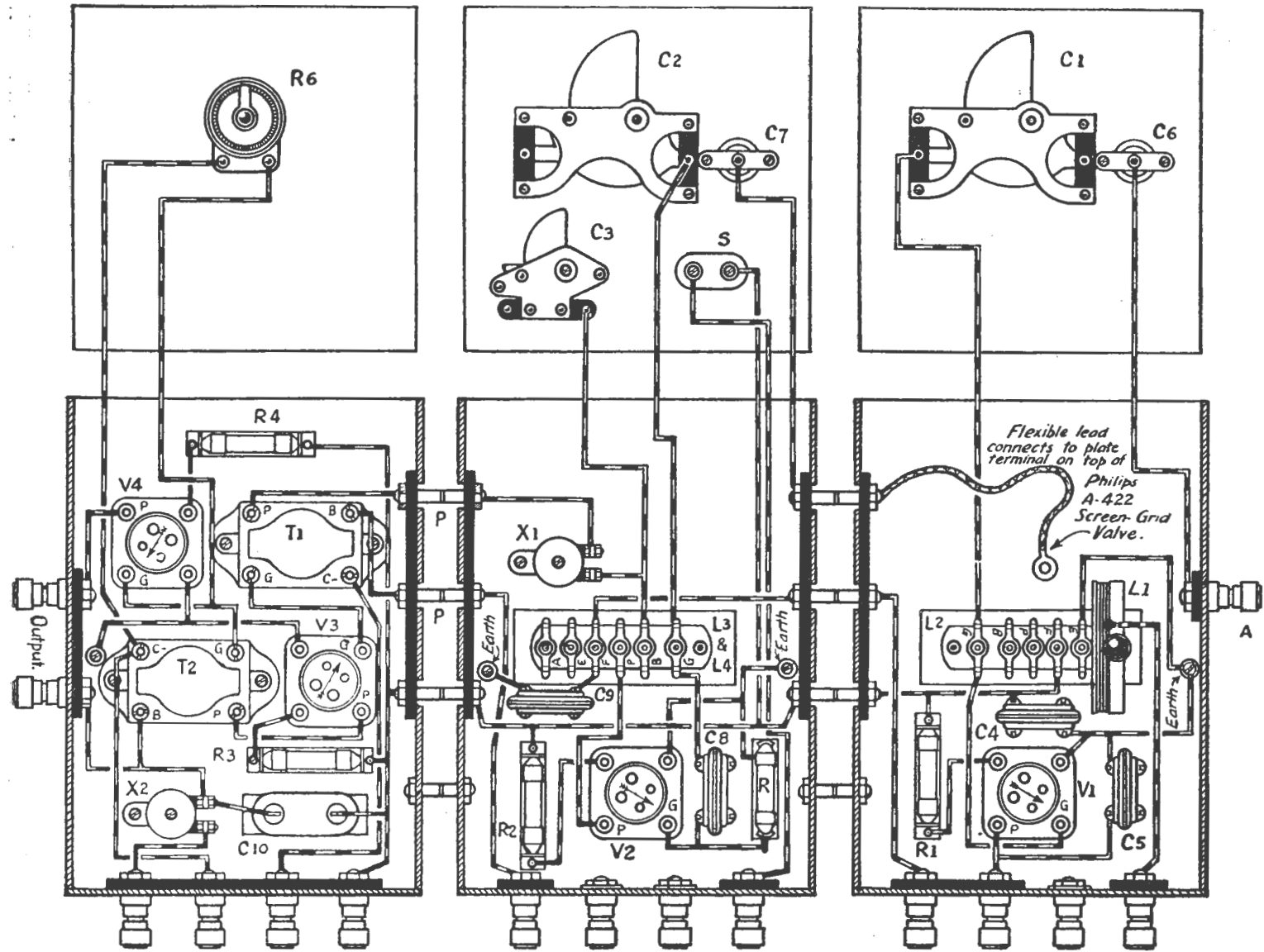
It should be made quite clear at this point that the entire four valves may be built into one complete unit, using one-piece aluminium panel, back, top and bottom, and with aluminium partitions dividing the large box off into three compartments. For

the man with limited time and means, however, the commonsense way is to build the detector unit first, as we have done, adding the audio unit when time and funds permit, and, lastly, completing the receiver by the addition of the screen grid r.f. section. If the lastnamed is not required, then it is perfectly feasible to construct only the detector and audio sections, thus forming a complete three-valve set, and letting it go at that. It will be seen from the foregoing that the design admits of a maximum of flexibility, and this feature alone will commend itself to most amateur set constructors.

The Circuit.

Now we progress to a brief description of the circuit, which is illustrated diagrammatically in Fig. 4. At this stage, it will be most convenient to regard it in the light of a complete four-valve receiver, and, if you are accustomed to reading circuit diagrams, you will be able to discover for yourself that it is really a modification of the old four-valve broadcast receiver, using one stage of radio-frequency of the "tuned-anode" type so popular a few years ago, a regenerative de-

EFFECTIVE radio-frequency amplification at short wavelengths! What entrancing words to the short-wave enthusiast — and how eagerly awaited! Yes; it is here at last—radio-frequency amplification of wavelengths as short as 15 metres with an efficiency equally as high as that of the ordinary broadcast wavelengths amplifier, or perhaps higher. And the beauty of it is that there is so little apparatus needed, and everything is so simple and straightforward that it doesn't need an expert either to build or operate such a set. The Globe-Trotter Screen Grid Four is without doubt the latest word in short-wave receivers, and its performance attains a standard which one cannot describe with much hope of being believed.



B+135 C-13½ C-3 C+ B+45 B- A+ A- B+135 C+67 E A

FIG. 5.—Wire the set from the pictorial diagram. Some of the terminals are insulated from the shielding, while others are not. The same applies to the plugs and sockets (P). The alternative aerial terminals provide for either magnetic or static aerial coupling.

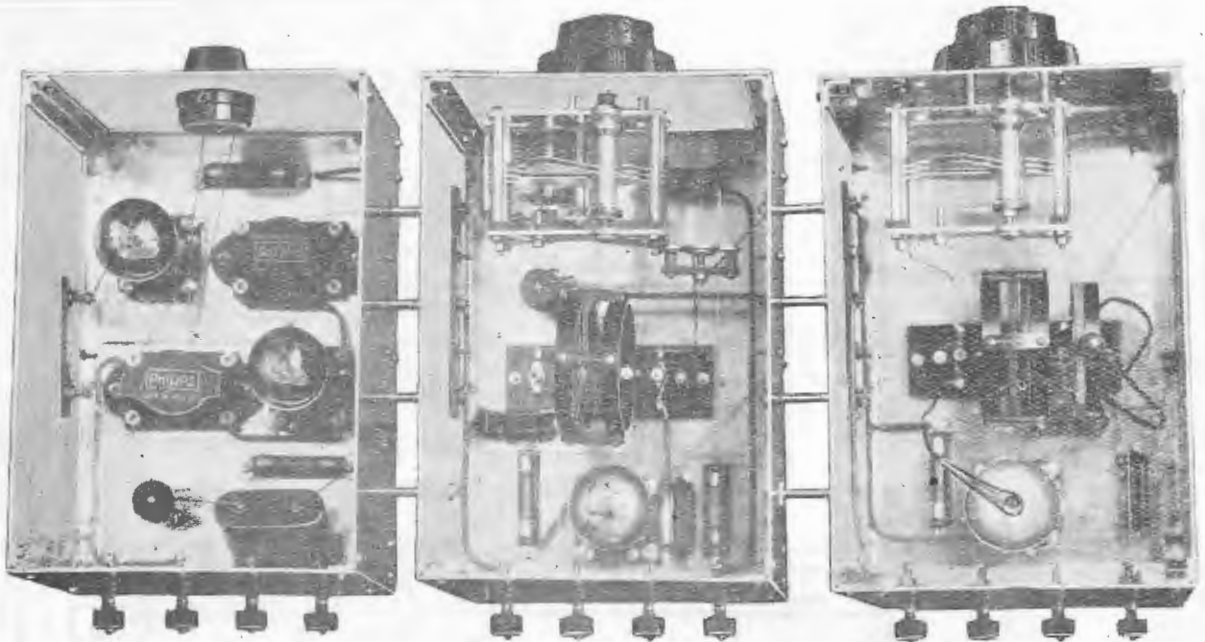


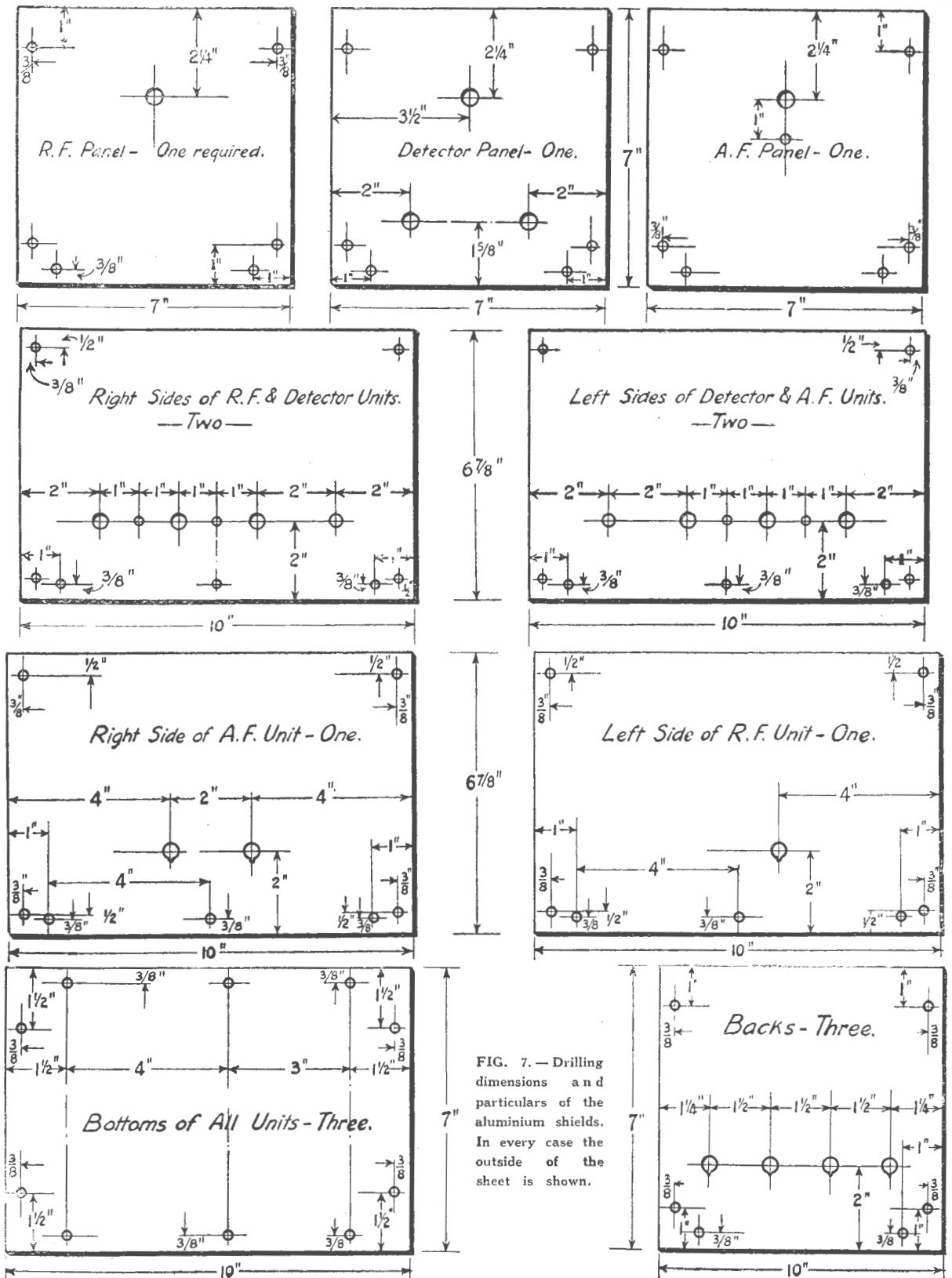
FIG. 6.—A top view of the three units with covers removed. The simplicity of layout and wiring is apparent. Don't follow the wiring in this picture, as the reflections in the aluminium are very confusing. The screen grid r.f. compartment is on the right, detector in the middle, and audio on the left.

detector, and two stages of audio. An interesting and novel feature of the r.f. amplifier section (the left-hand unit) is that provision is made for the aerial to be either inductively coupled to the grid coil L2 by means of the untuned coupling coil L1, or statically (capacity) coupled via the small adjustable condenser C6. V1 represents the screen grid valve, the screen grid being indicated by the line surrounding the plate. This screen grid, as explained previously, has the effect of minimising the capacity between the plate and the grid of the valve. A bias, or "C" voltage must be applied to the screen grid for correct operation, and it is important to note that, contrary to customary practice, it is a **positive** bias, and is really a tapping from the ordinary "B" battery. The correct voltage to use here, with the Philips valve, is approximately half that applied to the plate, although the value is not critical within limits of about ten volts each way.

A lead goes from the plate of the screen grid valve, through the shielded side of the box (without touching it), to the grid circuit of the detector valve. Notice that the small adjustable condenser C7 is short circuited when the screen grid amplifier is being used. When the middle unit is being operated as a plain detector circuit, however, without any stage of r.f. ahead of it, this small condenser becomes the aerial coupling condenser. In most respects, the detector circuit (in the centre compartment) is of standard design. In one or two points, though, it is different. For instance, some slight modification had to be made in order to allow the plate current for the screen grid valve to be fed through the coil (the one immediately below L4) without the plate voltage being applied to the grid of the detector valve. The fixed condenser C9 takes

care of this, and, for the same reason, the grid leak was connected directly to the positive leg of the filament, instead of being shunted across the grid condenser, as is usually done. In the "B45" lead, which carries plate current to the detector (through the primary of the first audio transformer T1) is inserted a fixed 20,000 ohms wire-wound resistor, its object being to eliminate the intensely annoying "fringe-howl" which is often encountered in short-wave receivers. This trouble manifests itself in the form of a loud howl just as the circuit is on the point of oscillation, and is fatal to good reception of telephony. It is common knowledge that a short-wave receiver—in fact, any regenerative receiver—should go into and out of oscillation smoothly, without a loud click or a howl. The fixed series resistance incorporated in this receiver is the most successful solution to the problem that the writer has come across so far. In this circuit, regeneration is controlled by the variable condenser C3 in the usual way.

The audio amplifier (the right-hand section) calls for little comment. One unusual feature is the inclusion of the radio-frequency choke X2 in the "B" battery lead. Its purpose is to eliminate any tendency for r.f. energy to be fed back into the audio end of the receiver by way of the "B" batteries. A means of controlling the volume is furnished by the variable resistance R6, connected across the secondary of the second transformer T2; the set is so powerful that this is an absolute essential, especially when it is desired to listen in on the phones. In our receiver, the valve V4 is one of the new Philips B.443, which has three grids, and, suitably connected, has the extraordinary amplification factor of 100. This valve has an extra connection, which is not shown in the illustrations be-



cause it had not arrived when the pictures were made. This is simply a terminal on the side of the valve, and is connected directly to the "B†135" terminal.

Construction.

It is just as well to say, before going any further, that there is nothing so very formidable in the construction of the Globe-Trotter Four, in spite of its rather complicated appearance. By far the greater proportion of the work is involved in constructing the three aluminium boxes. However, as the aluminium sheet is obtainable already cut to size by a guillotine, and all dimensions for drilling are shown in the drawings reproduced on page 11, assembling the boxes is a matter of time and patience rather than of skill.

The sizes of the aluminium sheets are specified in the list of parts, together with the length of the various pieces of aluminium angle strip to which the sides are bolted. The panels, backs, sides and bottoms should be drilled according to the dimensions shown in the drawings. The holes near the edges, which accommodate the assembling bolts, should be made with a 5/32-inch drill, so that sufficient clearance will be left round the 1/8-inch bolts to allow for any slight error which may creep in. Aluminium is very easy to drill—much easier than bakelite—but a large burr is formed on the reverse side, and this must be removed with a coarse file. On the reverse side of each sheet you should mark the position it is intended for; this will avoid any mistake when assembling the boxes. The larger holes in the sides of the boxes through which the plugs and sockets project **without touching**, are 3/8-inch in diameter. If you do not possess such a large drill, they may easily be reamed out from a smaller hole by means of the tang of a file. The large holes in the backs, and in the left side of the r.f. unit (see drawing) are just large enough to accommodate the bakelite shoulder on the Belling-Lee terminals, and a small "V" shaped nick must be cut just below each hole to hold the point moulded in the terminal; this is to prevent the terminal turning, and is an excellent feature.

After drilling the sheets and polishing them with Brasso, and cutting the angle strip to the correct lengths, the boxes may be assembled. The easiest way to do this is to hold two of the sheets which are intended to be joined with their edges up against one another in the correct position, with the proper piece of angle strip inside, and, with a centre-punch, mark the position of the holes on the angle-strip. The punch, is of course, inserted through the various screw-holes which are already drilled in the sheets. The holes are then drilled in the angle-strip, and the two sheets bolted to it. This process is repeated with each corner, and with the bottom, until a five-sided box is the result. The top, in each case, simply springs on, the top edge of the back being bent slightly inwards to grip it. If, due to any slight inaccuracy in marking or drilling the holes in the angle-strip, it is found that some holes do not line up with one another (do not register), simply enlarge one or both until it is possible to pass the bolt through comfortably.

Now, all this sounds complicated in the extreme, but in reality it is not so. It is the hardest thing in the world to describe the assembly of these boxes in so many words, but with the very complete drilling

measurements furnished, and with a grain or two of commonsense, we feel sure that anyone who is moderately handy with his tools and has sufficient patience and the desire to make a good job, will have little trouble in constructing them satisfactorily.

Now we will deal with the construction of the separate units, assuming that the aluminium boxes have been assembled. We will consider them in the order they appear in the photograph of the complete set—Fig. 1.

The R.F. Unit.

In Fig. 2 is shown a view of the radio-frequency amplifier unit, with one side and the top removed from the shield. In order to show the parts clearly, the small adjustable coupling condenser C6 has been removed. With the aid of the top view (Fig. 6) and the pictorial diagram (Fig. 5), it should not be a difficult matter to secure the various parts in their correct positions. The Radiokes coil mounting must be placed so that there is a clearance of about 1 inch between the back of the condenser and the coil. It is mounted with the variable aerial coil at the right-hand end (looking from the back). The other parts to be mounted are the socket (make sure the terminals face in the correct direction) and the Amperite. These parts are bolted directly to the aluminium bottom-plate of the box, using the 1-inch bolts specified in the list of parts. In the case of the coil mountings, small spacers about 1/2 in. long should be slipped on the bolts between the aluminium and the coil mounting, so that it will be raised up a little. Three Grodan plugs are mounted 2 inches apart on one of the 5 in. Radion strips, and this strip is bolted to the side of the box, as shown, in such a manner that the plugs project through the three large holes, without touching the aluminium. The fourth plug is mounted directly on the aluminium side of the box, as indicated in the drawing. All the terminals except the one marked "E" (earth) are insulated from the aluminium. This is easily taken care of with the Belling-Lee terminals, as they are provided with a bakelite shoulder, and it is only necessary to drill a fairly large hole in one of the 3/4 in. squares of Radion, slip it over the stem of the terminal inside the box, and run on the washer and nut. This makes a perfect job, mechanically and electrically.

The wiring is carried out with 18-gauge tinned copper wire, with a piece of spaghetti slipped on the wire wherever there is any danger of it coming into contact with the shielding. It will be noticed that two of the connections are connected to a point marked "Earth." This is simply one of the bolts which hold the box together; an extra nut is used in order to clamp down the wires, so that they will make good contact with the metal. The Grodan neutralising condenser C6 is mounted directly on one of the stator terminals of the tuning condenser C1, by means of its own lug. The flexible lead should be just long enough to connect to the plate terminal on the top of the Philips screen grid valve, and may consist of a piece of the 18-gauge tinned wire. Perhaps it should be made clear that the tuning condenser C1 is mounted directly on the aluminium panel, without insulation. The aluminium shielding is used, throughout the entire set, as the positive "A" battery connection, and this scheme saves a considerable amount of wiring.

The Detector Unit.

In the detector unit, the tuning condenser C2 and the reaction condenser C3 are mounted right on the metal panel. If the Cutler-Hammer battery switch is used, there is no insulation required between it and the panel, as the metal body of the switch is "floating," and does not make contact with any part of the actual switch mechanism. This is an important point. In the small Grodan condenser C7 will be found a piece of heavy paper, or some such material, covering the fixed base-plate, so that it is impossible for the moving plate to come into contact with it when screwed down as far as it will go. This insulation must be removed—tear it away so that the two plates will press together when screwed down. Do not neglect this point. As before, the coil mounting is placed so that there will be an inch of clearance between the coil and the back of the tuning condenser, but this time, the aerial-coil end must be on the **left-hand** side (from the back). The aerial coil is removed from this mounting altogether, as it is not used. The socket, Amperite and the grid-leak mounting are bolted to the bottom, the fixed condensers being supported solely by the wiring. Mount four Grodan sockets on each side of the box in the same way that the plugs were mounted on the previous box. In this case, however, the two sockets (one on each side) which are mounted directly on the aluminium should have 1/8-inch nicks on their open ends, for obvious reasons. The wiring needs no description.

The Audio Amplifier.

Care must be taken in assembling the audio amplifier unit to mount the transformers and sockets in such a way that the terminals will be in the correct relation to one another. The terminals are marked in the drawing, and, if this is followed closely, everything will be alright. Both transformers and the 2-mfd. Ferranti condenser C10 are bolted to the aluminium with no insulation interposed. On the other hand, the variable resistance R6 must be insulated thoroughly from the metal panel. The best way to accomplish this is to drill an oversize hole to pass the spindle and bushing with ample clearance all round it. A bolt is passed through the panel one inch below the spindle, and this passes through the hole provided in the resistance, a nut making everything secure. A piece of empire-cloth, or even a piece of cardboard, is placed between the resistance and the panel, and, before tightening up the bolt, make sure that the spindle and centre-bushing project through the hole centrally, and do not touch the aluminium at any point.

Notice that the connections from the positive terminals of the valve sockets are joined to one of the bolts in the aluminium shielding; in other words, they are "earthed." We omitted to say that four rubber feet are bolted to the bottom of each unit, close to the corners. Better still would be four small pieces of rubber bath sponge glued to the bottom of each box.

Preliminary Adjustments.

The Philips screen grid valve is inserted in the socket V1, and the flexible connection secured under the terminal on top of the valve. It should be under-

stood that the connections shown are correct only for this particular make of screen grid valve. As yet, there is no uniformity as regards the socket connections for the various makes of screen grid valves, so, if it is desired to utilise a valve of different manufacture, it will be necessary to change the socket connections in accordance with the directions accompanying the valve. With the Philips valve, we found an exterior continuation of the screen (inside the valve) unnecessary. This was not unexpected, as the manufacturers mention that the screen is required "when the valves are used in a two-stage amplifier," although they do not say definitely that it is unnecessary when only one stage is used. At the same time, there is no harm in trying the effect of the exterior screen; an idea of its construction is given in the leaflet packed with the valve. It is important that the grid and plate leads should be as widely separated as possible, and the plate lead should be isolated as far as practicable. As will be noticed in the drawing, the reaction coil is not used in the r.f. amplifier unit—the terminals are simply left blank. We have found that capacity (static) coupling gives better results with this set on the lower wavelengths than magnetic coupling. When the aerial is connected to the terminal in the side of the box, the aerial coil L1 should be lifted out of its socket, and rested on the bottom of the box. The coupling condenser C6 should be screwed with the plates as close together as possible—that is, with the small plate resting against the insulating separator. When magnetic coupling is desired, the aerial is transferred to the "A" terminal on the back of the box, and the aerial coil L1 placed in the position shown—parallel with the grid coil.

Refer now to the detector unit; in this case, the aerial coil is not used, but is removed entirely. A Philips A.415 valve goes in the socket H2.

In the audio amplifier unit, a Philips A.415 valve is inserted in socket V3, and the new B.433 in the last socket V4. From the extra terminal which will be found on the side of this valve, a flexible connection is taken to the terminal of the r.f. choke X2 which is connected to the transformer. Of course, if an ordinary type of valve is used, this is not needed.

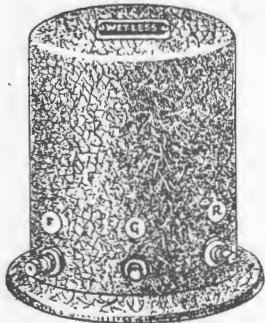
Now for the battery connections. We will regard the set as a complete receiver, with the three units plugged securely together. The 4-volt accumulator "A" battery is connected to the "A—" and "A+" terminals, negative to "A—" and positive to "A+." The filament circuits have been designed in such a way that the filament current is fed from the centre (detector) unit to the other two, so that the battery switch "S" controls all three units.

Three 45-volt "B" batteries are connected in series, so that a 135-volt battery is formed, the positive terminal of one battery being connected to the negative of the next in the usual manner. Following the pictorial diagram (Fig. 5), the "B+" terminal is connected to 45 volts, or perhaps to 67 volts. The "C+67" is connected to the 67-volt point on the same battery. The two "B+135" terminals are connected to the maximum voltage—135.

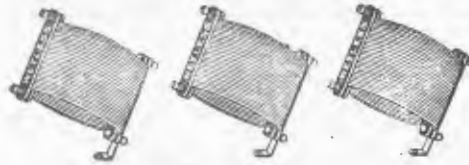
The three 4½-volt "C" batteries are connected together, negative to positive, as before. Terminal "C+" goes to the "+" of the 13½-volt battery thus formed, "C-3" to the 3-volt point, and "C-13½" to the full negative voltage. Earth goes to the "E" terminal,

"WETLESS"

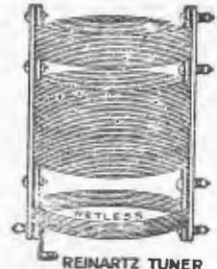
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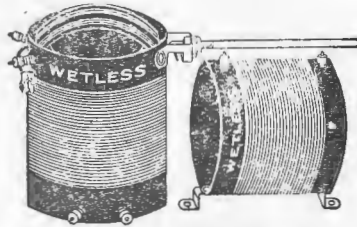
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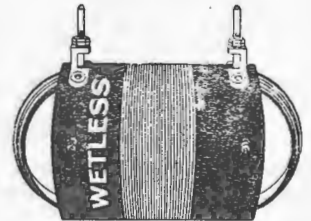
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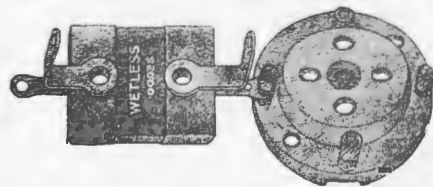
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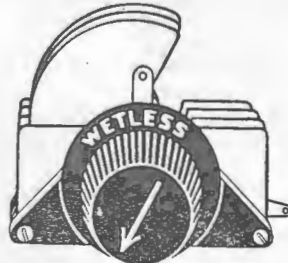
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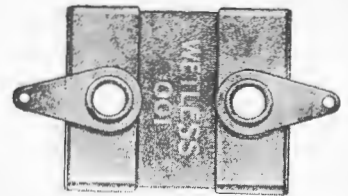
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"B" TYPE.

"WETLESS" MICA CONDENSERS

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 for
"WETLESS"
 Guaranteed Radio
 Products

"A" TYPE.

.0001
 .00015
 .002
 .00025
 .0004
 .0003
 .0005
 .001
 .002

1/6 Each

.00025 (with clips), 1/9 each.

"B" TYPE.

.0001
 .00015
 .002
 .00025
 .0004
 .0003
 .0005
 .001
 .002

2/- Each

"B" TYPE.

.003 2/6
 .005 3/-
 .004 2/6
 .006 3/6
 .0075 3/9
 .01 5/-
 .02 5/-
 .0025 (with clips), 2/6 each.

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aerial to either of the two "A" terminals, as explained previously, and a loudspeaker or pair of phones to the output terminals. Results will be better still if it is possible to increase the voltage applied to the "B \dagger 135" terminal on the screen grid r.f. stage to 150 volts, though all our reception has been carried out with only 135 volts. It should always be remembered that the voltage applied to the "C \dagger 67" terminal must be somewhere about half that applied to the other, and it is taken from the same "B" battery.

Reception.

The smallest coils supplied with the Radiokes kits have three turns each, and these coils run up to about 30 metres. For the reception of 5SW, Chelmsford, England, which transmits the London programme on 24 metres, one of these coils is plugged in the r.f. unit, and the other in the detector unit. In order to promote ready oscillation on the part of the detector circuit, the turns of the coil which is plugged in that unit are bent over towards their reaction coil (which will be seen wound in a slot in the same former). This can be seen in Fig. 6. Assuming all the time that the three units are being operated as a complete receiver, the moving plate of the coupling condenser C7 (from which the insulation has been removed) must be screwed right down until it presses firmly against the bare lower plate.

To tune in 5SW, turn on the battery switch, and rotate the volume control resistance (R6) as far as it will go towards the left (counter-clockwise). Turning the plates of the reaction condenser C3 into mesh should make the circuit oscillate, this being indicated

by the usual hissing sound. 5SW should be received with the plates of the detector tuning condenser C2 **somewhere about** threequarters of the way into mesh, and the adjustment of the radio-frequency tuning condenser C1 will not be so very far from this point. It will be found that a signal may be tuned in weakly (try this on a morse signal) simply by rotating the detector dial slowly while the set is maintained in a state of oscillation by means of the reaction condenser. Upon turning the r.f. dial, the signal will become stronger until the two circuits are almost in tune, when the strength will be maximum. At this point it will probably be necessary to retune slightly with the detector dial, and to increase the reaction condenser setting in order to keep the set oscillating.

In the case of telephony, the carrier may be tuned to maximum strength, then reaction reduced until the music is clear, at the same time following it up with the tuning dials. Although somewhat tricky at first, tuning the Globe-Trotter Four is not difficult when the principle is grasped, and a little practice soon enables one to tune in a station with astounding strength in a very short time. As mentioned before, we obtained better results on the smaller coils with the aerial connected to the side terminal, but this may not be so with all aeriels. The volume control is used to reduce the strength sufficiently to make headphone reception comfortable, and to prevent some of the louder morse stations in America and Japan from causing trouble with the neighbours.

The medium-sized coils cover the wavelengths between approximately 30 and 50 metres, and at this point a small surgical operation is called for. From

Parts Required for the Globe-Trotter Screen Grid Four

- 2 Cyldon .0001-mfd. Logmidline variable condensers C1, C2
- 1 Cyldon .0002-mfd. Bebe reaction condenser, C3
- 3 Sangamo .006-mfd. fixed condensers, C4, C5, C6
- 1 Sangamo .0001-mfd. fixed condenser, C8
- 2 Grodan neutralising condensers, C6, C7
- 1 Ferranti 2-mfd. fixed condenser, C10
- 2 Radiokes short-wave coil kits, L1-L2, L3-L4
- 4 Amperites, type 18, R1, R2, R3, R4
- 1 De Jur 5-meg. leak, R
- 1 Ferranti 20,000-ohms fixed resistor, R5
- 1 Electrad Royalty variable resistance, 1500-100,000 ohms R6
- 1 Cutler-Hammer battery switch, S
- 2 Philips audio transformers, T1, T2
- 4 A.W.A. cushioned sockets, V1, V2, V3, V4
- 2 Radiokes R.F. chokes, X1, X2
- 1 De Jur single resistor mounting
- 2 Gee Haw vernier dials
- 8 Grodan short-wave plugs and sockets

- 15 Belling-Lee bakelite terminals (ANT., ANT-1, GND., A-, A+, B-, B+, B.AMP+, B.AMP+, C+, C-, C-, OUTPUT+, OUTPUT-).
- 4 Strips Radion, 5 x $\frac{3}{4}$ x $\frac{1}{8}$ inch
- 12 Pieces Radion, $\frac{3}{4}$ x $\frac{3}{4}$ x $\frac{1}{8}$ inch
- 4 Dozen 1 x $\frac{1}{8}$ inch round-head nickelled brass bolts
- 1 Gross $\frac{1}{2}$ x $\frac{1}{8}$ inch round-head nickelled brass bolts
- 1 Gross $\frac{1}{8}$ inch hexagon pressed brass nuts
- 12 Perdreau rubber basin buffers

Aluminium Sheet:

- 6 Pieces 7 x 7 inch, 16 gauge (panel and backs)
- 6 Pieces 10 x 6 $\frac{1}{2}$ inch, 16 gauge (sides)
- 6 Pieces 10 x 7 inch, 16 gauge (tops and bottoms)

Aluminium Angle:

- 6 Pieces 8 $\frac{1}{2}$ inch long
- 12 Pieces 5 $\frac{1}{2}$ inch long
- 12 Pieces 6 $\frac{1}{2}$ inch long

ACCESSORIES:

- 1 Philips A.422 screen grid valve
- 2 Philips A.415 valves
- 1 Philips B.443 valve

- 3 45-volt "B" batteries
- 3 4 $\frac{1}{2}$ -volt "C" batteries
- Loudspeaker, phones, aerial equipment, etc.



the 8-turn coil which is to be plugged in the detector unit, 2 complete turns must be removed, making it into a 6-turn coil. This is done by unsoldering the wire from the grid end pin, cutting it, and pulling it through the supports, soldering it to the lug again when the two turns have been removed. This operation is not necessary in the case of the coil which is to be used in the r.f. unit, nor is any change made in the largest coils.

After one has become familiar with the operation of the receiver, it is possible to pick up a station quickly by rotating the two tuning dials in the approximate relative positions which will give greatest sensitivity; however, this is a matter which needs practice.

The Globe-Trotter is so extraordinarily sensitive that the aerial does not need to be at all pretentious. At the same time, it is recommended that as good an aerial as it is possible to provide be used, because, as with any receiver, signal strength is greatest with a large aerial. Some idea of the receiver's power may be gained from the fact that, using an indoor aerial no more than 30 feet in length, and consisting of a 24-gauge wire concealed above the picture-rail, it is possible to receive 5SW (England) at good loud-speaker strength as late as 6.30 o'clock in the morning. If one is strong-minded enough to be able to turn out at 5 a.m., or even a little earlier, he is rewarded by tremendously strong telephony. On an outdoor aerial of average dimensions, however, the English station is still audible on the speaker as late as 7.30 a.m., and, at 6 a.m., the volume is such that the music and speech can be plainly heard all over the house. A surprising part about this reception is the almost startling clarity of the announcements. Usually, it is just as though the announcer were standing at one's elbow; it is almost uncanny to reflect that in actual fact he is standing before a microphone some 13,000 miles distant, this being approximately the distance covered by the waves.

More in Next Issue.

If the detector unit is constructed first, as we have suggested, it is placed in operation as follows: The small Grodan condenser C7 is unscrewed until the plates are separated about one-eighth of an inch. The aerial is connected to the socket on the left-hand side, nearest the front of the box. The earth-wire goes to the socket on the same side, nearest the back, and the headphones are connected to the two front sockets on the right-hand side. For adding the audio amplifier and thus operating the set as a three-valver, no directions are needed. In our next issue we shall describe the small alteration which has to be made to an ordinary short-wave receiver in order to permit the screen grid radio-frequency unit being connected in front of it.

Since the Globe-Trotter Four was built, the well-known Sydney firm of Radiokes has placed on the market a kit of aluminium shields which is easily assembled into a box measuring 9 x 6 x 5 inches. These should be an attractive proposition to those who do not wish to go to the trouble of making the shields themselves. Although smaller than the boxes we have used, the Radiokes shields should be quite suitable for the Globe-Trotter if the parts are re-arranged a little. They are a very neat job, and should fill a big want among set constructors. We shall present more particulars of these in our October issue, which will contain quite a lot of information relative to the latest screen grid developments.

CORRESPONDENCE

Beerburrum

6th August, 1928.

To the Editor,

Dear Sir,

The other day, whilst talking to a keen wireless friend of mine, I was asked to describe the "Power Buzzer."

The Power Buzzer, as it was commonly called, was a two-valve wireless transmitter and receiver; no aerial was needed and the earth consisted of eight pegs, four on each side of the set. Although I have operated this set on several occasions during 1918 in France, I would like to know something more about it technically.

You would greatly oblige if you could publish full particulars and also the circuit of this old time set in your next issue of the "Radio News."

I'm sure that most of your listeners would be interested to know something about what was the best in wireless ten or eleven years ago.

Thanking you in anticipation,

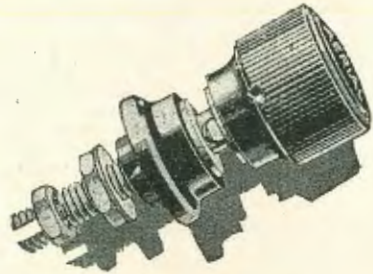
I am, Yours faithfully,

Wm. Barber.

Late of Signals, 10th Inf., G. Coy., A.I.F.

(Perhaps some of our ex-Signal Corps readers may be able to supply particulars of the Power Buzzer mentioned by Mr. Barber.—Ed.)

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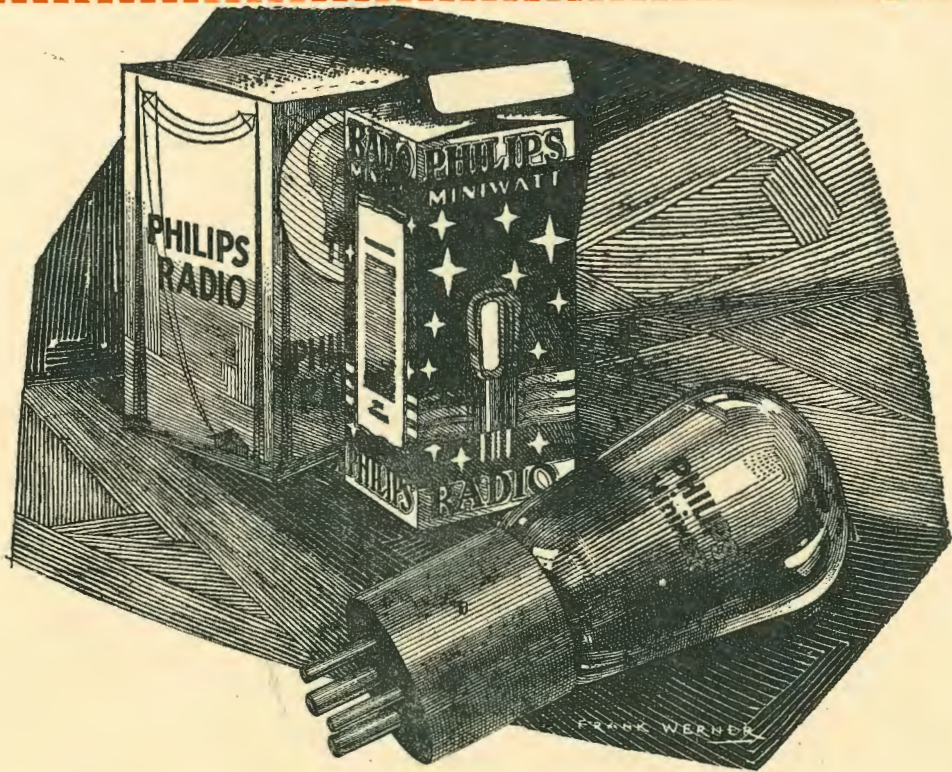
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Best results are obtained by using two A.W.A. "IDEAL" Transformers (one in each stage). Equip your Set with them-to-day, and results will astonish you. Supplied in ratios of 2-1, 3½-1, 5-1, and 9-1.

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Fit the new 1928 Series MARCONI Economy Valves in your receiver. You will be astonished at their wonderful tone quality, volume, and exceptional "B" battery economy.

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AT last the long-awaited-for MARCONI SCREEN-GRID VALVES have arrived. You can now purchase them at your radio dealers.

MARCONI Screen-Grid Valves make possible enormous amplification at radio-frequencies—even on the very short waves, with complete freedom from self-oscillation. This means that a degree of really stable amplification before detection is now possible, which was unheard of before.

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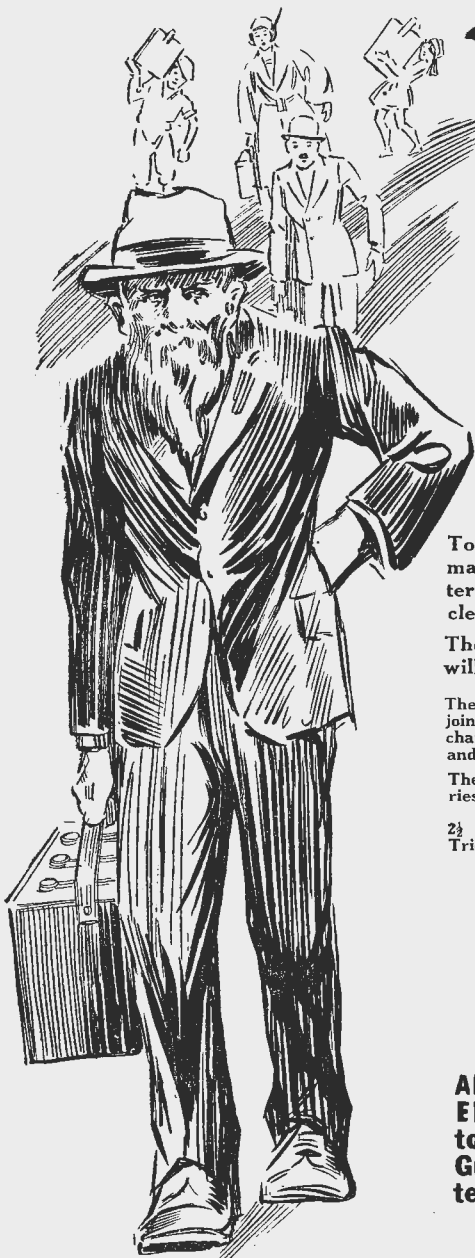
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The 2½ amp. Battery Charger is guaranteed for 1000 hours. The Trickle Charger carries a guarantee of 5000 hours. Both made with metal rectifying unit.

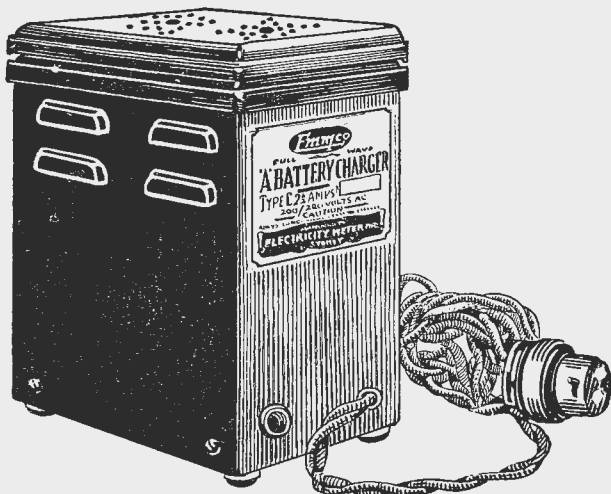
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An Explanation of the AUTOMATIC FILAMENT CONTROL



ANY people still remember the early days in the automotive field, the days of "cranking her up," when it needed at least one doubled-up man power and a sprained wrist to start the blessed thing. How far off those days seem now, when no one would dream of buying a car that wasn't equipped with a self-starter!

But a problem far more serious than that confronting the motor-car industry faced the radio industry when it became a question of how to build a radio set which would be simple enough for the layman to handle who has no mechanical knowledge, even as most people are now able to handle a motor car or a phonograph.

Be it remembered that radio burst upon an unsuspecting public with a rush such as had never been seen before or since. Radio, which constitutes the greatest achievement of the present century, found millions of people ready to enjoy it—but a comparatively small number sufficiently trained to operate a radio set. Not before the handling of a radio set could be made so simple that even a child could operate one, could the industry hope to attain that degree of popularity which it is just beginning to enjoy. Hence, simplicity of operation became the guiding star of everybody connected with the radio industry, and tremendous strides have been made in this direction.

One of the most vexed questions was "how to safeguard valves," the correct operation of the valves being, of course, the very essence of proper reception. Many are the perils to which the valves are exposed in the hands of the inexperienced operator. Rheostats to control the valves—though quite alright in the hands of experts—proved a source of unending trouble in the hands of the layman. Consequently, a great deal of effort has been directed toward the elimination of hand rheostats.

It would be under-rating the scientist's ingenuity to assume that this difficulty could not be solved, and concurrent with an ever more insistent demand for simplified operation, it has been solved by the Amperite, the self-adjusting rheostat. This has been to the

THE automatic filament control, or "ballast resistor," is being used more and more to replace the out-of-date rheostat, and thus simplify operation. In this interesting article our contributor explains in easily-understood terms, the principle of operation of these useful accessories.

By

H. A. BARRY

radio what the self-starter has been to the motor-car. It not only makes the set equipped with it easier to operate, but actually makes it foolproof.

There are, however, still a large number of what— for want of a better term— may be called the Rip-Van-Winkles of radio, who are unaware of this development, and it is for their benefit that information about it may be worth while.

Right amperes are a sine-quanon of proper radio valve operation, a condition ordinarily brought about by the more or less frequent adjustment of a hand-rheostat, to the end that the current flowing through the valve may always be of the right amperage. Requiring great dexterity, "burn-outs" are often the result of hand-rheostat operation, hence the self-adjusting rheostat came as a veritable godsend to the layman as well as the expert, since it takes over in its entirety the function of the ordinary rheostat.

The valves are the most important factor in the set, and to operate them at their highest efficiency it is essential that the valve filament gets neither too much current, which would damage it, nor too little, which would impair its efficiency. To achieve perfect valve-performance, it is necessary to introduce a variable resistance in the filament circuit; that is, either a hand-rheostat, by means of which the operator can increase or decrease the current at will, or a variable resistance such as an Amperite, which is self-adjusting and exercises this function automatically.

By way of demonstration, let us first take an ordinary kind of wire and see how it acts under the influence of electric current. As everybody knows, the electric current heats up the wire, causing it to emit both light and heat. We have here in fact the principle on which electric heaters and incandescent lamps work. But a wire or filament, subjected to electric current, increases its resistance to the current as it heats up. This is called the thermo-electric characteristic of the wire, and the change of resistance when heated differs considerably in all kinds of metals or alloys. Look at the tungsten vacuum lamps burning in your home. Irrespective of their wattage or volt-

tage, all burn at the same temperature. This is not merely a coincidence. Every tungsten vacuum lamp is carefully designed to operate at that definite temperature. Why?

The life of any vacuum tube depends upon the life of the filament. The best scientists and metallurgists in the world spent many years in trying to develop a method to make tungsten into fine filaments. The difficulty lay in the fact that tungsten is very hard and brittle; it was like trying to draw an eggshell into wire. Nevertheless, a process was finally developed which changed the egg-shell-like structure of tungsten into tungsten that could be drawn into wire of less than one thousandth of an inch in thickness. It is this kind of tungsten that is used in modern radio valves, and in order to keep this tungsten-filament in the proper ductile form for giving best results, it must be operated at a definite temperature.

Contrary to popular conception, the lamp will not last longer if burned at a lower temperature. Doing this, in fact, changes the filament to the eggshell structure, and any slight vibration breaks it. On the other hand, if the valve is operated above the proper temperature, the filament is rapidly vaporised and the valve may be burned out. It is evident, therefore, that the temperature and current must be kept within a narrow range—something which it needs a skilled operator to achieve with the ordinary hand rheostat.

There are, however, certain kinds of wire consisting of metallic alloys, which possess the quality of increasing their resistance under heat to such an extent as to exactly counter-balance a voltage across the filament. If, then, a voltage applied to such a filament is increased, the wire simply heats up a little more and increases its resistance, so that, even with a higher voltage, only the required amount of current can flow and no more.

It is a filament of this kind of metallic alloy of which the Amperite consists and which adjusts the current automatically. It is contained in an hermetically sealed glass tube, filled with an inert gas, which prevents damage to the tender filament operating under the aforementioned thermo-electric principle. It has, as has already been indicated, the unique property of automatically changing in resistance as the "A" battery voltage changes, thereby maintaining an even flow of current in the valve filament.

This is most clearly demonstrated when we observe the current passing through a set, which is operated on a freshly charged battery. The current tends to rise above the point for which the valve is designed, a condition which calls for adjustment. It is effected automatically by the self-adjusting rheostat, whose filament at once heats up. It thus increases its resistance and decreases the current that can flow through its filament to the valve with which it is connected. It is obvious, therefore, that a valve which is connected to the right kind of filament resistance never becomes overheated, nor gets out of commission. In this connection it is well to remember, as has already been mentioned, that, if a valve filament draws only a very small overload of current, its life will be considerably shortened and replacement of the valve becomes necessary long before its due time.

On the other hand, when in course of operation, the battery potential becomes weaker as the charge of the battery decreases, the self-adjusting rheostat again takes care of this by decreasing its resistance

through cooling off. It thus once more allows the proper amount of current to flow though the valve filament, until the battery becomes exhausted, when the valve naturally won't function. Then it is time for the battery to be recharged.

With a self-adjusting rheostat in control, it is just as if an expert operator were at all times adjusting the rheostat of each individual valve to that particular point at which the battery voltage will give the best results. It takes care that the valves neither burn too brightly, which would considerably shorten their life, nor burn too low, which would impair their efficiency and performance. With a device such as an Amperite in control, the valves will at all times give the best that is in them, they will have their full span of life, and will never be prematurely destroyed or exhausted.

Simplified operation of radio sets has at all times been the principal aim of all radio experimenters, and the Amperite, the self-adjusting rheostat, is one of the biggest steps towards that goal.

FIFTEEN MINUTES WITH SCHUBERT.

A most attractive musical programme from 3AR has been arranged by Miss Estelle Mark of the Estelle Mark Trio for Monday, September 3rd, when, under the title of "Fifteen Minutes with Schubert," she will give a brief recital of gems from the works of the master. Miss Mark's soprano voice will be heard in several vocal numbers, and Margot Sheridan (piano) and Celia Kilduff (violin) will also contribute instrumental solos and duets.



AMPERITE is the only automatic filament control that keeps the temperature or voltage of the valve filament constant despite variations in the L. T. Battery Voltage. It guarantees improved valve performance and increased valve life through always operating valves at their proper filament temperature. Simplifies wiring, panel design, valve control, tuning. Eliminates hand rheostats. Do not confuse with fixed filament resistors which attempt to imitate AMPERITE but are entirely different in principle and operation. Insist upon AMPERITE. For sale by all dealers.

PRICE 5/9

Complete with Mountings

Distributors—

EDGAR V. HUDSON

AMPERITE
REG. PAT. OFF.
The "SELF-ADJUSTING" Rheostat

Free Seeds
for Radio

Flower Gardens

NOVEL COMPETITION FOR 4QG LISTENERS

THE Flowers that Bloom in the Spring, Tra-la-la!" sang the poet of long ago. It is not to be supposed for a moment that the bard conceived that some day free seeds would be broadcast into the ether and followed by fertile talks to gardeners to aid successful propagation.

Yet such is the case. Station 4QG Brisbane, in an endeavour to cultivate a further interest in gardening, and to create a wider interest and appreciation of instructive talks, has organised a novel Flower Garden Competition among its listeners.

The station is to supply a free packet of seeds to listeners who write in requesting same, enclosing 1½d stamp to cover return postage. 4QG's gardening lecturer, "Tecoma," will commence a series of weekly gardening talks, dealing particularly with the seeds distributed by the station. The first of these talks will be given on Tuesday, September 18th, and will be included in the main nightly programme.

The talks will be arranged in a progressive manner, so that listeners will receive instructions and advice regarding the plants at weekly intervals throughout the whole time they are under cultivation. Every phase of gardening will be covered, commencing with a description of how boxes and soil



Can you make your Radio Garden bloom like this .

should be prepared for the sowing of the seed, and subsequent talks will describe the transplanting, protection against insects, and detailed instructions for every step of cultivation right up to the time the plants bloom.

Wives of "radio cranks" affirm that their husbands are poor gardeners. Seemingly all of their leisure hours are spent in transplanting wireless components from one set to another. Wives of "radio cranks" affirm that their husbands are poor gardeners. Seemingly all of their leisure hours are spent in transplanting wireless components in their sets.

But with 4QG's Flower Garden Scheme, even a radio man will not have an excuse for not owning a pretty garden. All he has to do is to write to 4QG, marking his envelope, "Home Gardens," and await the arrival of the seeds. He then listens in to the talks giving complete details for the cultivation of the flowers each Tuesday night, and before many weeks have past, his good wife will have the pleasure of cutting flowers from the "Radio Garden" and arranging an attractive display on the radio cabinet—which, by the way, may or may not be appreciated by the radio gardener.

To those of our readers who are interested in the scheme, we would suggest that early application for free seeds be made, as the Director of 4QG states that there are sufficient seeds for only 2500 listeners.



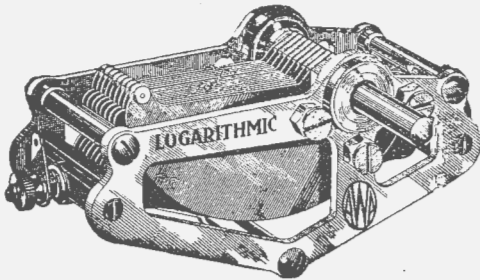
A Pretty Garden Beautifies a Home.



TESTED AND RECOMMENDED

A Department of Investigation, conducted for the benefit of our readers. Every piece of material featured on these pages is subjected to a rigorous and searching test before publication. No remuneration is received for the publication of these paragraphs.

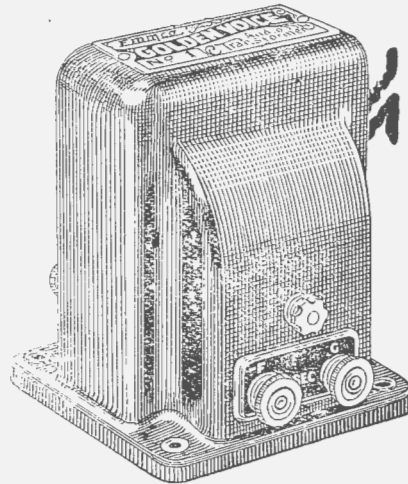
THE A.W.A. LOGARITHMIC CONDENSER.



The new variable condenser manufactured in Sydney by Messrs. Amalgamated Wireless (A.sia.) Ltd., is a truly splendid piece of work from start to finish. It is an extremely rugged piece of apparatus, and should stand up indefinitely under all kinds of operating conditions. The frame is composed of stamped aluminium end-plates bolted to heavy brass pillars at three points, thus ensuring permanent alignment of the entire assembly. A minimum of insulating material is used, this being placed well out of the intense electrostatic field which surrounds the plates of a condenser, and consisting of two moulded strips of the highest grade of bakelite. A valuable feature is the provision which has been made for easy "ganging" of two or more condensers, so that they may be operated by the one tuning dial. The end plates are both drilled to the same template, so that one condenser is easily screwed to the back of the preceding condenser. By merely slacking off two small screws it is possible to remove the spindles entirely, and "ganging" then becomes simply a matter of substituting a suitable length of brass rod, and tightening up the holding screws. The "single-hole" mounting idea has been abandoned in favour of the three-hole principle, countersunk screws being provided, in addition to by far the best drilling templet we have yet seen. While the single-hole mounting is often convenient, it is at times a great disadvantage, as the heavy bushing which is necessary interferes with the action of many vernier dials now on the market. A very important point is the design of the plates, the contour of which follows a true logarithmic curve (often called the "Ceneraline" plate), a shape which has been found to be ideal in the interests of even spacing of the stations and easy tuning. The bearings are very good indeed, resulting in a silky rotating action, and a thin phosphor-bronze "pig-tail" contact gives a definite contact with the rotor plates at all times.

Large hexagon terminals are furnished, complete with soldering lugs. The small dimensions, fine proportions, and beautiful satin-nickel finish of the A.W.A. Logarithmic condenser combine to make an instrument which the most discriminating set-builder will be proud to include in his receiver. Our sample was received from Messrs J. B. Chandler & Co., Adelaide Street, Brisbane, the Queensland distributors for A.W.A. products.

THE EMMCO "GOLDEN VOICE" TRANSFORMER



The tendency in modern design towards making audio transformers large as regard physical dimensions is exemplified in the new Emmco "Golden Voice" transformer, a sample of which has just reached us from the manufacturers, Messrs. Electricity Manufacturing Co., Ltd., of Sydney. The "Golden Voice" transformer measures $3\frac{1}{2}$ by 4 by 4 inches high, and weighs in all $3\frac{1}{4}$ lbs. In external finish and design the "Golden Voice" transformer is a joy to behold; the pressed metal case is finely finished in a dark brown crystalline enamel, with moulded with moulded brown bakelite terminal plates and large nickelled terminals. The thing which interests us most, however—and the aspect with which our readers will be mainly concerned—is the performance of the transformer under actual broadcast receiving conditions. Our tests have conclusively proved that it may accurately be summed up in very few words—practically perfection. Used with valves of correct type, and with the requisite power supply—A, B, and C—and coupled to a good loudspeaker, the reproduction was so near perfection that the ear could detect no flaw. The naturalness of tone was unimpaired by any over-amplification or "screeching" of the higher notes, and did not suffer from that very com-

mon' complaint with some transformer—under-amplification of the extremely low notes of the string bass, the bassoon and the Sousaphone. The warmth and richness of the human voice as reproduced by these transformers goes to prove the accuracy of the manufacturers' assertion that the amplification curve extends well over the entire harmonic scale—that is, up to approximately 8000 cycles. Frequently it is desirable to earth the core and case of an audio transformer. In the Emmco "Golden Voice" this need has been anticipated, an extra terminal being provided for the purpose. Another point which calls for approval is the position of the mounting screw holes; they are located where it is possible to get at the screws with an ordinary screwdriver without performing any violent feats of contortion or scraping some of the enamel from the case. Taking everything into consideration, few transformers have impressed us so favourably as this all-Australian product. Certainly its title is no misnomer, and we heartily recommend it.

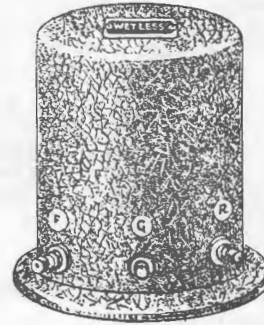
THE SHIP CONE LOUDSPEAKER.



Messrs Trackson Bros. Ltd., 157-159 Elizabeth St., Brisbane, have submitted to us a sample of the Ship Cone Speaker for test. This is a cone loudspeaker of very unusual design, and its unique appearance has attracted a great deal of attention. The cast metal frame is extremely rugged, and is attractively finished in a dull bronze colour. It

is 12½ inches in diameter, and the speaker stands 13 inches high. A cast reproduction of an old Spanish galleon under full sail forms part of the frame, and acts as a protection to the cone itself. A large actuating unit with generous windings drives the free-edge cone, the periphery of which is bound with felt in order to prevent excessive vibration and possible rattling. An adjusting screw is provided whereby the distance between the armature and the pole-pieces of the magnet is readily varied, so that the unit will operate at maximum efficiency, and a five-foot long cord is furnished. In actual operation, the speaker is a great surprise. It is a very low-priced instrument, and for that reason we were somewhat sceptical as regards the quality of reproduction. However, music and speech were rendered with good tone and excellent volume, and the speaker is quite capable of handling sufficient volume for a large room without distortion. The clean-cut and natural reproduction of speech was particularly noticeable; in this respect, indeed, the Ship Cone is superior to some speakers we have heard which sell at double the price. We can recommend this loudspeaker to those of our readers who require a good low-priced speaker; certainly the Ship Cone is a gift at the figure asked for it.

THE WETLESS SOLODYNE KIT.

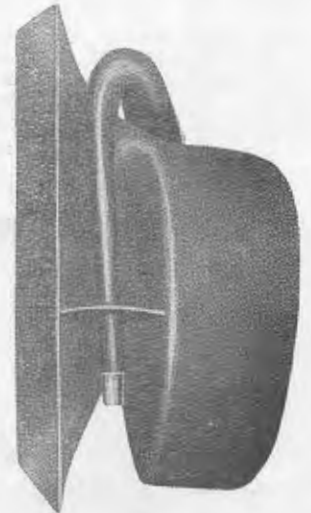


The shielded coil kit manufactured by Messrs. J. Wetless, Rockdale, N.S. Wales, tested in the standard Solodyne circuit, gave excellent results, and measured well up to the standard set by this popular receiver. The coils are space-wound, and are manufactured according to the original Elstree specifications. They are rigidly supported inside attractively finished aluminium cans or shields,

taking up but little space. Continental bakelite is utilised to insulate the nickel-plated terminals from the shields, and the various connections are plainly marked. The kit comprises three coils—the aerial coupler and two radio-frequency transformers—and two Wetless neutralising condensers, and, before being packed in the two-colour three-division box, is carefully tested in order to ensure that the coils match perfectly. The Wetless Solodyne kit is intended to be used in conjunction with tuning condensers of .0005-mfd. maximum capacity.

THE RACON EXPONENTIAL HORN.

In the search for the most nearly perfect loud speaker, there is one type which is receiving more and more attention daily, although it is not as yet in general use. That type is the "exponential" horn—a mathematically designed horn which differs fundamentally from the ordinary horn-type loud speaker. It has been established beyond doubt that even the largest of the usual horn loudspeakers cannot reproduce the very low notes of the musical scale with anything approaching their true value. The cone has



been developed to a wonderfully high standard, and is more or less in general use to-day, but even it has several shortcomings when considered from an acoustical viewpoint. The increasing interest in the exponential horn, stimulated by its application to high-quality phonograph and radio reproduction, has attracted the attention of several of the more progressive manufacturers, and we have lately had the opportunity of testing the largest model of the range of exponential horns manufactured by the Racon Company of America—a concern which has had extensive experience in producing horns for high-grade phonographs. This particular model (designated the



FLUSH PATTERN

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HOLLINWOOD
LANCASHIRE
ENGLAND

SINGLE RANGE



PROJECTING PATTERN



MEASURING INSTRUMENTS

Highest Quality at Reasonable Prices

The Ferranti Radio Meter is contained in a highly finished non-corrodible moulded case of pleasing appearance which is mechanically strong, and dust and damp proof. It also prevents accidental short circuits through wires touching the cover, as easily happens with metal cased instruments. The non-metallic case also minimises stray capacity effects.

The magnetic system is of the Ferranti Patent Construction, which is an improvement on existing forms and possesses the following advantages:—

- (1) Inherent mechanical strength of the arrangement.
- (2) Unique design of the magnetic circuit reduces the magnetic losses to a minimum.
- (3) Minimum distortion of magnetic circuit with varying temperature.

A special feature of this instrument is that a FUSE is incorporated which protects the winding from destruction in the event of an excessive overload. A spare fuse is supplied with each instrument, and further spares can be obtained from the supplier.



PORTABLE PATTERN

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WEDMA LIMITED,
Adelaide.

GIBBS, BRIGHT & CO.,
Perth.

o

OB-1315) has an air-column length of 104 inches, and the flare measures 24 by 18 inches. In order to compress this great length—nearly nine feet—into a reasonably small space, the narrow portion of the horn is, of course, curled round upon itself several times. The reproducing unit is a Baldwin; it will handle great volume without chattering, and has exceptionally heavy windings.

One has to hear this loudspeaker in action to appreciate the benefits gained by the exponential design. The low notes simply "boom" out, as clear and undistorted as the treble, and there is no muffing

effect at any frequency. It is difficult to describe such a degree of excellence without resorting to superlatives, so we will content ourselves with saying that, in our opinion the exponential horn is the loudspeaker par excellence, and it is here to stay.

The Racon exponential horns are produced in several different sizes, the smallest having an air column 48 inches in length, and a 10-inch diameter flare. Messrs. Edgar V. Hudson, 53 Charlotte St. Brisbane, from whom our sample was obtained, are the Queensland distributors.



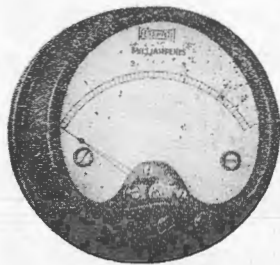
NEW ARRIVALS.

FERRANTI MEASURING INSTRUMENTS.

An excellent series of radio meters has just arrived on the Australian market from the English firm of Ferranti Ltd., whose audio-frequency transformers are already very well known to the Australian radio enthusiast. These meters have been designed for the use of all set owners and experimenters, and will undoubtedly fill a long-felt want. They are made in three types:—

- (1) The flush type with back connection for panel mounting;
- (2) The projecting type with back connection for panel mounting;
- (3) The portable type.

In appearance, finish, and performance, these meters are exceptionally good. They are all moving coil instruments and incorporated in every type is a safety fuse which protects the meter in the event of an error in use. On test, this safety fuse performs its function with remarkable efficiency, and it will appeal to those of us who have at some time or other had the misfortune to burn out a meter and either returned it to the manufacturer for repair (usually necessitating several months' waiting), or "scrapped" it. The safety fuse device is undoubtedly a valuable feature, the cost of replacing being so trivial as to be hardly worth consideration, especially as a spare fuse to each meter is standard equipment.



Ferranti Single Range Projecting Pattern Radio Meter for panel mounting, Type R.I.P.a.

The complete range of meters registers with a "dead beat" movement—another commendable feature, making it possible to take a number of accurate readings very rapidly. Tested against laboratory standards, the precision of these meters is such that they all carry a guaranteed accuracy of 1 per cent.

Ferranti voltmeters are available in two types,

having resistances respectively of 200 ohms and 1000 ohms per volt. The 100 ohms per volt type are specially designed instruments for checking "B" battery eliminators or mains units, where the ordinary type of voltmeter is more or less useless. The 200 ohm per volt type is a very useful instrument for battery testing; it will not give a false "B" battery reading through reading too high a current consumption, as is the case with many cheap meters.

The prices of these meters are exceptionally low for such high-grade instruments. For example, the portable type three-range instrument reading 0/30 m/s 0/7.5 volts and 0/150 volts, with a resistance of 200 ohms per volt, costs £2/18/6 complete with fuse and a spare fuse. Milliammeters in several types, reading from 0/5, /15 and /50 and /150 respectively, retail at £1/17/- each.

Messrs. Edgar V. Hudson, 53 Charlotte Street, Brisbane, the factory representatives of Messrs. Ferranti Ltd., will be pleased on request to forward price lists and descriptive matter concerning these new meters. They may be obtained from all authorised radio dealers.



DON'T GUESS

Make certain of what you are going to listen to by sending 9/6 to Box 1095N, G.P.O., Brisbane, for 52 weekly issues of the "Broadcast Bulletin." Posted every Thursday evening. Programmes commence from following Monday.



A CROSS in this square denotes that your subscription expires with this issue.

Subscription 6/6 year

The Importance of Using Power Valves

IT is an accepted fact that a large percentage of radio set owners put up with inferior reproduction from their receivers, where a little time and thought would enable them to vastly improve the tone. Many of these people, too, really believe that the results they get are as good as it is possible to obtain. Are YOU satisfied with your reception?

The most common shortcoming is to be found in the selection of the valves used. A good professionally constructed receiver, sold without accessories, is often sacrificed on the altar of incorrect valve types. The unconverted owner purchases five or six valves, all of the one type, and so combats the design of the receiver. Since such firms as Philips, who make a range of over 40 valve types, give the correct types to use for the various various purposes and voltages in their folders, they should be adhered to most strictly.



In an endeavour to educate owners in an important aspect of reception, the firm of Philips Radio are stressing the importance of using power valves in the last audio stage of the receiver. This is what they say:—

“Any receiver which is designed to comfortably operate a loudspeaker must have a power valve to handle the volume which is put through the final audio stage, if distortion is to be eliminated and tonal purity achieved. Using a power valve does not entail any extra cost with the exception of a slightly higher price paid in the first instance for the valve itself. People should discard the idea that a power valve is used to create greater volume. It is really used to provide an adequate outlet for the high gain of amplification which is supplied by the previous amplifying stage without distortion.”

We give here the characteristics of the most popular four and six volt power “Miniwatts.”

These Characteristics are Interesting :

B-605:

Filament Volts	6
Filament Amps.1
Impedance	2800
Amplification	5
Mutual Conductance (slope) 1.8 m A/V.	

Grid Bias:

6-7.5 at	90v.
7.5-9 at	100v.
12-15 at	120v.
15-18 at	150v.

C-603.

(Super Power Valve, 6-volt.)

Filament Volts	6
Filament Amps.3
Amp. Factor	3.3
Impedance (ohms)	1650
Mutual Conductance (slope), 2 m A/V.	

Grid Bias:

21 at 120 volts.	27 at 150 volts
------------------	-----------------

B-405:

(Super Power, 4 volt.)

Filament Volts	4
Filament Current15
Impedance (ohms)	2100
Amplification	5
Mutual Conductance (slope) 2.4 m A/V.	

Neg. Grid Bias:

18 at 150 volts.

B-409:

(High Gain Audio Amplifier, 4 volt.)

Filament Volts	4
Filament Amps15
Impedance	4500
Amplification	9
Mutual Conductance (slope) 2 m A/V.	

Grid Bias.

9 Volts at	150v.
6 Volts at	120v.
4.5 Volts at	100v.

BULLETIN TO RADIO TRADERS

We guarantee all the goods. You can order with every confidence. We stock everything in Radio. Send or 'phone your Order, and we will despatch Goods the same day. Our service is absolutely the best in the trade.

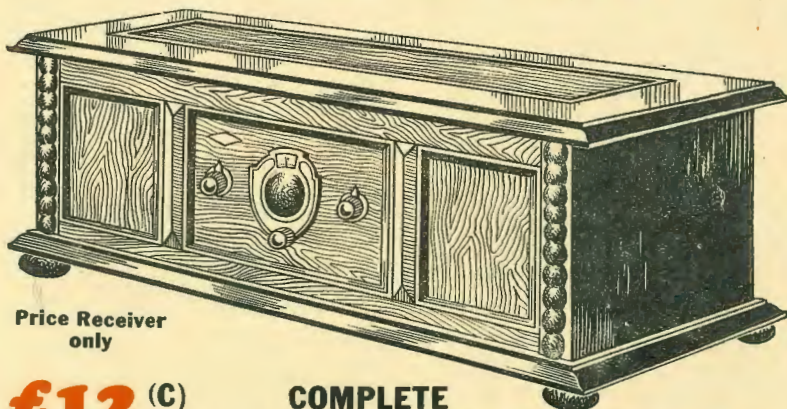
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Announcing The

"GENWIN" THREE

All that can be desired in a Radio Set is embodied in this Genwin 3 — perfect selectivity — mellow tone—good volume, and the cabinet is a delightful Jacobean design, and a handsome piece of furniture.



Price Receiver only

£12 (C)

COMPLETE

with 3 Valves, two 45v. "B" Batteries, three Dry Cells, one "C" Battery, Loudspeaker (as selected), aerial equipment,

£18 (C)



Your Choice of Two Speakers

With the equipment of the "Genwin" Three you are offered the choice of either a Ship Cone or an Amplion Cabinet Speaker.



The Famous
AMPLION CABINETTE

Country Clients

We want your orders for these GENWIN Sets. They are unbeatable.

**CHEAP TO
RUN!**

**CHEAP TO
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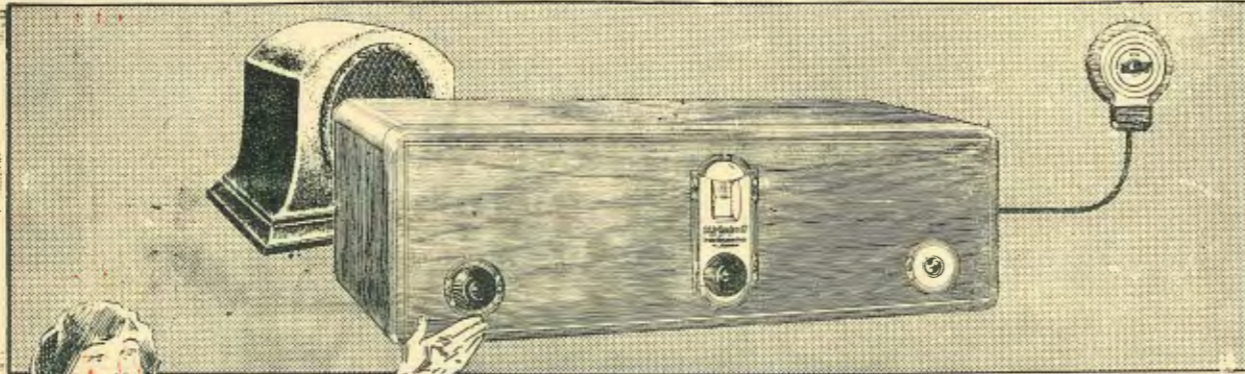
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Goods sent same day as ordered.

TRACKSON BROS. LTD.

The Electrical and Radio People

157-159 Elizabeth St., BRISBANE



Radio from Your Light Socket

The Light Socket operated 6 Valve R.C.A. Receiver illustrated at the left, is a full twelve months ahead of anything yet developed. Just plug in. No batteries. No battery eliminators. Nothing but a wonderful mechanism housed in a slim polished mahogany cabinet. Snap a switch, turn a single dial and listen.

At £75 (which, remember, includes the cost of the ten guinea R.C.A. Loudspeaker 100A) this 6-Valve R.C.A. Receiver offers remarkable value for such an outstanding achievement. Its cost is comparatively little more than a good battery operated receiver. Think of its practical economy. No batteries to buy—and keep charged—and replace from time to time. No extra equipment—negligible upkeep. Have it demonstrated immediately. Send the coupon for particulars now.

Battery Operated

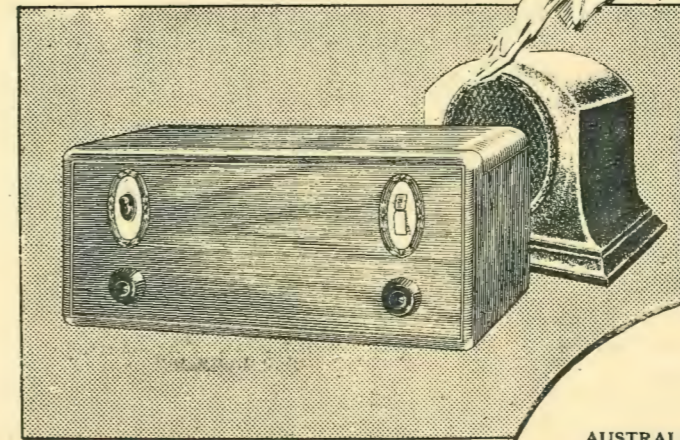
For those whose homes are not on the electricity supply, R.C.A. has developed a 6-valve Battery Operated Receiver. Like the light-socket operated 6-Valve Model, this receiver is capable of enormous amplification, magnifying the tiny fragment of energy it receives from the broadcasting station over 2,500,000,000 times. Its performance on long-distance reception is amazing. Like the light-socket operated R.C.A. Receiver, this model is finished in a handsome polished mahogany cabinet, and comes complete with the distinctive dull-bronze R.C.A. Loudspeaker 100A. The Price is £55. Hear it at any of the best radio dealers, or send the coupon for complete details now.



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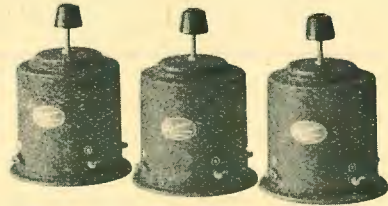
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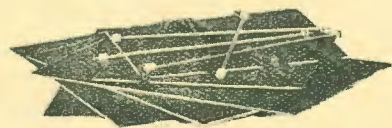
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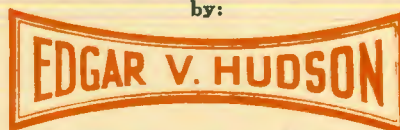
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Germany's Super Spy

A Thrilling Tale of German Intrigue and Cunning

by
ROBERT WARE

(Continued from August Issue)

Synopsis of Opening Chapters :

Lieutenant Ivan Vorensky arrives in London bearing letters from the Russian Premier (Count Poltich). He has with him a mysterious black box which proves to be an "F" ray machine.

Vorensky and Robert Hilton (Chief of the Naval Intelligence Department) accompany the British Prime Minister (Lord X) to the latter's magnificent country home to test the Russian's invention. These tests prove the machine to be completely successful in exploding ammunition by means of a wireless wave. Vorensky informs Lord X that, because of German intrigue in St. Petersburg, Poltich desires Britain to purchase the invention from Russia and manufacture "F" ray machines for the Allies. The purchase price is twenty millions sterling and the rebuilding of the Russian Baltic Fleet—which has been almost swept out of existence by German submarines.

Vorensky stipulates that before the British give their answer three important officials must witness an "open sea" test of his machine, when he will use a moving "target."

Lord X is so impressed with the tremendous value of the "F" ray machine that he mentally decides to acquire it for Britain at all costs. He therefore tells Vorensky that the British Government will buy his machine—and carry out the conditions of purchase—without any further tests.

Vorensky, however, insists upon the "open-sea" test being carried out at some lonely island, explaining to his Lordship that Count Poltich's orders must be implicitly obeyed in this respect. Lord X thereon decides to return to London immediately and consult his Cabinet.



VI.

Although everything possible had been done to prove the bonafides of Vorensky, the young Russian inventor, Lord X determined to communicate with Poltich, the Russian Premier, and protect himself as far as possible from making any damaging move regarding the astonishing ultimatum-like proposal which had been delivered by Britain's ally.

In his usual deliberate way, he had decided that Great Britain needed the "Vorensky 'F' Ray" machine—indeed, as a matter of fact, it simply **must** become British property. It did not need much military training to envisage the almost unbelievable power such a machine would endow upon its possessor.

Soon after the Cabinet had met in the big conference-room at 10 Downing Street, the British Premier received a message from Sir Desmond Chambers, British Ambassador to the Russian capital. Being in Foreign Office General Code, the message was quickly decoded and Lord X, walking into the room, threw the communication on the table for all present to see.

"16 corroborates Vorensky's instructions stop written instructions from 16 to Vorensky to be carried out implicitly for the welfare of both nations—F3."

"Gentlemen," said Lord X quietly, "16 is the Foreign Office designation for the Premier of Russia, and F3 is our own Ambassador in St. Petersburg."

The announcement had a remarkably steadying influence on the rising tide of suspicion and ridicule, and Lord X, with his usual calm smile and quiet voice, once again subdued the opposition his proposals had aroused.

"Gentlemen, that machine simply must not fall into enemy hands. This request from Russia must be complied with, and a further demonstration arranged. It is obviously impossible for me to leave London for

an unknown destination, but Commander Hilton and Captain Chisholm of the War Office shall accompany Vorensky on this venture. What the outcome may be we cannot say, but these two young British officers can, I think, be trusted to take care of themselves in an emergency."

Leaning forward with a pretence at secrecy, a twinkle in his clear blue eyes, the statesman issued a final instruction:—

"My dear colleagues, the messenger from Russia is waiting outside the door. He will come in to face your questions. Go as hard as you like, but remember—**I want that machine for England.**"

The nobleman drew himself back to his usual proud stand. His plea for their assistance hid a dominating command for their obedience; his quiet, firm tones masked a fierce patriotism that neither fire or steel could dismay; his smile was benign, and charming—yet, it covered a relentless rectitude. He stood, a glowing admixture of simplicity and audacity, nobility and mentality—England's most masterful and magnetic personality—with a firm hand on the helm.

Touching a bell at his side he stood until Vorensky was announced, and walked across the huge apartment to greet his visitor. Standing by the Russian's side Lord X turned to his Cabinet.

"Gentlemen, I count it an honour to present Lieutenant Vorensky of the Russian Engineers. You all know why he is in England—and he knows why you're all waiting for him.

"Lieutenant Vorensky," he continued, turning to the Russian, "I presume these gentlemen may ask you any questions they desire relevant to your visit."

"That is quite so, your Lordship," assented Vorensky gravely.

"That's right," replied the Prime Minister. "Now take a seat and a cigar, and enlighten my friends as



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much as possible regarding the matters upon which they seek information."

Suspicion and unbelief, however, hung heavily in the air, and the Parliamentarians showed no undue haste in flinging their questions into the arena. Nor were they at any pains to disguise their unbelief and suspicion—such questions as were formulated indicated a plainly hostile attitude towards the Russian, his motives and his mission.

Finally, Vorensky took the offensive, and, throwing back his head and laughing, rose to his feet.

"Gentlemen," he commenced, "with true British caution you refuse to show your hands—you're waiting for me to make the first deliberate move. Speaking frankly, I expected as much, and, as I am as deadly serious in this matter as it is possible for any man to be, I have brought the 'Vorensky "F" Ray' machine with me, and, with the permission of Lord X, will demonstrate it in this room, before you all—on one condition—if you are satisfied that the secret of my invention is worth possessing you will agree to such conditions as I choose to stipulate without equivocation."

Vorensky had such confidence in his machine that he felt no doubt regarding the acceptance of his ultimatum by the serious-faced politicians—but not a word came in reply to his offer.

Lord X, though holding himself tense for the psychological moment, appeared to be half asleep over his cigar. The rest of the gathering looked at the young Russian engineer long—and hard.

After a long, oppressive silence, Sir Edward Creighton (Secretary for Foreign Affairs) unlimbered his long legs, and in his usual calm, droning voice, addressed the inventor:

"Lieutenant Vorensky," he prefaced, "you have come to England to sell us—for a huge sum of money—a machine, the value of which, to be perfectly plain, is very problematical. We have not the same knowledge regarding the machine that the Prime Minister has, and, naturally, we cannot share his Lordship's enthusiasm. We are willing to view your demonstration—if you can arrange it here—but we cannot give you our promise in advance that we shall agree to do anything at all in the matter."

The Foreign Secretary's pronouncement left the room even more hostile than before—but Lord X, gazing at the cigar in his hand murmured:

"Dear, dear Creighton—you really are perverse."

Suddenly the cloak of lethargy fell from the statesman, and he turned briskly to Vorensky.

"Bring in your machine and demonstrate it," he commanded.

As Vorensky left the room, Lord X turned to his countrymen—"You dear old bunch from Missouri, please remember I want that final demonstration to take place. Sir Edward," he continued, speaking to the Foreign Secretary, "I charge you with the honour of obtaining a fraud-proof clip of British military cartridges, which—with the bullets extracted—will be better for our purpose than the explosives which Vorensky has doubtless brought with him."

The murmur of assent which arose was the first indication of the carefully camouflaged interest which the subject of Vorensky's visit had yet provoked. By the time the Foreign Secretary returned, Vorensky had his machine mounted at one end of the big room, and was busily adjusting the magnets.

Lord X, who appeared to be enjoying a subtle joke, went forward to receive the bulletless cartridges, and then turned to the still silent group at the table.

"My friends, in order to be absolved from any charge of complicity in the forthcoming exhibition, I shall choose four of you to hold one of the cartridge cases each—bullet end downwards—between the thumb and first finger, the fifth will be held by Sir Edward himself.

"There is no danger," went on his Lordship with a laugh. "The case will merely hit the roof. Now, then, Sisley, Yarborough, Grainger, and—dammit it—I will hold the other myself. Sir Edward you will be number one, and will stand near that far door; Yarborough, number three, at the window; Sisley, you are number two and will be stationed in the far corner; Grainger, number four, in the corner behind the machine; myself, number five, directly in front of the machine itself.

"Lieutenant Vorensky," he continued, "as I call the number, so you operate."

Vorensky straightened and saluted; he had almost forgotten the previous hostility, and was really beginning to enjoy the spectacle of the captain running his hesitating team.

Vorensky commenced turning the handle of his machine—and when Lord X judged it to be at top speed, he suddenly called "Number five—myself!"

Obediently Vorensky sighted the twin telescope on the cartridge case held at arm's length by the Prime Minister, he leisurely leant over and pressed the key, and with a sharp report, the cartridge flew from the Prime Minister's hand and struck the roof.

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"Number three—Yarborough!" commanded Lord X, and in a few seconds Lord Yarborough's cartridge case had jumped from between his finger and thumb.

"One—Two—Four!"

Each cartridge case was whipped from the hand which held it in an almost monotonous succession.

"Now, gentlemen, give your verdict," casually requested Lord X.

Sir Edward once again acted as spokesman, and turned to his chief: "I think, Sir, we are quite satisfied to leave the matter in your own capable hands."

The chorus of approval left no doubt regarding the unanimity of Sir Edward's decision, and the lively conversation which followed showed what a perfectly misleading mask British indifference really is.

VII.

"I think, Sir, we had better leave the demonstrating ground entirely in the hands of Lieutenant Vorensky," said Hilton languidly. "It'll save much time and argument."

"I think you are right, my boy," assented Lord X. "What about you, Chisholm?"

"If Hilton's satisfied, Sir, I'm quite content, and I expect our friend has some spot already chosen in his mind," was the indifferent reply.

"In that case we shall leave the matter for you to decide, Lieutenant Vorensky," decided Britain's Prime Minister. "Have you any place in mind?"

"Well, Sir," began the Russian diffidently, "I would rather that you had chosen the place, in order to prove my bona-fides in the test. But it must be in a spot where there is no risk of being observed—where there are no mines which we may destroy—and, if possible, at a place where no patrol boats are likely to dash across the path of the rays. I have been pondering on the subject and think—provided you agree—that Fair Island would suit our purpose admirably."

Vorensky paused and flashed a questioning glance at Hilton.

"Fair Island—right away up there?" echoed Hilton. "Let me see. A day's hard steaming up the coast, and a day to return. I didn't want to waste two whole days if I could help it," he grumbled.

"Waste?—Commander Hilton?" queried Vorensky in a quiet tone.

"No; I shouldn't perhaps have used that word," laughed Hilton contritely. "It'll be worth it, of course. Alright then, we'll decide on Fair Island."

"That's settled, then," announced Lord X. "Lieutenant Vorensky, I shall not be able to see your final demonstration, but Commander Hilton and Captain Chisholm will report to me fully on the matter—and if that report is favourable, you can advise Count Poltich that we accept his proposal in its entirety. In the meantime, kindly place yourself under Commander Hilton's guidance, and look to him as the leader in the matter from now on. I shall arrange with the Admiralty for a vessel to convey you there and back, and expect to see you all again by the end of the week at the latest."

VIII.

Tilbury Docks were crowded with shipping. Union Castle liners were sandwiched between R.M.S.P. and P.S.N.C. boats, while British India, P. & O., Orient and C.P.R. ships jostled one another for space at the quays.

The air of secrecy and mystery which was occasioned by the war camouflage on their sides—generally termed "razzle-dazzle"—was intensified by the smoky atmosphere and drizzling rain.

Khaki-clad figures, like armies of ants, swarmed over and around these huge specimens of the British Mercantile Marine; and fussy, smoking tugs darted hither and thither as they pushed, pulled, tugged and jammed the incoming and outgoing liners about the limited water space.

Near the entrance lock, however, lay a small trim craft which was proudly flying the White Ensign, and it was to this diminutive vessel that Hilton, Chisholm and Vorensky were taken.

Of only a few hundred tons burden, H.M. Yacht "Sapphire" had been handed over to the Admiralty by a patriotic old sea dog who had since given his life for the Empire, whilst engaged in the perilous task of mine-sweeping.

"The 'Sapphire' was soon cast off and taken into the murky Thames, where she showed her nose seaward against a strong flowing tide. When Hilton had calculated a day for the trip from London to Fair Island he had visualised himself aboard a modern destroyer, but a short conference between himself and Lord X had resulted in the choice of the old steam yacht.

Never capable of making a greater speed than ten knots—even in her prime—the prevailing bad weather meant over two days' hard steaming before the "Sapphire" reached her destination, and Hilton and his companions immediately set about making themselves as comfortable as conditions would permit.

As the "Sapphire" met the open sea she gave her passengers a slight indication of what was in store in their trip up the East Coast of England and Scotland, but with the exception of Chisholm and Vorensky, all were accustomed to the vagaries of the North Sea.

H.M.Y. "Sapphier" doggedly punched her way through the rising sea—past the Shipwash, northward, up past Smith's Knoll and Leman Bank.

Between The Dudgeon and the Outer Dowsing, however, the sharp ringing bark of the after gun brought everyone on deck.

"What's up, Stevens?" demanded Hilton, bounding up the bridge ladder.

"Submarine abeam, Sir," replied the skipper pointing to a periscope about quarter of a mile distant.

"Keep her bow on, and use your for'ard gun, then," commanded Hilton, as he turned and left the bridge.

"Quick, Vorensky, bring that machine. Here's a chance we can't miss. Hurry!"

Vorensky, however, was seized with panic, and, with a wail of distress, called upon the gunners to sink the submarine before they were torpedoed themselves. Hilton, determined to act on the opportunity, dashed to the Russian's cabin and carried the black box to the bridge.

"Come on, Vorensky, get the damned thing working," he yelled.

Vorensky had completely lost his self-control, and was running up and down the narrow decks beseeching the gunners to "sink it before we're torpedoed."

Thoroughly disgusted by this display of arrant cowardice, Hilton jumped to the deck and roughly caught hold of Vorensky. Dragging the panic-stricken Russian to the bridge, he again commanded him to

open the box and get busy; and Vorensky frantically searched his pockets for the key to his machine. The fight between the yacht and the submarine had now become fierce—the submarine despising its diminutive antagonist, had now risen to the surface and was attempting to sink the yacht by gunfire.

Vorensky suddenly ceased in his search and, leaping to his feet, again beseeched the gunners to "Sink it! sink it!! sink it!!!"

A shell from the German submarine crashed through the upper bridge work, exploding with a violent report, and Vorensky gave an inarticulate cry and sank insensible beside his "F" ray machine.

Suddenly there was a deep, resounding explosion, and the enemy submarine was blown into the air in fragments.

Almost immediately a huge black object broke the surface, and one of His Britannic Majesty's submarines appeared on the starboard bow.

Easing the "Sapphire" to "half ahead," Hilton crossed the bridge and waited for the submarine to come alongside. Soon the conning tower was opened and out came a laughing youngster with a megaphone.

"Just in time, Sir, what! Any damage done?"

"Total casualties: one man fainted," responded Hilton cheerfully. "See if there are any survivors, and then 'carry on,'" he commanded.

Turning to Chisholm, Hilton waved his hand to the rapidly departing K2.

"My Deus ex Machina," he said with a bored air.

"Really," echoed the man from the War Office with languid surprise.

A groan from Vorensky brought them both to the side of the Russian engineer.

"Is he gone?" he asked feebly.

"Well and truly gone," comforted Hilton. "He's disappeared from sight."

"Thank goodness," gasped Vorensky. "I hate getting wet."

The feeble attempt at humour brought an ironic smile to the lips of his companions, but beyond giving Vorensky a stiff drink of whisky, the two Britishers did not offer any sympathy.

During the night H.M.Y. "Sapphire" ploughed through the heavy seas—up past Flamborough Head, past the Tees and the Tyne. The following day the seas grew higher, but still she ploughed and "bucked" her way northward. From the Farne Islands she pitched and rolled her way towards the next "land-fall"—Buchan Ness. Through the "Long Forties" she staggered—tossing and smashing until it seemed that she must fall to pieces—but still pushing her willing way towards Fair Island.

Early on the third morning the Island of Stronsay was sighted on the port bow.

"The Orkneys at last," muttered Hilton to Chisholm, as he nodded towards the blur on the horizon.

"I'm going back by train," solemnly announced Chisholm with a feeble grin.

"You sinful land-lubber," laughed Hilton. "I might make you go back by submarine yet."

"I'll be Christopher Columbus if I do," retorted Chisholm with determination.

"You might be Robinson Crusoe if you don't," riposted Hilton with a roar of laughter.

"You Naval birds are too damned smart to keep up with. Come and have a drink; I've not eaten since yester-morn," grumbled Chistolm.

IX.

"It is a sub."

"It isn't I tell you."

"Here, take this glass and you'll see his periscope sticking up from the conning tower."

The mate of H.M.Y. "Sapphire" excitedly pushed a telescope into the hands of his skipper, Captain Stevens.

"By jove! I believe you're right, Swanson—I think I'll call the Commander and see what he says."

Summoned hastily to the side of the two excited men, Hilton gazed over the wave tops long and earnestly at the black spot on the hazy horizon.

"It might be and it mightn't be," he finally declared. "Heave a shot just in front of him and see what he does. Have the depth charges ready in case he comes for us."

Instantly all became bustle and excitement—Vorensky alone seeming to be unalarmed at the prospect of another encounter with the enemy.

"Better hide yourself before the fireworks start," advised Chisholm ironically.

"I don't fear torpedoes when land is in sight," was the Russian's grave answer.

Crack! The little twelve-pounder up for'ard gave a vicious spurt of flame, and a few seconds later the watchers saw a fountain of water rise into the air just at the side of the object ahead.

"See what his answer is to that," ejaculated Stevens with satisfaction.

No answer came, however. The black blot remained as steady and as unperturbed as ever.

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"It isn't a submarine, at any rate, Sir," came in puzzled accents from Swanson.

"Don't be too certain yet, Swanson. Keep her as she heads until we get nearer—and don't take your eyes off the thing."

"Aye, aye, Sir."

"As a matter of fact," proceeded Hilton, "I expect you'll find it's nothing more than a ship's lifeboat with its mast stepped," and possibly a dead crew."

Events proved that Hilton was correct—or nearly so. As the "Sapphire" gradually drew nearer, it was evident that the object which had caused their hearts to thump was a lifeboat with its one mast in position, and, as far as could be seen, without life aboard.

She has a crew—all lying in the bottom!" yelled the lookout who had remained in the crow's nest to investigate.

"Push her a bit harder if you can, skipper," commanded Hilton. "Those fellows may need immediate assistance."

A heavy sea was still running, but by skilful seamanship, Stevens brought the abandoned lifeboat under his lee, when all on board could plainly see the wet huddled figures lying about the bottom of the boat.

"None of them seem to be conscious," observed Hilton quietly. "Someone get aboard to take a line."

"Righto, Sir," came the ready reply of a seaman, and, without more ado, he plunged into the cold, grey water. Soon he was clambering over the gunwale of the lifeboat, and caught the light line which was thrown to him.

"Six of them, Sir—more dead than alive, I think," he informed Hilton.

"Poor devils. What nationality are they?"

"Dunno, Sir. Scowegians by the looks o' things, Sir."

"Alright," replied Hilton repressing a smile. "Come as near as you can and we'll get them aboard."

The delicate operation of transferring six insensible men from the tossing lifeboat was at last accomplished, and all on board H.M.Y. "Sapphire" immediately set to work at the task of restoring them to consciousness.

One by one they at last struggled back to life, and with a steaming mug of coffee in his hands, the captain of the castaways—in broken English—told a story of revolting callousness.

Their ship "Olaf," had, it appeared, been bound from Stavanger to Leith with timber, and when about half-way across to Scotland had met with a German submarine. Knowing that his cargo was for the British Government, the Norwegian commander had refused to surrender when called on by the submarine, and a long chase to the northward had taken place.

Eventually the German submarine torpedoed the "Olaf" and sank each lifeboat as it left the side of the sinking steamer, leaving the crews struggling in the water. Fortunately, however, when the "Olaf" sank, one lifeboat floated free from her after deck, and to this boat he (Captain Svalsen) and five of his crew managed to fight their way.

The German commander then came alongside, and an armed officer, jumping into the boat, proceeded to empty the water from their cask into the sea—and on leaving took the whole of their supply of bis-

cuits back to the submarine with him. That was three days ago, and they had suffered terrible privations during the recent gale. Realising that they had been carried far to the north, they had given up all hope of rescue and, hungry and thirsty, had lain down to wait for the long sleep.

Tears of gratitude and happiness welled in Captain Svalsen's eyes, and Hilton, with a slight shudder, left the castaways to their own devices and sought Vorensky.

"This somewhat complicates matters, doesn't it?" was his greeting to the Russian.

"In what way?"

"Why, all these men will see the motor boat leave with the targets and will, presumably, be mighty inquisitive."

"I do not think it matters so greatly," returned Vorensky complacently. "They won't understand a word we say, or an action we do regarding the machine."

"Oh, well, if you're satisfied, I don't mind," was Hilton's pleasant rejoinder.

X.

As it was dangerous to carry firearms in the vicinity of the "F" ray machine, Hilton made sure his friend, Chisholm, was not armed, and then turned to give his final instruction.

"Captain Stevens, you are not to allow any man ashore under any circumstances," commanded Hilton as they prepared to embark in the launch which was to take them to the tiny stretch of sand which fringed the eastern side of Fair Island.

"The motor boat will leave when I give the signal from the top of the clip, and will circle the island," he continued.

"I think Captain Svalsen, or one of his men could help carry the box—we shall have a good deal of climbing to do," suggested Vorensky suddenly.

"—and we'll blindfold him when we commence the test," he added with a smile as Hilton gave a look of surprise.

"Oh! alright if you want to," assented Hilton as he clambered into the waiting launch.

The climb up the steep cliff proved more arduous than anticipated, and more than once Hilton felt glad that the burly Norwegian skipper had been brought to assist them.

Finally they reached the top with their precious black box, and, having signalled the motor boat to proceed on its way, continued their own way across the island to the western slopes. Just as they had selected their vantage point they heard a deep, tremulous explosion behind them.

"What the hell—!" Hilton stopped in astonishment—for Vorensky had burst into a fit of hysterical laughter.

"Really, you English are too stupid for words," gasped the Russian as he wiped his eyes. "That explosion you heard was your own ship—the "Sapphire" being blown sky high by a torpedo from a German submarine, and you and Captain Chisholm are my prisoners."

"What!" cried the enraged Chisholm. "What the devil's the game?"

"Don't become more foolish than you already have been," chided Vorensky. "You and Commander Hil-

ton—Chief of the British Naval Intelligence Department—will accompany me to where we landed, when I shall have the pleasure of escorting you back to Germany in His Imperial Majesty's Undersea-boat U80. What a haul! Ye Gods! What a clever piece of work!"

Chisholm, his eyes blazing, made a move towards Vorensky, but Hilton placed his hand on his friend's shoulder and looked straight at Vorensky with an almost imperceptible smile.

"Yes, Vorensky, it was a very clever piece of work. But suppose Captain Chisholm and I decided to throw you over the cliff. Once this Norwegian knows who you are he won't be inclined to show you any mercy."

Again Vorensky laughed aloud:

"My dear Hilton, Captain Svalsen and his unfortunate crew are my assistants in this highly amusing comedy—and, moreover, we are both armed. So I wouldn't advise you to attempt to throw me over the cliff. You fools, you utterly brainless fools!" Vorensky laughed again.

Hilton's face, however, was a mask. What thoughts were racing through his brain, his face gave no indication.

"As a matter of fact, Vorensky," he began in slow, studied accents, "I took the trouble to extract the ammunition from your automatic while you were asleep last night and replaced it with dummy cartridges. Captain Svalsen will likewise find that his gun was emptied of its contents whilst he changed into the dry clothes so providentially supplied to him on the 'Sapphire.' But I have here a repeating compressed-air pistol, however, which is guaranteed to stop any man at twenty yards."

Suddenly his bantering voice ceased—and his face hardened.

"You are therefore my prisoner, Von Hagen, and your precious submarine will follow the 'Sapphire' in a few seconds."

The German, not sure whether Hilton was bluffing or not, raised his automatic and deliberately fired at the tall Britisher. The series of feeble reports which followed—and the absence of any alarm on his antagonist's part—convinced him that Hilton had spoken the truth, and with a bitter oath he flung his weapon to the ground.

The look in Hilton's eyes, and the weapon in his hand, now held the two Germans in complete check, and the British Naval Officer pulled a whistle from his pocket and blew two shrill blasts. Immediately a ring of naval ratings, with levelled rifles, sprang up around the little group.

"My turn to laugh, I fancy, you clever spy!"

Suddenly another violent explosion shook the little island, and Hilton, with a gleam of satisfaction in his eyes, quietly said:

"There goes His Imperial Majesty's Undersea-boat U80—torpedoed by His Britannic Majesty's submarine K.2—the little fellow who followed us from London and who proved so helpful yesterday. Grab that black box, Chisholm," he commanded. "I think we'll save our country that twenty million sterling and still retain Lieutenant Vorensky's invention."

Wild rage blazed for the moment in the eyes of Vorensky—or Von Hagen—but it swiftly subsided, and the German spy once again relapsed into laughter.

"Hilton, you're not such a fool as I supposed, but this particular black box is filled with junk, the original being safely in Germany by now."

XI.

The procession which filed back to the tiny stretch of sand was very quiet. The Naval guard which had been placed around the two Germans prevented any further outburst from either. When they descended the cliff a terrible sight met their eyes. The old "Sapphire" had been blown almost out of the water, and of the German submarine only a few traces could be seen. The five so-called Norwegians had been disarmed and sat with a dejected air on the deck of the K.2.

Miraculously enough, when the "Sapphire" had been struck, no one was hurt, but the tragic looks on the faces of Skipper Stevens and his crew told of a hurt which, at the moment, was more bitter than physical injury.

At last all had embarked on the K.2 except Chisholm and Hilton. "Come on, you old Christopher Columbus," laughed Hilton, "or you'll be Robinson Crusoe."

Chisholm, with a grin, turned towards the submarine and muttered: "Well, I'm damned!"

(To be continued)

What's on To-night ?

Don't wonder any more—send a P.N. for 9/6 to Box 1095N, G.P.O., Brisbane, and the "Broadcast Bulletin" will be posted to you for one year. Contains full details of all the radio programmes.

For Clearer Reception—

The battery is the vital part of your set—no matter how good the set may be, a poor battery will absolutely cripple it.

Install a C.A.V.—the battery especially constructed for radio work—and get the results you have always hoped for.

The C.A.V. will give a reliable service throughout the whole of its long life. Call and ask us about it.

C.A.V. Radio "A" & "B" Batteries

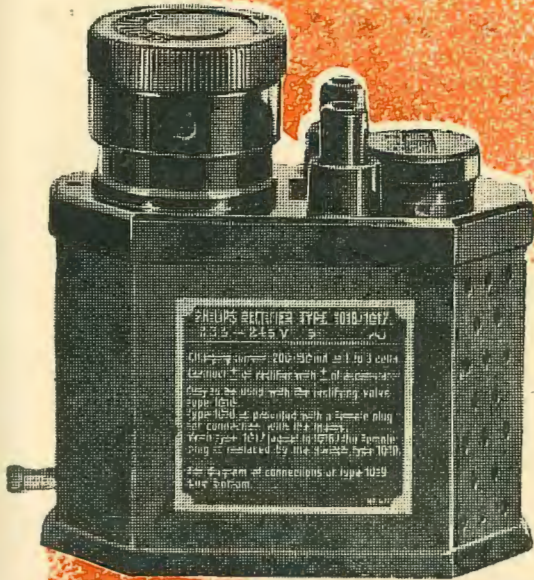
Specialty Constructed for Radio Work

Queensland Distributors

Barnes Auto Co.

CORNER NORTH QUAY & QUEEN ST.

THE NEW METHOD— TRICKLE CHARGING!



For large sets using old-type 25 amp valves the "Four Fifty" should be used. This charger gives both heavy trickle (.65 amp) and normal (1.3 amp) rates.

USE a Trickle Charger! Use the new PHILIPS Trickle Charger! Here is the cleverest and neatest piece of radio apparatus that you can purchase. Study a few of its unique features and then send for further details of this ingenious new Philips product.

1. Rectification and regulation by "peanut" Combined Thermionic Rectifier and Resistance Lamp.
2. A large knurled switch at the top controls THE WHOLE OF THE POWER SUPPLY when using a "B" or "B" and "C" Unit.
3. It charges between 150 and 195 m.A.
4. It is covered by the usual Philips GENERAL GUARANTEE.

Sold by all Radio Dealers, £3/10/-

PHILIPS

BATTERY CHARGERS

8R47



The "Four Fifty"
Price £4 15/-

POST THIS STRIP FOR COMPLETE DESCRIPTION
To Philips Lamps (A'sia) Ltd., Box 2703c, G.P.O., Sydney

Please send me at once full detailed description of your new TRICKLE CHARGER.

Name _____

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**The
Model 33**

6 Valve Receiver

The Model 33 Six-Valve Receiver is one designed for use in remote localities or in a large city. It is extremely selective, remarkably sensitive, and the Acme of engineering design and workmanship.

*Have You Heard
REAL Radio
Yet?*



Model 33 One Dial Six Valve Receiver

**Excellent
Loudspeaker
Results
Guaranteed**

Excellent loudspeaker results are obtainable on a small indoor aerial, whilst with an outdoor aerial good loudspeaker results are obtainable under favourable conditions from the main A class stations in Victoria, N.S.W., and Queensland during the greater part of the day.

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Re-creates Music & Speech

**HEAR
IT!**

Six and Seven Valve ONE Dial Receivers, £25/10/- to £37/10/-, without valves or equipment. Radio speakers, £3/15/-, £4/10/- and £8/15/- (New Model E). Complete outfits from £43/10/-, also Console and Writing Desk models.



SEND FOR FREE
LITERATURE

Easy to Carry

Being compact, it can be carried in a suitable travelling case, which is a big factor should it be necessary to take the set from place to place.

£49/10/0

Price complete with Standard Equipment, including Model H. Speaker.

WIRELESS HOUSE LTD.

City Buildings, Edward Street, BRISBANE



A reader of "Popular Wireless" living at Melbourne has a one-valve set that reaches out and picks up Rugby, England, every morning. He writes:—
 "I use home-made coils, and I can tune in Rugby any morning at all at 6 a.m. It certainly is great to have the test scores laid on, and all the official British news, without having to wait for the papers hours afterwards.
 "MY VALVE IS AN EDISWAN A.R.06, and the two 1½v. dry cells that have already had six months still survive. The aerial is a standard 100ft. single wire, of 7/22 enamelled wire.
 (Signed) _____

Ediswan Valves are obtainable in the following types:

Type	Volts	Amps.	Price	Type	Volts	Amps.	Price
R.	4	0.75	2/6 each	P.V.6	2	0.4	13/6 each
A.R.	4	0.75	2/6 each	P.V.8	3	0.12	13/6 each
A.R.D.E.	2	0.3	12/6 each	G.P.2	2	.1	12/6 each
A.R.06	3	0.06	10/6 each	G.P.4	4	.15	12/6 each
P.V.2	4	0.7	13/6 each	D.R.2	2	.1	12/6 each
P.V.4	4	.35	13/6 each	H.F.210	2	.1	12/6 each
P.V.5	5	0.25	13/6 each	R.C.2	2	.1	11/ each

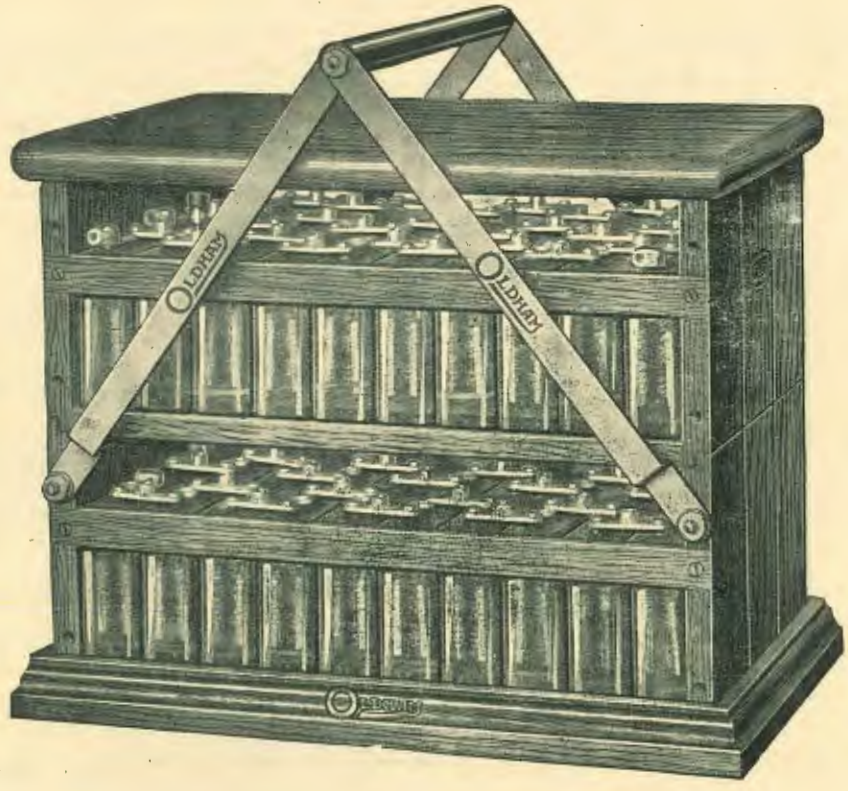
FIT

EDISWAN VALVES

AND NURSE YOUR SET
THE EDISON SWAN ELECTRIC CO. LTD.
 156 CREEK STREET, BRISBANE.

Special Activation Process
OLDHAM
 BATTERIES

ALREADY DRY CHARGED—ONLY NECESSARY TO ADD ACID



Supplied
in
20 Volt
Units

Can be
Built
to any
Voltage

1/3 PER VOLT FOR YOUR HIGH TENSION
"B" BATTERY POWER

WRITE FOR ILLUSTRATED PRICE LIST

Noyes Bros.
 (Sydney) **Ltd.**
 PERRY HOUSE BRISBANE

4QG's Annual Report

Some Interesting Figures Revealed

Every year the Queensland Radio Service, as a State Department, presents its report to Parliament. We publish hereunder extracts from the 1928 report prepared by the Director (Mr. J. W. Robinson) which are of particular interest to our readers.

The Year 1927-1928.

The year 1927-1928 constituted an interesting period in the history of the Queensland Radio Service. During the early days when broadcasting was first introduced, thousands of people purchased and installed wireless receiving sets, and to those people the service given by 4QG proved attractive. Wireless is a most wonderful branch of science, and the very fact that speech and music were flashing constantly through miles of space and were being received by people in their own homes, created feelings of wonderment and awe, which made the possession of a receiving set a very attractive proposition.

After a little while, however, wireless lost that appeal to the imagination of the public, and the owners of receiving sets then came to regard them as being instruments of ordinary household use, instruments which would give them a service which would prove entertaining, instructive and amusing. Such being the case, 4QG was faced with the task of providing a service for people who did not own receiving sets merely because it happened to be wonderful to receive speech and music through space, but who owned, maintained and operated them purely as ordinary pieces of household furniture and equipment. Every care had to be taken to attempt to cater as far as possible for everybody, and to give a service which would result in the owner of a receiver regarding his instrument as one of the necessities of life. The fact that so large a number of people renewed their licenses at the end of the year proves that this object was achieved.

License Figures.

License figures constitute a certain guide as to how broadcasting is progressing, and those for Queensland are interesting. At the commencement of the year 23,163 listeners' licenses were in force, and this number had increased to 25,211 by the end of the year. A certain number of cancellations took place, but these were considerably exceeded by the issue of new licenses, thus increasing the figures representing the total license issue for the State.

Artists.

During the year more than 950 different individual artists contributed to the programmes. In arriving at this number, choirs, bands, orchestras, etc., were regarded as one artist each and not as several. The total shows that the station presented to the public an average of nineteen different artists per week all the year round. When it is remembered that the supply of artists in Brisbane is by no means inex-

haustible, and is much more limited than in the larger cities in Southern States, the figures demonstrate that 4QG made a very serious attempt throughout the year to provide as much variety as possible. Whether the broadcasting of the efforts of so large a number of artists is better than the broadcasting of the efforts of a smaller number is a difficult problem. Personally, I am of the opinion that a smaller number of first-class specially trained artists gives better musical programmes than a larger number of inexperienced performers, but I have no hesitation in saying that the comments both received at 4QG and levelled at the station through the Press, seem to indicate that the listening public to-day desires variety at the expense of everything else. Any attempts which have been made by 4QG to secure quality at the expense of quantity have invariably resulted in the expression of many protests from listeners whose favourite complaint has been contained in a statement to the effect that the station "broadcasts the same old artists."

Profits.

During the first year of its existence 4QG made a profit of £730; during the second year it made a profit of £5335; and last year a profit of £3310 was made.

The profits have been paid into the Treasury for the purpose of reducing capital expenditure.

There seems to exist a small number of (generally anonymous) critics who, every now and then, complain bitterly because this money is not being completely spent upon an increase in service given. I would point out that were such an action taken, it would prove fatal to the best interests of wireless in Queensland. Broadcasting is a most modern and most progressive branch of science, and is developing rapidly. Apparatus which is modern to-day becomes obsolete to-morrow. If 4QG is to keep pace with the march of progress, it will be necessary to renew costly transmission apparatus in the course of two or three years. Such being the case, it is extremely wise to place profits to reserve, or to reduce capital expenditure by paying them into the Treasury. If all the profits were to be spent as fast as the money came to hand, 4QG would find itself in the unfortunate position in future of being unable to renew apparatus, and so remain modern without considerably increasing its capital and thus loading its interest bill. The careful reducing of capital by the placing into the hands of the Treasury officials the modest profits the station has made, will have the effect of giving the Government a chance of renewing costly gear in the future without placing any burden on either the wireless listener or the general taxpayer.

Staff.

The staff at 4QG again demonstrated their keenness and enthusiasm and loyalty during the period under review.

It is worthy of note that since broadcasting was established in Queensland (except for a death which removed one of the early members of the staff) only one change has been made in the personnel of the station. This does not indicate that the Queensland Radio Service is a safe retreat—the hours of working show that the staff do not hold what might be termed comfortable positions—but it does indicate that each member is imbued with the spirit of service and is attached very deeply to the institution which he or she helps to man and operate.

Without a keen and loyal staff no large station could serve the public, and I therefore feel in duty bound to attribute a great deal of the success which has attended the year's operations to the loyalty and devotion of the staff of 4QG.

Finance.

The operations of 4QG during the year 1927-1928 resulted in a profit of £3310, the accounts for the period being:—

EXPENDITURE.

Salaries	£4,864
Maintenance	3,431
Royalties	2,566
Artists	5,799
Copyrights	845
Incidentals	1,328
Interest	1,471
Balance, excess of revenue over expenditure	3,310

£23,614

REVENUE.

License Fees	£21,555
Advertising	1,974
Miscellaneous	85

£23,614

J. W. ROBINSON,
Director, Queensland Radio Service.



THE INTERNATIONAL EUCHARISTIC CONGRESS.

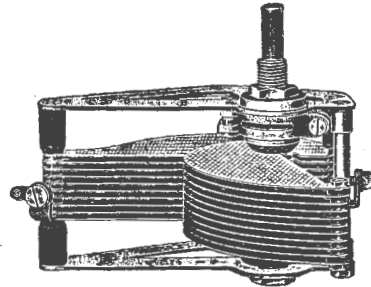
The promoters of the 29th International Eucharistic Congress are determined that every modern expedient which will make for success shall be adopted on this occasion. The ordinary radio listener with his valve set and loudspeaker will be astonished to hear that no fewer than 70 giant loudspeakers will be used on the route of the procession, alone!

This procession will be of considerable length, and yet it is desirable that the music which leads the singing shall reach every person in the procession at the same moment, so that the singing of everyone is synchronised. This will be made possible by the judicious placing of speakers along the route and suitable switching arrangements, whereby speakers are switched in so as to keep in touch with the head of the procession, and switch out as the end of the procession passes.

As will be imagined, with such a huge installation there are numerous difficulties to be overcome, and the fact that the work has been entrusted to Messrs. Amplion (Australasia) Limited is evidence of the popularity of that Company's Public Speech System.

A further large installation at the show ground for the purpose of amplifying the special service there, and also the equipping of five halls in the city will be undertaken by the same company.

EASE OF TUNING



J.B. True Tuning S.L.F.

The J.B. True Tuning S.L.F. gives the wide wave-length range and overlap of a normal condenser with the ease of tuning usually associated with condensers of much lower capacity. This is a notable achievement in condenser design, which has only been attained after much research.

As the majority of stations work on frequencies between 500 and 1,000 kilocycles, the J.B. True Tuning S.L.F. is arranged to give greater variation on the high frequencies. This means that the whole of the scale is being used to the best advantage.

The J.B. S.L.F. models are the high-water mark in S.L.F. design.

Prices J.B. (True Tuning S.L.F.):
.0005 mfd., 16/6; 100035 mfd., 16/-;
00025 mfd., 15/9. For Short Wave Receivers, 100015 mfd., 15/9. Write for full particulars of Logarithmic and Neutralising Models.



Dealers communicate with:

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SYDNEY AND MELBOURNE.
EDGAR V. HUDSON, BRISBANE.
WEDMA LTD. :: ADELAIDE.
GIBBS, BRIGHT & CO., PERTH.

Broadcasting in Japan

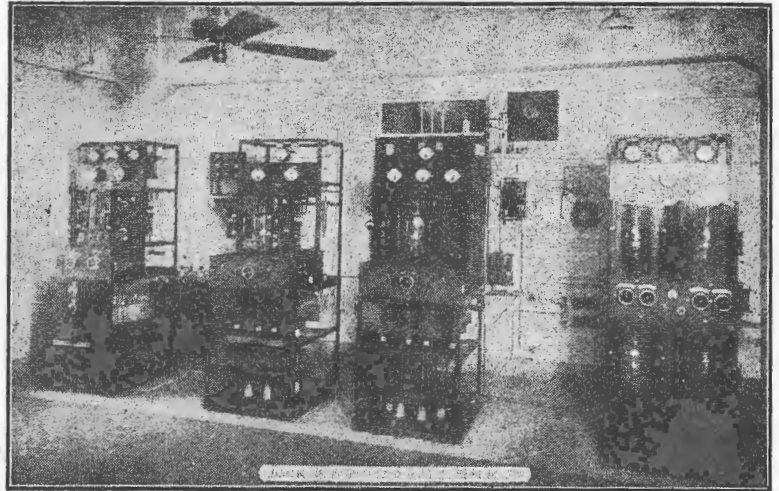


HE old idea that the people of the East are lagging centuries behind Western civilisation is dying hard. Japan in particular is fast becoming a nation of advanced ideas, and in many modern sciences she is holding her own with other countries.

Broadcasting is one of the sciences in which the Jap. is taking a very active interest, as will be seen by the photographs of the handsome studio, the well-laid-out station, and the broadcasting schedule of JOCK printed on this page.

The Mystery of the East.

Those of us whose sets are powerful enough will not forget the thrill that accompanied our first successful attempt to tune-in a Japanese broadcasting station. It seemed as though all the weird mystery of the East floated right into



The Transmitting Station at J.O.C.K.

SCHEDULE OF BROADCASTING HOURS

Announcing Words: J.O.C.K. Nagoya Chuo Hoso Kyoku. Wavelength: 370 metres. Power: 1 K.W.

WEEK DAYS:

From To
 8.45 a.m. 10.10 a.m.—Market reports.
 10.20 a.m. 10.35 a.m.—Cookery and daily menu.
 11.10 a.m. 11.20 a.m.—Foreign market reports.
 11.30 a.m. 11.40 a.m.—News.
 12.0 a.m. 12.5 p.m.—Time signal, weather forecast.

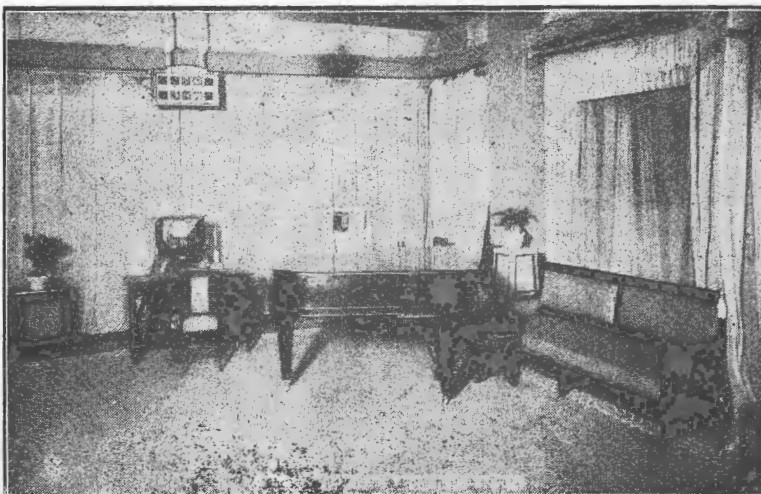
WEEK DAYS:

From To
 12.10 p.m. 12.40 p.m.—Entertainment or speech.
 3.30 p.m. 4.0 p.m.—Talk on home service.
 4.0 p.m. 4.15 p.m.—News, weather
 6.0 p.m. 6.30 p.m.—Children's hour.
 6.30 p.m. 6.40 p.m.—News.

WEEK DAYS:

From To
 6.40 p.m. 7.45 p.m.—Lecture or speech.
 7.50 p.m. 9.20 p.m.—Entertainment.
 9.20 p.m. 9.30 p.m.—Programme of the following day, weather, time signal.
 9.30 p.m. 10.0 p.m.—Lesson or entertainment.

SUNDAYS & HOLIDAYS: Evening schedule is the same as that of the week days.



The Modern Studio at J.O.C.K.

the room. The monotonous though fascinating strums of strange instruments, the rising and falling of the sweet voices of Oriental maidens singing in a strange tongue, and the announcements made in Japanese and broken English caused us to marvel.

But soon we accepted Japanese reception as casually as we would the reception of, say, 5CL Adelaide, or any of the New Zealand stations, and to-day, when conditions are good, we think nothing of tuning in to that far-off land.

Broadcasting in Japan.

By the courtesy of Mr. N. W. Arundell, of Thallon, Q., we are able to publish the photographs which appear on this page. Mr. Arundell kindly forwarded the photographs to us which he received from JOCK in reply to his report on a programme.

The Reasons Why ELECTRON WIRE Popularised Broadcasting

Its simplicity enabled everybody to erect an efficient aerial in a few minutes.

It is the best and cheapest aerial in the world.

It abolishes insulators, masts and separate lead-in tubes.

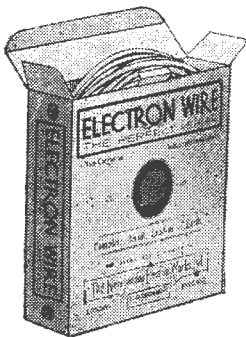
ELECTRON AERIALS ARE USED BY MILLIONS all over the world, giving better results, purer reception, clearer tone, and what is most important, greater selectivity.

ELECTRON WIRE Stands for
SIMPLICITY
ECONOMY
EFFICIENCY



ELECTRON WIRE
THE PERFECT AERIAL

THE PERFECT INDOOR AERIAL—it can be hung carelessly around the room, behind the pictures, or along the picture rail. It gives perfect results under the most difficult conditions and brings in programmes from all over the world. It is a complete aerial and lead-in all in one continuous length.



PRICE

2/6

Coil of 100 feet.

SUPERIAL
THE KING OF AERIALS

FOR LONG DISTANCE RECEPTION—extra heavy insulation **SUPERIAL** is the aerial for long distance work. The extra heavy, vulcanised rubber insulation is a perfect protection against leakage, which therefore minimises any loss of all incoming signals.



4/6

Coil of 100 feet

Sole Distributors for Queensland:

CANADA CYCLE & MOTOR AGENCY, LTD.,
CORNER CREEK and ADELAIDE STREET, BRISBANE.

How to—

Polish Your Cabinets

In dealing with a subject that may include every branch of cabinet-making, it is well to state what is taken for granted. In this article it is assumed that a plain box-like cabinet, either of white wood or some choice wood, has already been constructed to the required dimensions.

It is also assumed that the cabinet has been screwed together, and each screw countersunk so that its head lies about 1/16th inch below the surface of the wood. This article explains how from that foundation a handsome polished cabinet may be built up.

Suitable Stains.

Before describing the processes of staining and polishing we will deal with stains in themselves so that you may know what to buy. The following list will serve most purposes:

STAINS FOR WHITE WOOD.

Mahogany: 1 oz. Red Sanders to $\frac{1}{2}$ pint methylated spirit.

Walnut: Handful of washing soda in quart water. add brown umber until desired colour is obtained.

Oak: $\frac{1}{2}$ oz. permanganate of potash in $\frac{1}{2}$ pint of rain water. 2 or 3 coats.

FOR CHOICE WOODS.

Mahogany: 1 oz. alkanet wood to $\frac{1}{2}$ pint linseed oil. Wipe over with rag.

Walnut: Light, wipe with linseed oil; dark, treat as if white wood.

Oak: Treat as if white wood, but with fewer applications.

Teak: $\frac{1}{2}$ oz. Bismarck brown in 1 pint of hot water and vinegar (equal parts).

Always test a stain on a piece of spare wood before using. To obtain the right colour several applications may be needed. After straining, glasspaper and then rub a little linseed oil into the grain.

Two Polishing Methods.

There are two methods of polishing the stained wood. The first is very slow, taking several weeks to complete. The wood has to be daily treated with linseed oil, the oil being applied with a rag every day for at least a month. The cabinet should then be left to harden, when it will be found that an extremely hard and beautifully polished surface has formed.

The second method is the well-known one of french polishing. But before the cabinet can be french polished it is essential that the grain be filled. A grain filler is formed by mixing fine whiting and turpentine into a paste. This paste should then be coloured to match the stain which has already been applied to the wood. The resulting grain filler must

be rubbed into the wood across the grain. All countersunk screw holes should be stopped with this filler.

For use upon mahogany tint with venetian red, for walnut tint with brown amber, and for all light wood like elm tint with yellow ochre. When dry glasspaper quite flat.

The actual work of polishing may now be started. The french polish may be obtained at any oil-shop and is used with the following rubber: Take a piece of clean rag and lay it flat upon a piece of wood, then take a fairly small piece of wadding and squeeze it in the hand until it assumes a convenient pear-like shape. Lay this wadding upon the rag, pull the rag up and over the wadding and you have the rubber.

Charging the Rubber.

In folding the rag be careful that no creases form on the working face. For use the rubber must be charged with polish, and in doing this care must be taken. The covering of rag is opened so that a little polish may be dropped upon the wadding. A little pressure upon the rubber will now cause the polish to ooze out slowly and evenly.

The polishing is done by quickly wiping over the entire surface of the portion of wood to be polished squeezing steadily the whole time. First work against and then with the grain. The motion of the rubber should take the form of circles.

Quite Simple Really.

Never let the rubber rest upon the work, always keep rubbing lightly until the polish is quite dry. A fine hard polish will be left. All this sounds very complicated, but if you first try your hand on an odd piece of wood you will soon find it quite easy. The beauty of french polish is that it never marks, and will retain its polish for a great length of time.

The Magic of MORSE

SOONER or later, and better sooner than later, YOU as a radio enthusiast will turn to the magic dots and dashes, because, after all, the radio telegraph still dominates the air as far as the volume of traffic is concerned.

While the music and the radio-phone talks may be most interesting to the laity, the fact remains that many things of very great importance are being missed if one does not understand that vital spirit of sound—the telegraph code.

Let me teach you how. Sounder or Buzzer method; speed and proficiency guaranteed; terms moderate.

CHAS. RUNGE

(3 Years' Experience as a Morse Instructor; several years as a Commercial Operator.
Address enquiries c/o "Queensland Radio News,"
Box 1095N, Brisbane.

For the Blind Children

FUND RAISED TO BUY NEW RADIO RECEIVER

We have been asked by Mr. Holle, headmaster of the Blind, Deaf and Dumb School at South Brisbane, to gratefully acknowledge through our columns, the following list of subscription towards the School's new radio set.

The fund was organised and raised by Uncle Ben of 4QG, and on a recent Saturday evening the cheque was handed to Mr. Holle before the microphone, during the bedtime story session.

Australian Hotel (per Miss Moore)	...	£8	0	0
Peter Vallely, Esq.	...	2	0	0
G. H. Cowdry, Esq.	...	1	1	0
Austral Motors Ltd. Employees	...	5	0	0
Aust. General Electric Co. Ltd. Employees	...	2	10	6
Mr. Williams, Acacia Gardens	...	1	1	0
Globe Hotel (per Mr. Cook)	...	4	1	0
Aust. General Electric Co., Ltd.	...	5	0	0
L. Ball, Esq.	...	2	2	0
Read Press Ltd.	...	2	2	0
Read Press Ltd. Employees	...	1	5	6
S. A. Best Ltd.	...	1	1	0
S. A. Best Ltd. Employees	...	1	1	0
Radio Friends	...	2	2	0
More Radio Friends	...	1	10	0
Edwards Dunlop & Co., Ltd.	...	1	1	0
Shipping Newspaper Ltd. Employees	...	1	1	0
Garfield Robbins	...	1	1	0
J.D., South Brisbane	...	1	1	0
Hughes & Holmes	...	1	1	0
Aust. Co-op. Fertilisers Employees	...	1	1	0
Hotel Carlton	...	1	1	0
W. A. O'Hare, Esq.	...	10	6	
J. D. Sloan, Esq.	...	10	6	
J. W. Dobbies, Esq.	...	10	0	
S. B. Heiser, Esq.	...	10	6	
Hughes & Holmes Employees	...	7	0	
Mr. Williams	...	2	6	
G. Gough, Esq.	...	10	6	
Treasury Hotel	...	10	0	
E. Sachs & Co., Ltd.	...	10	6	
Friends at "Leckhampton"	...	10	0	
Total	...	£51	16	0

SUBSCRIPTION FORM

"QUEENSLAND RADIO NEWS."
Box 1095N, G.P.O., Brisbane.

Please send me the "Queensland Radio News" for 12 months. I enclose cheque or P.N. for 6/6.

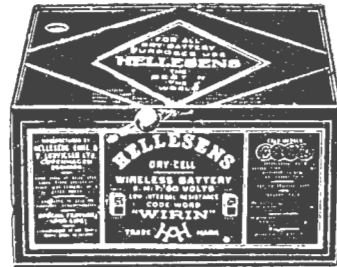
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HELLESENS

The Super

DRY CELLS



The Battery that RECUPERATES while idle!

The world's oldest battery company introduces the century's latest dry cell improvement—the wonderful

No. 7 Recuperating Agent

This exclusive feature is to be found in no other dry cell. It ensures longer life and full value for every penny spent.

See for yourself how superior the New HELLESENS are. Connect one up to your set and take regular voltmeter readings. You'll be surprised.

PRICES

Standard Capacity—	
45V.	14/-
60V.	18/6
Triple Capacity—	
45V.	21/-
60V.	27/6

At All Good Radio Dealers
or 'Direct from—

BRISBANE ELECTRICAL CO.

(T. Tonks)

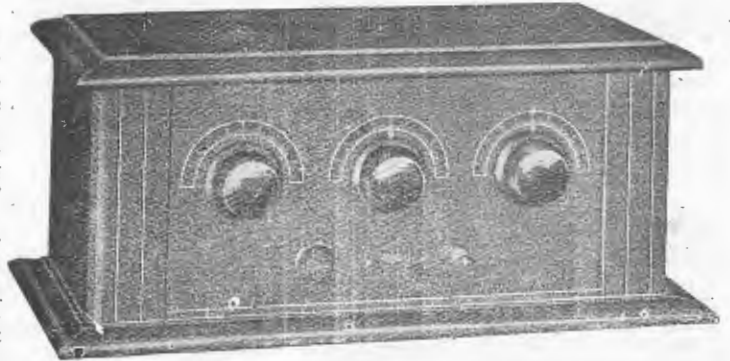
ELIZABETH STREET (Next to 4QG),
BRISBANE.

NEW RECEIVERS REVIEWED

In response to many requests from our readers, we have inaugurated this department. It is our intention to test each new receiver as it appears upon the market, and to offer candid criticism upon its performance.

THE "WORLD" RADIO SETS.

The "World" radio receivers, which are manufactured by the World Radio Corporation of America, are obtainable in two distinct designs—the "Compact" and the "De Luxe." Our illustration shows a view of the "Compact" model, the only difference between the two being in the design of the cabinet, which, in the case of the "De Luxe," is more elaborate and is large enough to accommodate the "B" and "C" batteries. By courtesy of Messrs Trackson Bros., Ltd., Elizabeth Street, Brisbane, we were given an opportunity of testing a "De Luxe" model.



On a 40ft. aerial, leading from a 35ft. mast directly to the set, we found no difficulty in tuning in all the Southern stations—both "A" and "B" class—the majority of the smaller stations being received at splendid loudspeaker strength. Selectivity is fair; while it is possible to receive 2BL and 2FC without interference from 4QG, a wavetrap is necessary in the city and suburbs in order to eliminate a background from the local station on 3LO (Melbourne). Used with a kit of Philips valves, the reproduction was clear.

Five valves are used, the circuit embodying two stages of tuned radio-frequency, detector, and two

audio stages. The radio-frequency stages are shielded, and an individual tuning control is provided for each input circuit. On the panel are mounted the three tuning knobs, a volume control, and the battery switch. In practice, the operation of the set is very simple, as the three tuning knobs synchronise closely in their adjustment. The set is housed in an attractive two-tone mahogany cabinet with an inlaid design, the "De Luxe" model having two folding panel doors which close over the main panel, thus excluding dust and moisture and presenting a neat appearance.



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Some Interesting Facts About

RECTIFIERS

A rectifier is a device for converting alternating current into direct current. There are many cases in which this is necessary, the most familiar being where it is required to charge a battery of accumulators from alternating current electric supply.

The principal types of rectifier in use are:—

1. Valve rectifiers.
2. Vibratory or mechanical rectifiers.
3. Chemical or electrolytic rectifiers.

An ideal rectifier would be, say, a short length of metal rod which had the property of opposing an infinite resistance to the passage of current through it in one direction and zero resistance to the passage of current through it in the opposite direction. Such a rectifier would be 100 per cent efficient.

In practice, however, the process of opposing a high resistance to the current in one direction involves certain losses in the rectifier and, further-more, the rectifying device has an appreciable (in some cases a large) resistance in the "through" direction. The nearer a rectifier approaches to the ideal conditions mentioned above the nearer its efficiency approaches to 100 per cent. The rectifiers of the various classes mentioned above all have advantages and disadvantages, and the choice of one or other will depend, to a large extent, upon the particular purpose for which the device is to be used.

THE VARIOUS TYPES.

For example, a valve rectifier, as a rule, gives very efficient rectification, in the sense that the reverse current is small compared with the "through" current. A valve rectifier, moreover, is entirely silent and, as it contains no liquids, it can be operated in any position. Its principal drawback is that it consumes a considerable amount of energy for the heating of the filament, and also it usually has a fairly high resistance.

The vibrating-reed rectifier, when properly adjusted, is very efficient as regards both rectification and low losses. A mechanical device, however, always requires a certain amount of attention; and a disadvantage of a vibratory rectifier is that it is apt to get out of adjustment and sparking occurs. In some circumstances even a reversal of the polarity of the D.C. terminals may take place.

Chemical or electrolytic rectifiers, except for the fact that they contain liquid and therefore are subject to certain obvious inconveniences, have many advantages. There is practically no attention required beyond the occasional addition of a little distilled water, and there is no energy consumed in a way corresponding to the heating of the filament in a valve

rectifier. If the electrodes and electrolyte are suitably chosen the internal resistance of the electrolytic rectifier may be quite small; consequently there may be little heating in operation and little loss of energy in the rectifier.

The advantages of the electrolytic type of rectifier have led experimenters for some years past to endeavour to incorporate the essential features of the electrolytic rectifier into a device which would be free from the chief (almost the only) drawback of the electrolytic type—that is, the fact that it contains free liquid, and is therefore not strictly "portable" in the ordinary sense.

A REALLY "DRY" RECTIFIER.

It has been found that if a disc of lead and a disc of copper be pressed together, with a "sandwich" of copper oxide between the two, the unit has unilateral conductivity, and therefore acts as a rectifier. The exact mechanism of the rectification under these conditions is not properly understood, but it seems probable that it is closely related to the rectifying action which takes place at the contact between a crystal detector and the cat's-whisker. The voltage required to drive a considerable D.C. current (2 or 3 amperes) through such a unit is quite small—of the order of a volt.

Starting from the above-mentioned discovery, investigations have taken place with a view to finding more suitable material and, as a result of these investigations, a commercial rectifier has now been placed on the market, and under the name of the "Kuprox," and "Rectox," the first name implying the use of copper and copper oxide. In the commercial device a number of these rectifying units are joined together in series in order to give to the device a sufficient breakdown voltage to enable it to withstand the reverse voltage of perhaps 15 volts, which is built up against it when charging a 6-volt battery. The discs of Kuprox are of reddish appearance and about the size of a half-crown. In operation this rectifier is absolutely noiseless and, being perfectly dry, it involves no trouble either in care or maintenance. The efficiency is very high, and the Kuprox does not deteriorate either in use or disuse. The metal discs are bolted solidly together and cannot break or develop other mechanical trouble unless deliberately mishandled.

You will see that these represent important advances in the subject of alternating current rectification and (quite apart from their many practical uses) their discovery and development provide an encouraging exemplification of the fact that there is still a great deal to be discovered even in the most familiar fields.

AMONG THE AMATEURS

(By "Lambda.")

Ten metre work goes on apace in the Fourth District. Several of the Fours have very wisely decided that it will be a sound scheme if we learn to crawl before we try to walk, and, applying this logical conclusion to the radio game, are investigating the possibilities of the ten metre wavelengths instead of dropping right down to five metres or lower. There has been quite a lot of experimental work carried out in the region of five metres during the last couple of years. Some of it has been productive of encouraging results, but much of it, it is to be feared, has amounted to so much wasted time. The behaviour of five-metre waves appears to be so entirely different from what we have been accustomed to on the longer wavelengths that we are forced to start right at the beginning, and to gather information as we go along.

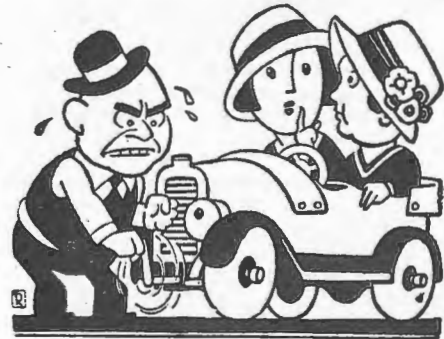
On thirty metres we are quite at home. On twenty metres, too, we have lost that feeling of strangeness that always accompanies our initial operation on a new waveband. If, in the general trend towards the use of shorter and shorter waves and higher frequencies, the reduction is made gradually, perhaps we may find ourselves ultimately utilising these ultra-short waves with the same facility that marks our 30-metre operations. It will be interesting—and seemingly not very difficult—to discover just at what point in the wavelength spectrum the behaviour of the waves undergoes such a decided change, assuming, of course, that the change actually is present. It may even be that it is the deficiencies of the apparatus used, and not some inherent property of the waves themselves, that is responsible for the vagaries which have been so much in evidence up to the present. There is one aspect which should never be lost sight of in considering "short" wave communication. It is a curious fact that, actually, there is no such thing as "short" and "long"—it is all a matter of comparison. Do you remember the days when we wound 1500-turn honeycomb coils (they could not be bought at that time—eight years ago), and listened-in to the 20,000-metre commercial arc stations? In those days we were accustomed to speak of the waves between 200 and 600 metres as the "short" waves, and I can well remember the thrill of trying the "very short" waves—as low as 150 metres!—for the first time. History has a way of repeating itself, and it will hardly be surprising if the "short" waves of to-day will, in the not-far-distant future, have no more claim to that title than the 200-metre waves have at the present time.

Facts About the Fours.

4NW has a ten-metre Hartley set, using three turns, 4 inches in diameter, with no shunt condenser. This oscillator is coupled to an aerial with a fundamental around 100 metres, shock-exciting it at approximately 10 metres. At 4AW these signals roll in R-10, while an R-7 report has been received from 4WA. A schedule has been started with 3BQ of

Melbourne for 12.30 p.m. every Sunday. So far, only sundry chirps have been heard on the 10-metre wave, but success is hoped for at an early date. Quite a number of 3's and 7DX of Tasmania, are in action on the 10-metre band.

4AW has his 10-metre transmitter mounted directly on the aerial mast, operating it by a remote-control arrangement. A 210 tube is used, with the (comparatively speaking) high input of 50 watts. The circuit is a series Hartley, feeding a Zeppelin wire. 4PN, 4RB and 4AW have lately been concerned in some highly interesting three-way 10-metre communication among themselves. In all cases the signal strength is excellent—it averages about R-7—and this is believed to constitute the first three-cornered operation so far carried out in Australia on 10 metres.



4CG HAS A NEW FORD.

When radio's the subject, old CG looks bored; The reason is plain—two YL's and a Ford!

4JB—the property of O. Alder, Old Sandgate Road, Albion—is a new one; new, according to the official lists, at any rate. At present he's working a portable at Dirranbandi. Only 80 volts of "B" battery are used on a 201A, but the beautifully pure and steady D.C. signals are making themselves heard in the South. 4BB uses only about 7 watts, but has been QSO the United States, for all that. He has a splendid "fist" and it's a treat to copy him. Heard several Yanks calling him a few nights ago. 4NW hooked up with sc-2AB (Chile) at 10.30 p.m. our time—daylight in Chile—and has been QSO plenty Yanks, using two 210's with 45 watts input.

4WA worked xnu-LG, an American ship steaming between Melbourne and Freemantle. Later on, 4NW clicked with the same ship. 4LJ, in the midst of his multifarious duties in connection with the A.R.T.L., finds time to wiggle the key occasionally. He was QSO recently with xcl-AWV, the Swedish motor-

ship "Thalatta," which was 300 miles from Yokohama at the time.

4CF has been putting out some very good telephony on 250 metres on Sunday afternoons. The records transmitted are generally well worth listening to, though the quality of modulation suffers at times from microphonic trouble, apparently. The speech is disappointing, when compared with the standard of the music. It is rather hard sometimes to identify

his call, and no doubt he is losing many reports because of this. Locally, the strength is enormous, and I believe his phone is covering some good distances.

4AN is stirring once more. The Screen Grid Four described in this issue is reported to be the stirring agent, and there is some prospect of the set finding a permanent home at 4AN. The next stage may be a transmitter—who knows?



Broadcasting the Eucharistic Congress

The Eucharistic Congress to be held in Sydney early this month, is an event of world-wide importance, and very complete arrangements have been made by the New South Wales Broadcasting Company to broadcast the important sessions on long and short waves, so that the people of Australia and countries overseas may be able to tune-in to the ceremonies.

St. Mary's Cathedral has been fitted out in a most complete manner by A.W.A. engineers to ensure perfect transmission of the services. An intricate system of five microphones is being installed in the cathedral. The first of these will be placed on a silver stand before the altar. The second will be suspended from the ceiling over the sanctuary. The third will be suspended from the ceiling above the altar on the eastern side of the cathedral, where a choir of 300 priests will chant the Mass. Another microphone will be suspended above the massed stalls, from where 350 voices will be transmitted. A further microphone will be placed at the pulpit, and still a further microphone will be suspended from the roof half-way down the cathedral to catch congregational effects. A special splitting panel has been built by A.W.A. engineers, and this will be installed at the back of the sanctuary. From this point all the microphones throughout the cathedral will be operated. At times the whole battery will be placed in series, and when necessary individual microphones will be worked to take the speech from various points.

4QG TO REBROADCAST CEREMONIES.

Station 4QG has made arrangements with the New South Wales Broadcasting Company whereby they are to re-broadcast 2FC's and 2BL's short-wave transmissions.

The following is a schedule of Eucharistic broadcasts which are to be re-broadcast by 4QG:—

Wednesday, September 5th: Solemn Opening of the Eucharistic Congress.

Friday, September 7th: At 10 a.m. Children's Mass from the Sydney Showground.

Saturday, September 8th: At 10 a.m. Women's Mass from Sydney Showground.

Sunday, September 9th: At 1.30 p.m. High Mass from St. Mary's Cathedral.

The Papal Legate's Visit to Brisbane.

Upon the occasion of the visit of the Papal Legate (His Eminence Cardinal Cerretti) Station 4QG has made arrangements to broadcast all the important functions.

The following schedule sets out briefly the broadcasting arrangements made during the Papal Legate's visit to Brisbane:—

Friday, September 14th: The arrival of the Papal Legate at Central Railway Station; description of the procession en route; special service from St. Stephen's.

Sunday, September 16th: Morning service from St. Stephen's with His Eminence Cardinal Cerretti officiating. In the afternoon the laying of the foundation stone of the Holy Name Cathedral will be relayed.



"B" Class Station for Toowoomba

Move by Station 4QG

As we go to press information has been received to the effect that there is a probability of Station 4QG establishing a "B" class station in Toowoomba in the near future.

The power or the wavelength of the station is as yet unknown; indeed, it is not known whether the Broadcasting License has been granted, although no difficulty should be experienced in this regard.

The Director of Station 4QG (Mr. J. W. Robinson) recently paid a visit to Toowoomba to make obser-

vations and enquiries, and returned impressed with the prospects of a successful "B" class station.

If the station is established a system of relayed programmes would be arranged between the two stations, enabling 4QG's transmissions to be relayed to and broadcast through the Toowoomba station, whilst occasionally the Downs station will relay a programme by Toowoomba talent to 4QG. We hope to give our readers more details of this big scheme in our next issue.

What to do with Your OBSOLETE APPARATUS

MANY wireless enthusiasts have now built their 1928 receivers, incorporating all the latest designs of components that they can afford, with the result that many constructors find themselves in possession of a quantity of old material.

A Practical Outlet.

There are many young enthusiasts who are yearning to put their itching fingers on their own control knobs. What care they if the condenser is not "square-law," or the rheostat not so velvety as now demanded? Does it matter to them if the valve holder isn't antimicrophonic as long as they can pull in a few signals? And I've heard some results from these youngsters' "junk" sets that would be a credit to many a so-called low-loss modern receiver.

Many lads cannot afford valve receivers, or have to wait a long time while they save up. They know quite a deal from wireless periodicals about the working of a set. Why not help some young friend to pull his first signals? Will you ever forget the time that you first heard signals from the ether? Not likely! Well, then, pass the pleasure on and add another recruit to the ranks of the radio fans.

If you cannot dispose of your old components, they are handy for rough experimenting when you have no wish to break down a set to try out a fresh circuit.

Controlling Feed-back.

The old-type semi-circular plate variable condenser—providing it is electrically perfect and not liable to short—can be used to control the amount of feedback when capacity reaction is used. There is no real need for square-law condensers in this position, as we are controlling feed-back which is dependent upon the capacity existing between the anode and grid circuits.

Many aerial-tuning condensers of a season or two ago were of a capacity of .001-microfarad, which is rather too high for fine tuning, even with verniers, over the present congested broadcast wavelength band.

They can, however, be used in conjunction with a .001-microfarad fixed condenser so that the tuning value is from minimum to .0005 microfarad. The two condensers are joined in series and placed in parallel with the inductance to be tuned. This arrangement may be used with any type and capacity of variable condenser.

Series Condensers.

For example, a .0005-microfarad fixed condenser in series with a .0005-microfarad variable condenser will have a maximum of .00025-microfarad and a very low minimum. A .00025-microfarad fixed condenser and a .0005-microfarad variable condenser will have a maximum capacity of .00017-microfarad, which is suitable for tuning very short-wave receivers.

With some variable condensers of simple construction it is an easy matter to take off the bottom end plate and remove half of the fixed plates, thereby reducing the capacity of the condenser to approximately a half of its former value.

Removing Vanes.

The moving plates that do not mesh with the remaining fixed plates can be left on the spindle, as they will have no effect upon the working or efficiency of the condenser. In fact, it is not advisable to remove them, as it may upset the correct re-setting of the spindle when the condenser is reassembled. Washers must be added to the lower end of the supports of the fixed plates to take up the space left by the removed vanes.

Two- or three-way coil holders may be made to serve a turn behind the panel by cutting off the handles. Many circuits require coils to be coupled, the amount of coupling, once determined, remaining fixed, being suitable for the range of the receiver.

Panel-mounting Rheostats.

Panel mounting rheostats may be fixed to the baseboard by making up a small platform. The two sides can be of $\frac{1}{2}$ in. wood, $\frac{1}{2}$ in. high and as long as the diameter of the rheostat. The top is of three-ply or similar thin wood. See that the terminals, or soldering tags, are accessible, by bringing them right up to, or beyond, the edge of the three-ply platform. The device may be screwed to the baseboard by means of angle-brackets.

Ordinary old-type valve holders are quite all right for H.F. transformers of the old barrel type and for H.F. valves. Modern valves are not nearly so microphonic as they used to be and plain valve holders are satisfactory for experimental purposes.

Bright-emitter valves or old type dull-emitters that have been replaced by more efficient and economical types, can still be of use in saving their modern comrade from premature demise when a new set is being tested out for the first time.

A Good Practice.

It is the practice, and a very good one, too, of most constructors, when testing a set for correctness of wiring, to plug in the valves and connect up the accumulator to the H.T. terminals. The valves, of course, should not light. If they do, something is dangerously wrong, and the test has saved the valves.

But modern valves take such a small current, and are so silvered internally by the "getter," that no visible sign of whether the filament is alight or not is perceivable.

The filaments of the old valves, however, are easily visible and are perfectly satisfactory for the test. Even old four- and six-volt bright-emitters will serve in a set working off a two-volt accumulator as their filaments will glow sufficiently to indicate the correctness, or otherwise, of the circuit.

It can be seen from the foregoing that even the oldest of components may be put to some use, and if from the suggestions mentioned, some old veteran is brought out from the junk box and given a place of honour, or put to further work, then this article will have achieved its purpose.

Do You "Q" SIGNALS?

A knowledge of the International Abbreviations is essential before you can hope to pass the Amateur Operator's Proficiency Certificate Examination. Here is the complete list—effective up to and including the last day of of this year.

Signal	Question.	Answer.
PRB	Do you wish to communicate by means of the International Signal Code?	I wish to communicate with your station by means of the International Signal Code.
QRA	What is the name of your station?	This station is —
QRB	How far are you from my station?	The distance between our stations is — nautical miles.
QRC	What are your true bearings?	My true bearings are —degrees.
QRD	Where are you bound?	I am bound for —
QRF	Where are you coming from?	I am coming from —
QRG	To what company or line of navigation do you belong?	I belong to —
QRH	What is your wavelength?	My wavelength is— metres.
QRJ	How many words have you to transmit?	I have — words to transmit.
QRK	How are you receiving?	I am receiving well.
QRL	Are you receiving badly? Shall I transmit ...— 20 times for you to adjust your apparatus?	I am receiving badly Transmit ...— 20 times for me to adjust my apparatus.
QRM	Are you being interfered with?	I am being interfered with.
QRN	Are the atmospherics strong?	The atmospherics are very strong.
QRO	Shall I increase my power?	Increase your power.
QRP	Shall I decrease my power?	Decrease your power.
QRQ	Shall I transmit faster?	Transmit faster.
QRS	Shall I transmit slower?	Transmit slower.
QRT	Shall I stop transmitting?	Stop transmitting.
QRU	(No question).	I have nothing to communicate; I have nothing for you.
QRV	Are you ready?	I am ready; all is in order.
QRW	Are you busy?	I am busy with another station (or with—); Please do not interrupt.
QRX	Shall I stand by?	Stand by; I will call you at — o'clock (or when required.)
QRY	What is my turn?	Your turn is No. —
QRZ	Are my signals weak?	Your signals are weak.
QSA	Are my signals strong?	Your signals are strong.
QSB	Is my tone bad?—Is my spark bad?	The tone is bad; or the spark is bad.
QSC	Is my spacing bad?	Your spacing is bad.
QSD	Let us compare watches—my time is—. What is your time?	The time is —
QSF	Are the radiotelegrams to be transmitted alternately or in series?	The radiotelegrams are to be transmitted alternately.
QSH	(No question).	The transmission will be in series of 5 radiotelegrams.
QSG	(No question).	The transmission will be in series of 10 radiotelegrams.
QSJ	What is the rate per word to—?	The rate per word is—.
QSK	Is the last radiotelegram cancelled?	The last radiotelegram is cancelled.
QSL	Have you got the receipt?	Please give a receipt.
QSM	What is your true course?	My true course is — degrees.
QSN	Are you communicating O.K.?	I am not communicating with land.
QSO	Are you in communication with another station (or: with —)?	I am in communication with — (through the medium of —).
QSP	Shall I signal to —that you are calling him?	Inform — that I am calling him.

Signal	Question.	Answer.
QSQ	Am I being called by —?	You are being called by —.
QSR	Will you despatch the radiotelegram —?	I will forward the radiotelegram.
QST	Have you received a general call?	I have received a general call for all stations.
QSU	Please call me when you have finished (or at — o'clock).	I will call you when I have finished.
QSV	Is public correspondence engaged?	Public correspondence is engaged. Please do not interrupt.
QSW	Must I increase the frequency of my spark?	Increase the frequency of your spark.
QSX	Must I diminish the frequency of my spark?	Diminish the frequency of your spark.
QSY	Shall I transmit with a wavelength of — metres?	Let us transfer to the wavelength of — metres
QSZ	(No question).	Transmit each word twice. I have difficulty in receiving your signals.
QTA	(No question).	Transmit each radiotelegram twice. I have difficulty in receiving your signals; or: repeat the radiotelegram you have just sent; reception doubtful.
QTB	(No question).	Number of words not agreed. I will repeat the first letter of each word and the first figure of each group.
QTC	Have you something—anything to communicate?	I have something to communicate. I have message (s) for —
QTE	What is my true bearing from you? (or: from —?)	Your true bearing from me (or: from —) was — deg.
QTF	What is my true position?	Your true position is latitude —, longitude —.
QTG	Shall I transmit call-sign of this station in order that a bearing may be obtained?	Please transmit your station's call sign for one minute in order that a bearing may be obtained.

A Forecast of Features

for

NEXT MONTH

THE SCREEN GRID SOLODYNE.

The very latest development of this notable five-valve receiver. New circuit—new screen grid valves—complete shielding—knife-edge selectivity. A broadcast receiver which is well ahead of its time, and yet is very easy to build.

A SUPER-EFFICIENT SHORT-WAVE TRANSMITTER.

Full constructional details of the beautiful little short-wave transmitter designed and built by Mr. Ray McIntosh, and used at Station 4RM. It costs less than £1 to assemble, and yet is the last word in efficiency. Just the thing for the man who wants to join the ranks of the transmitting amateurs.

THE SCREEN GRID BOOSTER.

An inexpensive radio-frequency amplifier unit employing the screen grid valve, to be added to any

existing short-wave receiver. It requires few parts, and is assembled in a ready-made shielded box.

THE A.O.P.C. COURSE.

First instalment of a very comprehensive course covering the Amateur Operator's Proficiency Certificate Examination.

TOOWOOMBA'S NEW STATION.

Full particulars of the "B" class relay station which 4QG plans to erect in Toowoomba at an early date.

GERMANY'S SUPER SPY.

A further long instalment of this thrilling serial of the Great War, by Robert Ware.

ALL THE REGULAR FEATURES.

"Tested and Recommended," "Receivers Reviewed," "With the Amateurs," and the informative "Questions Answered" Department.

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WOOLOOWIN RADIO CLUB (4WN).

The fourth annual meeting of the club was held in the club rooms on Thursday, 23rd August, and a very good attendance was recorded. The usual reports from the secretary, treasurer, auditors, and technical committee were presented and adopted. These reports showed that this club is as much alive as it ever was, and that financially it is in a very sound position.

Extracts from these reports will be included in these notes in the October issue of "Q.R.N."

The election of officers for the ensuing twelve months resulted as follows:—

- Patron: Jas. Love, Esq.
- President: Mr. H. A. Jiear.
- Vice-Presidents: J. W. Robinson, Esq., A. T. Bartlett, Esq., President ARTL (Q. Div.).
- Hon. Secretary: Mr. G. Payne.
- Hon. Assistant Secretary: Mr. V. Bouchard.
- Hon. Treasurer: Mr. J. P. Love.
- Committee: Mr. V. F. Kenna (4FK), Mr. L. J. Feenaghty (4LJ).

Technical Committee: 4FK, 4RG, 4JG, 4LJ.

Auditors: Mr. W. Rhode, Mr. C. George.

"Prescores": Mr. V. F. Kenna.

An apology for absence from the evening was tendered on behalf of the Radio Inspector (Mr. T. Armstrong).

Satisfactory tests having been carried out with 4WN working on phone, it was decided to broadcast the annual meeting from the club room.

This was accordingly done on a wavelength of about 86 metres. Reports on the reception of this transmission would be appreciated by the club, and should be addressed to the hon. secretary, c/- Mr. E. J. Thomas, Wilmington Street, Woolloowin. All such reports will be acknowledged.

The club-room is open every Thursday night at 8 p.m., when any person interested will be made welcome.



TOOMBUL RADIO CLUB

The 250 metre transmitter of the club has been operating on Sunday, Wednesday and Friday evenings during the past month and many helpful and encouraging reports have come to hand from all suburbs of Brisbane, the majority reporting fair speaker strength. The transmitter used is a loose coupled Hartley, input six to eight watts on a UX 210 tube. Absorption modulation is giving satisfaction.

The technical committee has drawn up a note of lectures for the coming months and as these have always been popular with club members, large attendances are expected at these lectures, which are to be delivered every Wednesday evening. Persons interested in wireless are cordially invited to attend the lectures.

On August 15th, a visit of inspection was paid to experimental station 4NW, owned and operated by Mr. T. W. Starkie, Sandgate Road, Nundah. An inspection was made of the very flexible transmitter, which operates on from 10 metres to 250 metres. Mr. Starkie's receivers were also the subject of much complimentary discussion, whilst great interest was shown in the working of an electric pickup for reproducing gramophone music.



THE INDOOROOPILLY RADIO CLUB.

The radio concert organised by the I.R.C. to furnish funds, proved to be a successful function. After paying our expenses, which were somewhere in the region of £6, we were about £5 to the good.

The success of the function was mainly due to three things. First, the high standard of items supplied by the artists. Secondly the very interesting talk on wireless given by Mr. Robinson (Director of 4QG). Lastly, but by no means least, was the "Death Ray" experiment conducted by Mr. Verne Kenna. In fact, this experiment actually terrorised some of the audience.

Egad! Wisdom was never so far from greybeards as on the night of Friday, August 3rd. Mr. Verne Kenna played a scurvy trick on the Woolloowin gang. He reserved a seat for them. How magnanimous! But Verne did not forget to fix beneath the seat a wire attached to a spark-coil. The machinery was set going and the gang began a-hopping. Up jumped the lads all at once as a ten inch spark trickled into their pants! Then up and up again! My! A metronome could not have kept better tempo. Ha, ha! This little story will show you what a lively night it was, and we can safely say everyone thoroughly enjoyed themselves.

We wish to thank those who helped towards the success of the function. They have assisted us to muster that which we yearned for—C-A-S-H!

The I.R.C. sent out an appeal for lecturers last month. So far we have had no reply; nevertheless, we are still patiently standing by.

New Brisbane Trade House

T. H. MARTIN & SON.

A new trade house carrying several well-known and highly reputed agencies, has been opened in the B. & F. Chambers (opp. Finney, Isles), Adelaide St., Brisbane, by Messrs. T. H. Martin & Son.

The more important agencies include the factory representation for Messrs A. C. Cossor Company, makers of "Cossor" valves; the Lissen Wireless Co., Ltd., of England; C. D. Maclurcan, of Sydney; M.P.A. cone speakers; and the Runbaken Magneto Company.

Mr. T. H. Martin is well and favourably known among the wireless and electrical circles of Queensland, having been connected with Messrs Trackson Bros., Ltd., for many years, and later with the Brisbane Electrical Coy.

His wide experience in the radio and electrical business should serve him in good stead in his undertaking, and the excellent agencies he has had the good fortune to secure augers well for the success of the venture.

This department is conducted for the benefit of our readers. We cannot answer queries by mail, but if a special diagram is required, we will supply it at a cost of 1/-.

Questions Answered

By the TECHNICAL EDITOR

Questions received before the 20th of the month will be answered in the following month's issue. Queries arriving after this date are deferred until the next issue.

"Z," Charleville.—"I intend buying a three-valver. Which direction would be best to point the free end of my aerial for this part of Queensland? (2) Would it be advisable to place the lead-in within ten feet of the power mains running on to the side of my house?"

Answer.—I would point the free end of the aerial in approximately a north-westerly direction if I were you. This should give you maximum results from the Sydney and New Zealand stations, and will still embrace Melbourne and Brisbane, as an inverted "L" aerial is supposed to give best signal strength from the direction of the lead-in end. The directional effect of such an aerial is a controversial point, but there seems to be little doubt that the effect is present, and there are sound theoretical reasons for supporting the theory. (2) Yes; you will be quite safe in running the lead-in within ten feet of the power lines, providing you take every precaution to ensure that there is absolutely no possibility of the wires coming into contact with one another in the event of any of them breaking or becoming slack. Don't run your lead-in parallel with the power lines for any distance, though, or you may have trouble from noises picked up from the lines.

"S.J.S.," Windsor.—"A strong whistle is heard in the speaker when the first amplifying valve is turned on past half-way, and when turned below that point, volume decreases very much. (2) A loud howl is heard when reaction condenser is taken past 85 degrees (vanes closing in). The set is a three-valve Reinartz. Can you help me?"

Answer.—The whistle you mention is caused by audio-frequency feedback, and is quite likely due to a run-down or partially run-down "B" battery, a defective valve, the transformers being mounted too close together, or at such an angle that there is interaction between them, or possibly to some of the grid and plate leads running parallel. Test your "B" batteries, and connect a 2-mfd. fixed condenser between the "B" battery positive terminal (the one which connects to the maximum voltage) and the negative filament line. Try changing the valves round. If the whistle still persists, alter the layout of the amplifier. It should be possible to turn the filament on full without whistling. By running the valve at reduced voltage, you are not only losing volume, but the tone quality will suffer as well. I have known cases where such a noise could be stopped by the simple operation of reversing the loudspeaker wires, but it is best to strike at the cause, which is instability. (2) I take it the howl is heard just as the oscillating point is reached—that is, just before the point at which you can tune in the carriers or whistles of the stations. This is called "fringe howl," and can be extremely annoying and very tenacious at times. Try different values of grid leak (a lower value may be advisable), alter the "B" battery voltage on the detector, make sure your "B" batteries are O.K., try another valve, and if all else fails, take a few turns off the reaction coil. A 100,000-ohms (.1 meg-ohm) fixed resistor connected across the secondary of the first audio transformer often will effect a cure, and perhaps will eliminate the other whistle at the same time. You could try that first.

"Dud," Maroochydore.—"Re the 1928 Browning-Drake set shown in June 'Radio News': One wire runs from switch S to red, and two short wires 8 inches long run from its other terminal. Do both those short wires connect with the variable resistance R1, and if so, Why? Is it for strength or in case of a breakage?"

Answer.—Due to an unfortunate choice of words on the part of the writer, that little point has confused several readers. No; one of those short wires runs to the variable resistance R1, and the other to the Brachstat R2. The two wires were attached direct to the switch merely to avoid soldering one wire to the one going to R1.

"W.A.P.," Winton.—"Have you published the circuit and pictorial diagram of the Elstree Six in the 'Radio News'? If so, could you supply me with a copy? If you have not published the circuit, could you tell me if you are likely to do so shortly? (2) Is a rheostat better to use with valves than a fixed resistance, such as Amperites, for good reception?"

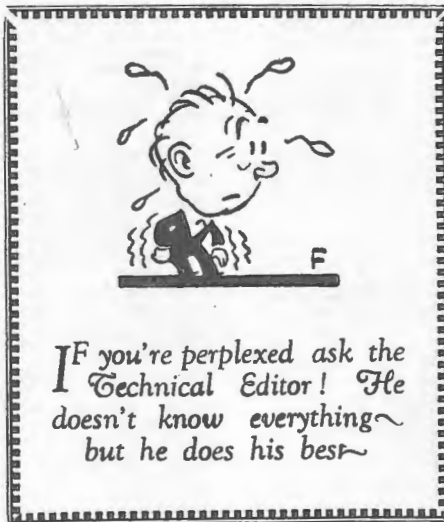
Answer.—No; we have not so far published details of the Elstree Six, and I cannot say definitely if we will do so. It appears to be a very good circuit, but there are many other newer receivers which have a greater claim on our space. This receiver was described, however, in the July 15th, 1927, issue of "Radio" (Sydney), and you may obtain a copy from Messrs. Wireless Newspapers Ltd., 51 Castlereagh Street, Sydney. (2) For use with any amplifying valves I always advise the use of automatic filament controls or ballast resistors. They are usually quite O.K. for the detector valve, also, if one or more stages of radio-frequency amplification are ahead of it. Where there is no r.f. amplification, however—such as in a one, two or three-valve receiver—the use of a rheostat to vary the detector filament voltage is recommended, as it is then necessary to operate the filament at the most efficient point in order to get the last fraction of energy out of the set.

"A.C.," Tate.—"Please inform me through your valuable journal if the Amplion carboncells are a satisfactory substitute for accumulators, and what is the charging element used? Are they suitable for multi-valve sets using .1 ampere valves (4 volt)?"

Answer.—Carboncells are excellent for the purpose you mention, and we can recommend them. The charging element used is Salammoniac, each charge costing 4/6 per cell. There are two sizes of Carboncell, but the larger size—No. 222—will be most suitable for your purpose. It is intended for use on receivers using four, five and six valves of the .1-ampere type, and is giving splendid service in many parts of Queensland.

"Woop," The Bush.—"I have been a subscriber to the 'Radio News' for some time now, and I have always had a desire to become a '4.' I have a key, etc., for practising, but the technical part has got me, and of course radio clubs are unknown here. I would be glad if you would give me an idea of the best books to get to take me right through the course."

Answer.—You should get a copy of James' "Wireless Valve Transmitters," price 12/6, obtainable from Barker's or McLeod's bookstores, Brisbane. Beginning in our next issue (October), we intend publishing a complete instructional course covering the A.O.P.C. examination. It will be divided into sections, one of which will appear in each issue for some time to come. They cover the subject very thoroughly, and, in conjunction with the book mentioned, should put you well on the road towards attaining your ambition. Next time you write to us, why not give us your address—not necessarily for publication? We know of quite



a lot of "bush" in Queensland, but we'd like to know just what iron-bark shelters "Woop!"

"V.S.," Molendinar, S.C. Line.—"What is the method of re-constructing dry cell 'A' batteries? What gauge of zinc is used, and what is the cost? (2) What is the method of constructing a home-made 'B' accumulator? Can it be constructed with carbon rods taken from dry cell 'A' batteries? (3) How is an electric arc made? Can the arc be made to radiate a continuous spark by using a special transmitter; if so, how is the transmitter made? (4) Is it possible to make a four- or five-valve set that will work from a small folding frame aerial, and bring in the Southern stations at good loudspeaker strength? The set is to be used as a portable. What is name of the circuit?"

Answer.—I am afraid three of your questions are rather outside the scope of this department. It is possible to make a dry cell if you care to spend enough time and money on it and to be content with an inferior article, but a complete description of the process would form a lengthy article in itself and would occupy far more space than is at our disposal here. (2) Full constructional details of "An Inexpensive 'B' Battery made from Old Dry Cells" were published in the August 27th issue of the "Broadcast Bulletin," obtainable from this office, price 2d. This particular battery has been remarkably successful, and is highly recommended. (3) A simple arc consists of two carbon pencils, one pointed and the other concave, and is supplied with about 50 volts of D.C. It will pass a very heavy current. In the case of the bioscope arc used for motion-picture projection, the current drawn by the arc is often round about 50 amperes. The arc is "struck" by placing the two carbon rods together and then drawing them apart, when an intensely brilliant "flame" is formed between the two pencils. Such an arc generates continuous oscillations, and when connected to a suitable tuning circuit, may be used for transmission, but it is quite unsuitable for amateur work. Again, a full description is impossible here. (4) Without reflexing, I doubt whether you would get good reception on a portable five-valve set with a frame aerial. It is a much better plan to carry a length of wire with you and string it over a branch of a tree. Under these conditions, it is possible to use a standard five-valve tuned radio-frequency circuit with excellent results, and I would advise you to follow this course. Your wishes reciprocated.

Millaa Millaa, N.Q.—"Please forward me a copy of the August issue of the 'Radio News.' (2) What is the cost of the parts for building the Peridyne Five as per page 12 of your August number?"

Answer.—A copy of the August issue has been mailed to you. (2) The material for the receiver alone, as illustrated, would cost approximately £14. The cost of the accessories will depend, naturally, on the grade of loudspeaker chosen, and the size of the batteries. You will be able to arrive at this by referring to our advertising columns.

"Anxious," Red Hill.—"Could you supply me with the circuit of a selective one or two-valve receiver?"

Answer.—An article describing an exceptionally good two-valve receiver—a prize-winner at the recent Radio and Electrical Exhibition—was published in the July 30th issue of "The Broadcast Bulletin," obtainable from this office at a cost of 2d. The set was called the "Blue Ribbon Two." It is an excellent distance-getter, but is not selective enough to operate in Brisbane without a wavetrap. Indeed, I do not know of a simple two-valve circuit which will eliminate interference from the local station without a trap, but it is an easy matter to build a wavetrap, and so ensure complete freedom from interference. The "Q.R.N. Wavetrap" described in our last issue is the right thing to use. I can thoroughly recommend the "Blue Ribbon Two."

"W.B.," Beerburum.—Re the Power Buzzer, personally I don't know much about it, although I've heard of it several times. We are publishing your letter in the correspondence column, and perhaps some reader may be able to supply particulars of the set. Will make enquiries myself, and if possible, will publish a description in an early issue.

"Longreach."—Replying to yours by mail—after due consideration.

"F.C.G.," Capella.—"I have constructed the short-wave adapter in accordance with your April issue of 'Radio News,' but cannot obtain satisfactory results. The circuit has been tested and found correct. I have reversed leads on tickler coil and rheostat with little improvement. To further test set, I have obtained No. 5 coil (250-550 metres), and can only receive Australian stations faintly on headphones by reversing condensers—using .0025 as tuner and .00015 as reaction. I am using the adapter in conjunction with a Model 10 Gilfillan Neutrodyne set. All parts are identical with your list. I have tried all types of valves and grid leaks without result. The condensers supplied are 8 and 13 plate Pilot, so am wondering if they are the correct capacity, as there are no markings on them relative to capacity. I would appreciate any suggestion you may be able to advance."

Answer.—If you have wired the adapter correctly, and made the correction in the tickler coil wiring—that is, reversed the two wires which go to the "P" and "B" terminals of the coil mounting I cannot understand why you are not getting good results. Have you tried varying the "B" battery voltage on the detector tapping on your Neutrodyne? Make sure that the coil plugs are making good contact with the sockets. It is difficult to diagnose the trouble when you give so little description of the symptoms. For instance, you do not say whether the circuit will oscillate when the reaction condenser is turned towards maximum—plates all in. Can you hear any whistles when the reaction condenser is in this position? You may have a faulty r.f. choke—try substitution. The aerial coil usually has to be turned at an angle to the grid coil—frequently the circuit will not oscillate when the coils are parallel.

S.A.H., Deagon.—"What should an ordinary dry cell of the 1½-volt type, when fully charged, register on the volt-amp. meter in amps? (2) I have a variable condenser with 14 moving and 14 fixed vanes. What capacity will it be? (3) Would it be possible to strain a valve, when the highest voltage that's been used on it has never exceeded 90? The valves in question are 199 bright emitters. (4) In wireless, is there such a thing as a strained valve? To my limited knowledge of the subject, a valve is or is not. Am I correct? (5) Using a former 3in. in diameter, and 1½in. long, using the full 1½in. for winding, how many turns of 30-gauge D.C.C. wire will be required to make a good r.f. choke? (6) Is a 20ft. (or longer) loudspeaker lead detrimental to batteries or set in any way?"

Answer.—A new dry cell (it is not called a "fully charged" one) of the "No. 6" type usually will give a reading of something like 35 to 40 amperes momentarily. The meter should only be touched on the terminals long enough to obtain the reading, as such a procedure forms a dead short-circuit, and will seriously curtail the life of the cell if prolonged. (2) Your condenser is a very unusual size, but would have a capacity in the vicinity of .0006-mfd. It can be used wherever a .0005-mfd. condenser is specified. (3) and (4) There is no such thing as a "strained" valve. A valve frequently becomes inoperative, or functions with reduced efficiency, through the filament being overloaded, or being worked with too high a voltage on it. What happens in this case is that the thorium or other oxide coating on the filament, and which gives off the electron stream upon which the operation of the valve depends, becomes exhausted, due to the excessive temperature. It is possible for an excessive plate voltage to cause the same trouble, particularly if the valve is operated without a "C" battery. A plate voltage of 90, used with the valves you mention, and with the "C" battery voltage specified by the makers, should not cause any deleterious effect, but these valves are very susceptible to a small increase above normal filament voltage, and perhaps you have been guilty of the fatal error of attempting to get a little more volume by turning up the rheostats "just a shade higher." (5) For a r.f. choke to be used in the broadcast wavelengths, I would suggest that you wind about 500 turns of 36-gauge wire on a 3in. former. There is no need for wire as heavy as 30 gauge, and you would not get anything like the necessary number of turns on the former you have. (6) Long loudspeaker leads cannot in any way damage your set or batteries, as long as they are adequately insulated. The length may be extended almost indefinitely with only a small reduction in output, due to the resistance of the wire. If, however, you contemplate using a lead over 30 feet in length, you should use two separate wires rather than a "twin" cable or cord, as the condenser effect, or capacity between the wires begins to come into play, causing a reduction in the volume of the higher notes, and a consequent muffling effect on the reproduction. Not sure if your queries were intended for the "B.B." or "Radio News" (you omitted to mention this), so we are answering them through both to make sure.

"S.A.," Marceba.—Pressure on space prohibits our printing the somewhat lengthy answer which your questions demand here, so I am answering your letter by mail.

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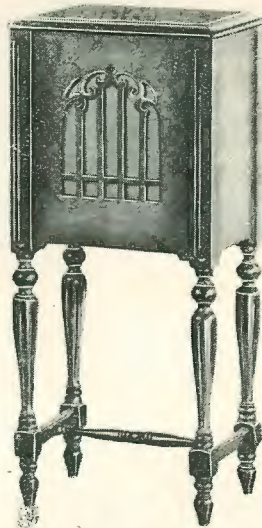
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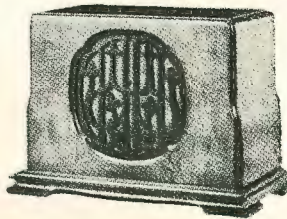
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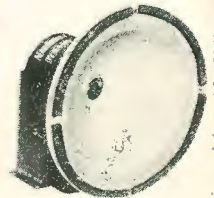
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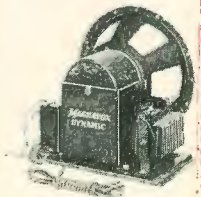


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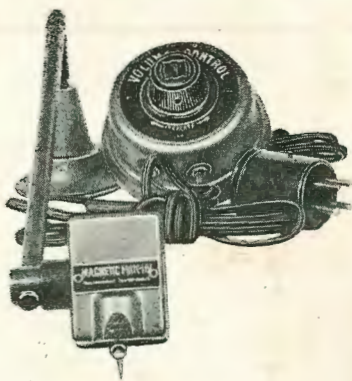
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