

Friday, June 6, 1924.

WIRELESS WEEKLY



The C-H Variable Grid Leak Can be mounted on the tube socket—panel controlled. Adjustable for all grid condensers.



The C-H Radio Potentiometer. The potentiometer with the resistance unit that does not wear and cannot be displaced under constant usage.



The C-H Radio Switch. A push and pull switch, controlling and protecting batteries.

# Cutler Hammer

A COMPLETE LINE OF RADIO CURRENT CONTROL APPARATUS MADE BY THE MOST FAMOUS ELECTRICAL CONTROL ENGINEERS.

For more than a quarter of a century the name **CUTLER HAMMER** has been known throughout the world as a passport of technical efficiency.

Their Radio parts are used in all laboratories where efficiency and precision are demanded.

We are glad to announce to the Public and Trade that we have a full and complete line of **CUTLER HAMMER** Rheostats, Potentiometers, Switches, and Amplifying Units.

**CUTLER HAMMER** parts are stocked by all up-to-date Dealers.

Are you Using

**UNITED** Honeycomb coils and coil mountings?

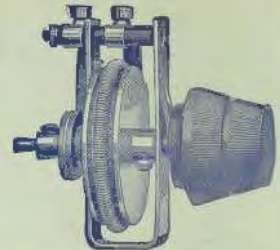
**UNITED** Transformers, & Condensers in your Set to obtain the greatest efficiency?

“Applause” Cards Furnished Dealers and Clubs Without Charge.

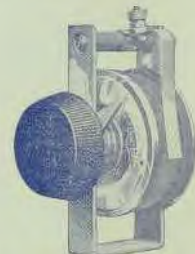
## United Distributing Coys.

(N.S.W.) Ltd.

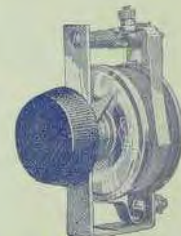
WHOLESALE ONLY



The C-H 4 ohm Vernier Rheostat. Perfect detector tube control. Also furnished without vernier for amplifier tube control.



The C-H 30 ohm Radio Rheostat. For control of the 1/4 ampere, “UV201A-C301A” type receiving tubes and the “UV 199-C299” type. Some also with Vernier.



The C-H125 ohm Radio Rheostat. The rheostat that makes it possible to use a 6V storage cell with the UV199 or C299 tubes.

Manufacturers of

# RADIOVOX SETS

28 Clarence Street, Sydney

and at

592 Bourke Street, Melbourne



Official Organ of the Australasian Radio Relay League

Vol. 4

Friday, June 6, 1924.

No. 8

## Support the Movement

There is no definite data available upon the matter, but it would be interesting to know what further steps are taken by those granted experimental licenses, to assist in the progress of the body to which they have been admitted.

As has been pointed out many times in this paper, were it not for the activities of the Wireless Institute of Australia, and several of the more progressive clubs, the experimental movement would have been seriously hampered, if not swept out of existence altogether.

The Wireless Institute, in endeavouring to effect an affiliation with other Radio Clubs, is seeking a means whereby the interests of the experimenters can best be protected. It seems therefore, that the body which in the future will be

mainly concerned with the advancement of the experimental movement is the affiliation of radio clubs under the banner of the Wireless Institute.

Upon every holder of an experimental license there is a responsibility towards the organization to which he may look for guidance and assistance in maintaining his privileges.

The policy of standing back and allowing a few enthusiasts to shoulder the burden is both selfish and fatal. It is therefore incumbent upon those not having already done so to link up with a club and thus demonstrate that they are prepared to give their active support to the body which has for its object the protection of all genuine experimenters.

### Roster for Week ending 11th June, 1924

	7.30 to 8.0	8.0 to 8.30	8.30 to 9.0	9 to 9.30	9.30 to 10	10 to 10.30
Thur, June 5	2 RA 2 GR	2 IJ 2 JM	2 YI	2 UW 2 ZN	2 YG 2 VM 2 ZZ	2 ZG
Friday, 6	2 IJ 2 GR	"	"	"	"	"
Saturday, 7	2 RA 2 GR	2 IJ	"	"	"	"
Sunday, 8	2 RA 2 GR	"	"	"	"	"
Mon., 9	2 RA 2 GR	2 IJ	"	"	"	"
Tues., 10	2 IJ	"	"	"	"	"
Wednes., 11	2 RA 2 GR	2 IJ	"	"	"	"

## RADIO AND ESPERANTO

A few short years ago, amateur transmitters were well satisfied when their Ford coil transmitters, or as the Yank briefly designates them, "rock crushers," succeeded in raising a faint answering hellow from some other enthusiast on the other side of the city. It was a matter for hearty mutual congratulation when the other fellow came back with a few Morseid remarks. The annihilation of ten miles of space was indeed an achievement.

The sudden development of the vacuum tube and its application (aside from broadcasting) to amateur transmission and reception, quickly enlarged the scope of the amateur, and nowadays the man in Australia has little difficulty in making his voice audible to a receiver on the other side of the Tasman Sea. Slowly, but steadily, this distance is being extended, and following upon the reception of speech from K.G.O., California, it is beyond all doubt that before long amateur stations will bridge the gulf between Australia and America with speech, and it needs no vivid imagination to gaze far enough ahead to the time when two-way telephone conversations will be carried on between experimenters in both countries. And if to the United States, then why not to Mexico and South America? And is it not feasible to suppose that the next objective will be Europe? No thinking person, having in mind the swift progress of the radio science can deny the fact that ultimately the thousands of miles between Australia and Europe will be overcome by amateurs.

During his recent voyage, C. D. MacLurean states he copied K.D.K.A., an American station, operating on 94 metres, up to a distance of 6,000 miles. According to the audibility meter, there was no fading effect noticeable. That is to say, signals were as strong during daylight hours as at night.

Following this, the recent test conducted by Amalgamated Wireless, in the reception of signals from England, sent by the Marconi beam system, marks another stepping stone on the path of progress. It is not disclosed what wave lengths were used during this test, but according to Marconi, the beam system, by making use of reflectors, allows a wireless wave to be projected in any desired direction without loss of energy. The fact that this system will allow of trans-ocean stations being erected for something

like one-fifth of their present cost seems to illustrate one thing—that future international radio commercial services will be conducted on low power and short waves.

That this will create a big field for amateur work is unquestionable, and we may confidently anticipate that eventually amateurs will adapt low waves and beam transmission to their purpose. Conversations between European and Australian experimental transmitters will be an ordinary every day occurrence. Let those who scoff at this remember that, ten years ago, the suggestion that New Zealand would converse with Australia by wireless was considered a wild dream. Now, to-day, it is too common to arouse comment.

Having overcome the question of distance and established contact with an enthusiast located in Italy or Serbia, another and equally important problem must be considered, and that is the overcoming of the barrier to a mutual exchange of speech represented by the difference in languages. The old and time-worn belief of the Britisher that pidgin English will carry him through no matter what foreign country he visits, can scarcely be applied to radio. Anyone familiar with the Morse code can write practically any language if it is sent to him in code; but when the question of understanding what has been written down is faced, it resolves itself into a blank wall. Having successfully raised a foreign amateur, what will happen after Q.R.K., Q.S.A., etc., have been exchanged and there is mutual desire to break into speech? Signs will be useless (unless television is an accomplished fact) and pidgin English will be meaningless to a man who has never heard the language in his life. Clearly, then, some mutually understandable means of exchange must be introduced, and this means the adoption of a universal radio language.

If we look further afield into the future of broadcasting and realise that its bounds will be almost limitless—that a single human voice will be carried to the furthest corners of the earth; and that if the message carried is one of vital importance to all mankind, then here again is clearly illustrated the fact that some form of international language is necessary if the masses are to understand the meaning of the message broadcasted by radio.

Hugh S. Pollock, Editor of the "Wireless World and Radio Review," in a article entitled, "The Key to World Broadcasting," published in "International Language," the journal of the Esperanto Society, shows clearly that the future of the science of Esperanto and the science of wireless telephony are indissolubly linked together, and that the one is dependent upon the other.

The proof of this is demonstrated in the following letter, written to the editor of "International Language," by an Esperanto student in Russia:—

"To-day (December 31st), I went to the radio station in this town (Tambov), with my friend, M—, and listened to a speech by the President of the Esperanto Union, who spoke from Moscow for the benefit of the world at large. His subject was 'The Economic and Financial Situation in Russia.' This was the first time I had seen a wireless telephone, and listened in (private persons here are not allowed to have wireless sets). . . . If you know when there are to be Esperanto speeches and concerts broadcast from London, please let me know the date and time and the wave length, so that we in Tambov can try to listen in to England. The manager of our wireless station says that news from foreign countries comes through very clearly."

Here is evidenced a desire to establish communication by the use of a language which is familiar to both the speaker and the listener, and a brief consideration of the plea of this obscure human being in Russia shows beyond all doubt that as the use of radio becomes world-wide, so does it become increasingly evident that the need for an international language becomes more acute.

That this need will be felt by the amateur is unquestionable, and it is refreshing to note that the Wireless Institute is considering the question of a universal radio language.

The fascinating story of the founder of Esperanto, Dr. Zamenhof, provides a study of intense interest. Little did the learned doctor dream that, when beginning his work on the Esperanto science, in 1878, at Warsaw, the fruits of his brain would be of inestimable benefit in the development of world-wide wireless.

Maico Rheostats, 30ohms, 6/8; Jacks, 2/6 and 3/6; Plugs, 2/8 and 3/4 each. Colville-Moore Ltd.,  
10 Rowe St.,

# N. H. M. Galena Crystal

## The Ideal Crystal for Long Distance Reception

200 Miles Broadcast Reception is becoming a common accomplishment

A striking feature of N.H.M. Galena Crystal is the fact that it brings in tremendous distances with greater clarity and power than has hitherto been accomplished by any other Crystal.

Price: **2s.**, No. 02, **1s.**



## Atlas Speaker

A Speaker of Distinction

Price  
**£7 10s.**

Gramophone Attachment  
**£3 15s. 0d.**

The Atlas Radio Reproduction of the Artist's performance brings the Studio into your home---not a copy but the original music.

Fibre and Bakelite Throughout  
No Metal to impair true reproduction.

### The Colville-Moore Wireless Supplies Ltd.

10 ROWE STREET, SYDNEY

Phones: Office and Sales, B 2261 Works, B 1721

TRADE INQUIRIES INVITED

"MELLO" Phones. 25, Set, 4,000 ohms, ALL BRITISH MANUFACTURE — COL-MO, 10 Rowe Street, Sydney.

# The Harkness Reflex

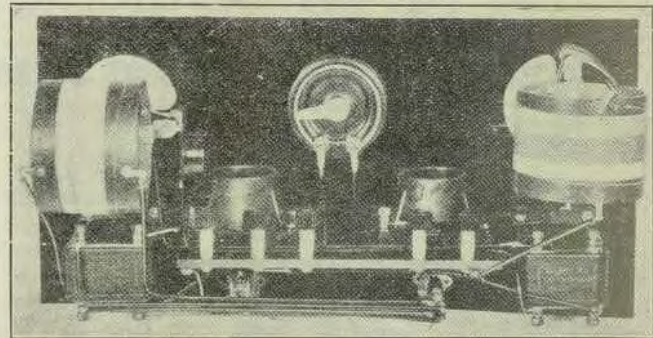
BY THE LITTLE AMERICAN.

One often hears of one valve receivers that will actuate a loud speaker, but seldom do we hear such a set in operation. In Australia where amateurs are giving programmes, and broadcast stations are few and far between it is almost impossible to guarantee such a result.

I am about to describe a set that with one valve a loud speaker may be worked with considerable ease up to an indefinite distance from the broadcast station depending entirely upon the strength of such station being received. To safeguard you in being able to operate a loud speaker I am adding one step of audio-frequency amplification.

The receiver is essentially a one-tube reflex outfit, with one step amplification, but involves certain modifications that make for efficiency, sensitivity, volume, clarity and ease of control.

It is efficient because the one valve is made to do double duty. Sensitiveness is the result of using one stage of tuned radio frequency amplification which is provided before the tuned detector circuit. Volume is accomplished by the audio frequency amplification of the rectified impulses



Back View of Panel

generative receivers is totally absent, and oh, boy; she do percolate.

The amateur should have little difficulty in constructing a receiver of this type. The diagrams and photographs afford constructional details which may be readily understood, even by the new comer in the radio game.

15 turns of No. 23 D.C.C. as the primary.

1 tuned radio frequency transformer constructed the same as the tuning transformer except it has 35 turns on the primary winding.

Note: There are tuned radio frequency transformers now on the market that with slight alterations to the primary of one only, by adding 10 turns, can be used in this set.

2—17 plate .0003 variable condensers. The two transformers will mount on the back of the condensers.

2 audio frequency transformers.

1—20ohm rheostat.

2—3in. dial for condensers.

1 2 1/4 in. dial for rheostat.

5—binding posts.

2 valve sockets.

1—4 point double circuit jack.

1—4 point filament control jack.

1 argenteite crystal.

1 crystal holder and cat whisker.

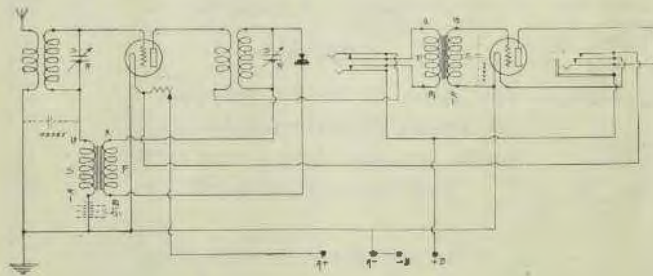
1 Panel 7 x 14 x 3/16in. bakelite.

1 terminal board 7 1/4 x 1 3/8 x 3/16in. bakelite.

2 lengths spaghetti tubing.

By following diagram carefully and mounting instruments as per panel lay out no trouble will be met. The terminal board is mounted under the panel mounting sockets being held by the back filament binding posts.

The transformers are mounted so as to be at right angles to each other. Be sure and securely solder all joints.



The Harkness Reflex

and both radio frequency amplifying and rectifying circuits are tuned, giving maximum amplification with corresponding selectivity. Also with the added step of amplification.

The reception is exceptionally clear because a crystal is used for rectification; and when properly adjusted the valve does not oscillate and the howling and squealing so noticeable in re-

It is wise to mount the panel in a cabinet that totally encloses the mounted parts to protect from dust and injury.

The parts and material required for this two valve set are as follows:

1 tuning transformer (in aerial circuit) is a 3in x 3in. bakelite tube, wound with 60 turns No. 23 D.C.C. wire as secondary. Over this is wound

Colmo Fixed Grid and 'Phone Condensers are of Mica and Brass Sheet 1/6 each.

Can you beat them at the price?

Friday, June 6, 1924.

WIRELESS WEEKLY

5

because a good connection is half the battle. Amplifier valves are used and a very light or fine cat whisker. If results are not obtained by a light contact of the catwhisker, don't jam down or move it about every minute. There is something wrong with the hooking, not the crystal. Don't try to save money by buying a cheap crystal, it's more expensive in the long run.

This set will produce results and has been well tried. Longer wave lengths may be obtained by addition of wire to windings. Next week variations of this circuit will be discussed.

CORRESPONDENCE.

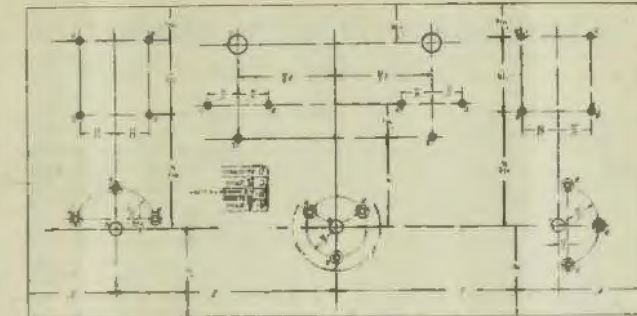
2 Macquarie Street,

Mayfield, Newcastle.

(To the Editor, "Wireless Weekly.")  
Dear Sir,

I read with much interest the article by Malcolm Perry, entitled "Wireless Apparatus and Regulations Ten Years Hence," and the reading appealed to me in the field for thought and imagination it opened up. Two or three lines in the second column of the article, where the writer supposes that "Mr. or Miss of 1934 will want some sort of noiseless detector," and again mentions some sort of controllable crystal, touches me just where I live, and, to my mind, touches a weak spot in present-day radio. Now, right here, I would like to describe a crystal detector which, when I was using that kind of detector, gave me splendid results, and which was practically "ever ready." I took a brass tube, 2in. in length and 3/8in. in diameter, polished inside and out, and made ebonite stoppers for each end; each of the ebonite stoppers were drilled centrally to take a copper rod about 12 s.w.g. The copper rods were inserted through one stopper into the tube, the space inside the tube and around the copper rod were then filled with galena crystals broken small to pack in loosely and still make good contact, both with copper rod and brass tube. For use one connection was made with the tube and the other with the copper rod. A tap on the tube or a half turn of the rod always assured fresh places of multi contact, and always gave me great satisfaction. This is an easily made detector, and well worth the slight trouble of making.

Now, touching the matter of the mains being used as a source of filament lighting, I firmly believe that the



Panel Layout



time is not far distant when this will be the thing to do, and further, that one valve will be made to perform the work of many (of course one difficulty to be overcome is the capacity effects between valve electrodes). Then we shall have the, say, nine electrode valve functioning with one filament supplied from D.C. mains, four grids, four anodes, carrying on rectification and amplification simultaneously, and—who knows—the very capacity effects we complain of to-day may be the means of such a valve being a success.

However, in the science of radio, as in all other things, perfection will be long in coming, but still, we are seeing, and will see improvement each year, and as Mr. Malcolm Perry truly says, the ends of the threads are now in the hands of the chemist and physicist, and possibly the intelligence of the generation of the near future may cause us to look back on the valve reminiscently, as to-day we think of the colander.—Yours truly,

PERCY R. BROWN.

MOLESWORTH STANDARD CRYSTALS.

These crystals, which include Galena, A.G.C., Hertzite, Molybdenite, Iron, Copper and Arsenical pyrites specially selected are reported to be giving splendid results to those who are using them.

Many letters have been received by

the Australian agents, Messrs Fox and MacGillicuddy Ltd., Sydney from various parts testifying to the excellence of the results obtained from Molesworth Crystals.

One user, in writing of the superiority of these mounted crystals over the unmounted variety, claims that the metal mounting gives the necessary conductivity and at the same time immensely improves the rectifying properties of the crystals.

QUESTIONS AND ANSWERS.

P.G. (Homebush.) Yes the ratio for the second may be the same as that of the first. Any standard transformer advertised in this journal will be satisfactory.

Peanuts cracked before the WOC (Davenport, Iowa) microphone prompted response from several hundred auditors who reported that the sound was received naturally and clearly. Letters came from points from Philadelphia to Denver and from Texas to Canada.

The peanuts were the "applause" of one radio listener who enjoyed an orchestra concert and when the jazz players arrived a title station for a return engagement they found a basket of peanuts waiting for them.

FOR SALE. Loose Coupler, 1,200 metre with 4,000 ohms. Head Phones, £3. 18 Arlington St., Five Dock.

Up-to-date RADIO EQUIPMENT, of the First Quality, at Competitive Prices. "OOL-MO," 10 Rowe St., Sydney.

## Some More Hints in Buying Radio Apparatus.

The keynote of this article is "consider quality rather than price if you want the best value for your money."

Let us commence with rheostats. Is the one you propose to buy equipped with the refinements that will make for a long and efficient life? Look at the sliding arm. Are the sides turned up where it makes contact with the resistance wire so that it will slide evenly and smoothly? If they are not, the arm will scratch over the wire and soon wear it out. Is the tension on the arm adjustable? Provision should be made for mounting the rheostat firmly on the panel, and the holes for the mounting screws should be in line on the panel, and the holes for the mounting screws should be in line with the hole for the shaft for facility in marking and drilling. Some rheostats have a metal shell, which is popular with discriminating constructors, as it holds the resistance unit firmly in place at all times regardless of what heat or vibration it is subjected

to. Take notice of the winding of the resistance wire. It should be firmly wound on its base. If it moves under pressure of the fingers you will eventually have some short circuited turns. Be sure that your rheostat is of sufficient resistance for the valve you propose to use. If you employ the 1 amp. valve at first and later wish to change to the 1/4 amp. type this can usually be done by changing to a higher resistance rheostat without redrilling your panel or altering connections, as most modern manufacturers make a complete line of interchangeable rheostats. Regarding vernier rheostats there is some diversity of opinion. True, a vernier is not needed by the BCL satisfied with local reception, but for the "DX hound" we think a vernier is a desirable addition to the detector rheostat. There are several types of verniers on the market, but those employing a single control are generally most desirable, due to their simplicity in construction and operation.

Now, a word about valve holders. Have your best buying senses on the alert when you set out to procure one, for the holder is one of the most vital parts of your set. Inefficient holders have, in the past caused endless trouble to the uninitiated. Because you place a valve in a socket and find that it works, it does not necessarily follow that it is a good socket. Perhaps your receiver would work better if you had a good socket. First and foremost look at the contact prongs. Do they present good wiping surface, and what are they made of? Do they spring sharply back into place when plucked with the fingernail? In the old days many inferior makes of sockets were on the market, but this item has improved greatly in recent times with the adoption of the metal shell and the silver-plating of the contact prongs by leading manufacturers. Ideal contact is afforded when the prongs are of phosphor bronze, silver-plated. The solid moulded socket is not as popular as formerly, for there is a tendency for it to wear at the bayonet prong contact, and to warp out of shape when subjected to heat. Bad connection with the valve prongs re-

## Attempting to Build a Rolls Royce from Ford Parts.

Sounds ridiculous, doesn't it? Yet it is no more ridiculous than attempting to build an efficient Wireless Receiver from cheap and second rate accessories.

IT CANNOT BE DONE.

The wonderful results obtained on our famous "BURGINPHONE" RECEIVERS has proved this. To obtain the Best Results, you must use the best equipment, AND WE HAVE IT. We have a very Representative Stock at prices that are reasonably competitive.

Call and we will demonstrate our Receivers 2213

SERVICE  
AND  
QUALITY

**BURGIN ELECTRIC CO.**

1st. Floor, 391-3 George St., Sydney

Telephone : M 3069

Telegrams : Burgineco

SERVICE  
AND  
QUALITY



Friday, June 6, 1924.

WIRELESS WEEKLY

7

sults. This is avoided by the metal shell socket, which holds the valve in rigid contact with the prongs at all times. If the base is moulded it should be of a good material, preferably bakelite, which will offer a very high resistance to the radio-frequency currents the sockets will carry. The metal shell should be moulded in its base. If it is screwed in place, trouble will probably eventuate when the screws slack up after a little use. Provision should be made for mounting the socket on base or panel. The provision of lugs for soldering connections is a desirable refinement, but screw terminals should also be accessible for easy connection in an experimental set. Valves generally should be mounted in a vertical position, but under some circumstances they must be placed horizontally. This is objectionable because there is a tendency for the elements to sag out of position when heated. The general appearance of your socket, and this applies to all your apparatus, should also be considered. Purchase parts that you will not be ashamed to show your friends when they drop in for a radio evening.

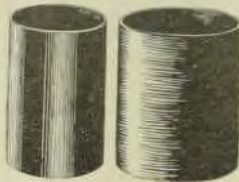
The general remarks on rheostats apply also to potentiometers. The addition of this part to your set is de-

sirable especially if you employ radio-frequency transformation. The contact arm should move smoothly, and should bridge adjacent turns of the resistance unit easily. Sometimes weak signals are completely beyond the scope of the receiver if a potentiometer is not employed. A detector valve is only as efficient on weak signals as its control, and many weak signals will be lost if the potentiometer is not present in the circuit to give a constant, steady change in potential without the variable curve encountered so frequently.

The valve has been aptly termed The Heart of the Radio Set. So much for

its holder and controls. Somewhere we have seen it written that "For radio work the best of apparatus is none too good," and we agree. Remember these hints on your valve accessories if you would keep the "heart" of your radio set sound and operating 100 per cent. efficiently.

FOR SALE—3 valve outfit, 1 valve (299), 3 valve panel and maple cabinet. Super crystal panel and oak cabinet; also other accessories. Cheap, £7/10/-. Cash. Apply, 10 Nowranie St., Summer Hill.



"Grodan" Heavy Stators

Suitable for Vario Coupler, Variometers, Neutrodyne, etc. Procurable in four sizes viz. 2in, 2½in, 3½in, 4½in. Diameter. Just as efficient as ebonite only half the cost.\* All dealers.

GROSE AND DANIELL

(Office)

63 Mountain Street, Sydney.

ANNOUNCEMENT

We are pleased to notify our customers, both Wholesale and Retail, that we are now ready to quote for the erection of aerial masts from 30ft. to 200ft. in either Wood or Iron, also for flags of any design.

E. H. BRETT & SONS LTD.

LITTLE AVENUE, BALMAIN EAST

Phone W 1205

# Construction of the Portable Single Valve Set.

By Insulator.

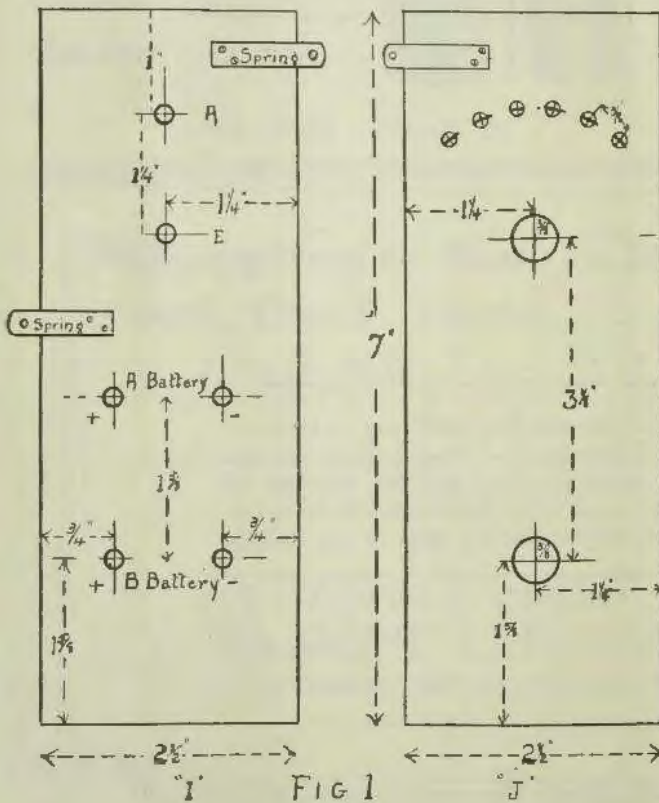
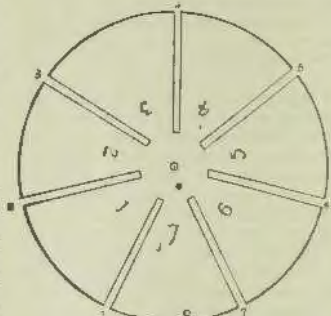
In last week's issue you will remember the description of a portable single valve receiver the details of which I promised to give you this week. Well, here they are.

Before going any further I wish to advise you to keep your copy of last week's Wireless Weekly beside you as some of the particulars therein will not be repeated here, and I will also refer to the various parts by the denominational letters I employed in last week's sketch.

We will begin with the box. This should be made from a good timber, such as maple of the thickness of a 1/4in. Cut two pieces 8 inches by 3 1/4 inches, two more 7 inches by 2

inches and still two more 7 1/2 inches by 7 inches. Smooth the surfaces with sandpaper and shellac over all. Of course if you wish or perhaps I should say, if you can, these pieces may be French polished. Personally I could never French polish in spite of many attempts. The total results of my efforts were a pair of beautifully polished hands. Sad, don't you think?

However, after shellacing, take the two ends (I and J) and mark out and drill as suggested by I and J in Fig. 1. End I acts as the terminal board while to end J are attached the contact studs, switch arm and filament rheostat. Use the terminal shown in last week's sketch and see that they



have cheese head screws for fixing and not wood screws.

Always keep in mind my golden rule, when using wood instead of bakelite, to shellac the inner surface of all drilled holes.

Assemble the contact studs switch arm and rheostat on J; and on I assemble the terminals. So far, so good.

Now to the coils. Fig. 2 shows the former for spider web coils. Cut from a good stiff cardboard to the shape shown. These formers are 4 inches in diameter, and should also be shellaced. I will say that it is somewhat difficult matter to make these formers but the pattern if cut out will assist you. I have often wondered why some enterprising local manufacturer doesn't put these formers on the market, as they are particularly good for various purposes on short waves.

Wind one former with 80 turns of 28 gauge wire and the others with 72 turns. The method of winding is simple. Leave about 7 inches of wire at each end for connections. For the benefit of those who haven't wound similar coils before I will explain the method employed. Leave about 7 inches through the little black hole in the centre and then take the wire through slot number 1 and behind section 1, bring through slot No. 2 and in front of section 2, in again to slot No. 3, behind section 3, out again through slot No. 4, in front of section 4 through the next slot, behind section 5, out from slot 6, in front of section 6, through slot 7 behind section 7 back again through slot 1 and

Friday, June 6, 1924.

WIRELESS WEEKLY

in FRONT of section 1, through slot No. 2, and so on.

It will thus be seen that the wire is wound on alternate sides, forty turns on one side and forty on the other. Tappings should be taken at the 25th, 35th, 45th, 60th, 70th, turn in the large coil (80 turn) whereas no tappings are necessary in the 72 turn coil.

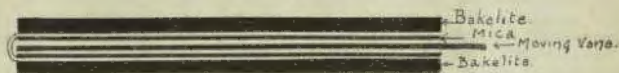
The next thing that claims our attention is the ebonite strip E which is 7 inches by 1 inch by 1/8 inch thick. This has to be bent into an L shape to support the primary (80 turn) coil. The bending can be done by immersing the strip in very hot water and gently bending round at a point 2 inches from the ends. Exercise care and patience and you will soon have the job done.

By means of a small screw attach the primary coil to this strip, and then screw it down to the base board L. (See last week's sketch for this).

While looking at the sketch you will see exactly where Block F is situated. Before screwing down drill the four holes for the valve holder legs. Now build up the box, noting carefully the manner in which sides H and K are hinged. I'll leave it to your own discretion as to where and how to put on the hinges.

Now let us look at variable condenser A. This employs a mica dielectric and is perfectly good, and easily constructed.

Take this 4 1/2 by 3 1/2 inch mica and cut to the shape shown in figure 5. The mica should be about 1/32nd of an inch thick, as it is the movable vane. Using gum paste tinfoil on each side excepting the small shaded portion in the corner. The two pieces of 4 inch x 4 inch mica (which need not be so thick as the movable vane) are coated on one side only with tinfoil. Now build it all up as suggested by Fig. 3. Hold tightly together and drill through the three corners shown in Fig. 4, T and Z of course not going through the movable vane, only A which acts as a spindle for the moving vane. Now take one of the bakelite pieces so drilled and using it as a template drill the three holes A, Z and T on side K. From the underside of K re-assemble the condenser using three contact studs. Before tightening up the nuts see that the stud through Z makes good contact with the tinfoil on the fixed plates and attach 8 inches of bell flex. Put a small knob on the moving plate and attach 8 inches of bell flex to this, also noting



Tinfoil represented by White spaces

FIG 3

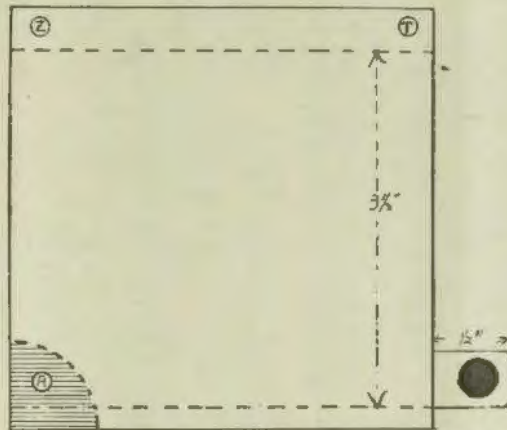


FIG 4

again that contact is made on both sides. Now you have a splendid variable condenser for a few pence. Should any difficulty be experienced in obtaining mica you will find that any of the electrical firms will supply you. Mine was obtained from the Australian General Electric Co. Ltd.

After all this is done screw the 72 turn coil to the side H at the same level as the coil on the ebonite strip.

A very small screw should be used for this purpose as you must not forget that side H is hinged and closes up to end I when not in use. You will notice the springs on both ends. These hold the sides to the ends when closed up and a small sprigg in the ends acts as a catch. The spring can be made from the brass spring contacts usually found on torch batteries.

"The next item on the test" is the wiring. Now follow me closely in this. One end of the primary (80 turn) coil is taken to terminal A. From terminal A another wire is taken to one side of the grid condenser and leak, the other side of the grid con-

denser and leak being connected to the grid leg of the valve socket. This grid condenser can easily be attached to the top G or if desired it may be allowed to hang from A. Connect the tappings and the last turn of the primary coil to the contact studs on J.

The switch is connected across to terminal E (earth). From E a lead is taken to the negative of the A battery terminal, and then to one filament leg of the valve socket. The other filament leg of the valve sockets goes right across to one side of the rheostat, while the other side of

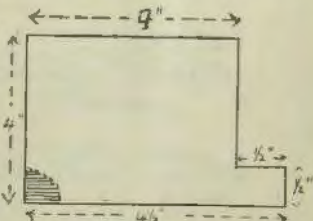


FIG 5

the rheostat is taken back to the positive terminal of the A battery. Another lead from the positive of the battery is taken down to the negative terminal of the B battery which is then taken through the telephone condenser to one of the telephone terminals in the baseboard (see last week's sketch.) The positive of the B battery is connected to the other telephone terminal. A lead is now taken from the plate leg of the valve socket to the 72 turn coil on the hinged side H, while the other end of this coil is connected to the same telephone terminal as the phone condenser is connected to. Now push the valve socket down into the holes provided for it in block E. Excepting for the variable condenser the set is wired. The variable condenser being left loose it may be used either in series for short wave work or in parallel for longer waves. Receiving short waves the aerial should be taken to one side of the variable condenser and the other side is taken to aerial terminal A. Long waves are received by connecting one side of the variable condenser to terminal A and the other side to terminal E. Then connect the aerial

to A and earth to E. See that you use bell flex for connections of the swinging coil to allow free play. When listening in swing the hinged coil away from the fixed one and gradually bring it towards the fixed till signals are heard at their loudest. Don't bring it too close or mushiness will set in and you won't be pleased. If when you bring the swinging coil nearer the fixed you find signals getting weaker, reverse the connections of the swinging coil.

Houray till next week!

REVIEW.

It is now twenty years since Dr. J. A. Fleming produced the two electrode Thermionic valve, or as it is sometimes known, the Electronic Valve.

In the intervening period many eminent scientists and inventors have added to its utility. In 1907 Lee de Forrest introduced the third electrode, viz. the grid, into the Fleming valve.

In 1913, Meisner produced continuous oscillations by the reaction of a triode upon itself, and C. S. Franklin utilised the same principle for the el-

mination of the losses in receiving circuits. The following year saw the production of hard Thermionic valves by Langmuir.

The development of wireless telephony during the last few years has resulted in tremendous progress in the design and production of electronic valves of every type. There has just been issued by Amalgamated Wireless (A/sia) Limited, a pamphlet illustrating and describing no less than 19 different valves for the transmission, detection and amplification of wireless signals. It is the most comprehensive leaflet yet published in Australia, and should prove invaluable to every wireless experimenter.

All of the 19 valves are beautifully illustrated and fully described. Copies of the pamphlet may be had from radio dealers or from Amalgamated Wireless.

NOTICE.

Will person who replied to my advertisement some weeks ago, please communicate with me? L. C. Davies, Hythe St., Rooky Hill (Gate 449 Glebe Road).

**Crystals for All Circuits**

Argentite, Molybdenite, Zincite, Infalite, Q.S.A., Galena, Million Point, Footes Famous Minerals.

All Crystal Parts, Terminals and Binding Posts, Loose Coupler Formers, Sliders and Rods, Hard Drawn Copper Aerial Wire, Aerial Insulators.

Phone Condensers, Head Phones, Guaranteed—27/6 pair.

*Harringtons* LTD

Wireless and Photographic Merchants

386 GEORGE ST., SYDNEY

And at Melbourne, Brisbane, Adelaide, Katoomba, Wellington, N.Z., Auckland, N.Z. Agents Everywhere.



## BRITISH EMPIRE EXHIBITION. THE MARCONI STAND.

The Marconi stand, which is situated in Avenue 11, Bays 9-11, in the Electrical Engineering Section of the Palace of Engineering, contains a great variety of exhibits representing the latest developments and appliances in all branches of wireless science. The stand is shared by Marconi's Wireless Telegraph Company, Ltd., the Marconi International Marine Communication Company, Ltd., The Marcomphone Company Ltd., and the Marconi Scientific Instrument Company Ltd.

The most prominent feature of the stand is the model of a wireless beam which is mounted on the roof and rotates slowly as in action. This apparatus represents one of the latest developments in applied radio work, and is intended to enable all classes of coastal shipping fitted with an appropriate receiver, including vessels which do not carry wireless operators, to obtain bearings during fog when in the neighbourhood of dangerous points.

As it revolves, it signals to every two points of the compass a different Morse letter. These signals are trans-

mitted on a very short wave length, and are picked up by special receiving apparatus which is independent of the ship's ordinary wireless installation, and does not require operation by a skilled telegraphist. The receiving instrument is kept permanently tuned, and all that is required to bring it into operation is to switch on the current to the valves. By observing the Morse letters which his instrument receives, the navigator is able to tell the direction of the transmitter, and by taking a success of readings at intervals he can accurately chart his course.

In practice, the arc covered by the beam emanating from the transmitter is about 20 degrees at full strength, with a 10 degree fringe of about half strength each side. "Long" letters are transmitted at every two points of the compass, and "short" letters, such as T or I at the intermediate points and half points. The navigator will therefore receive a range of letters such as: I, Q, I, T, I, L, I, T. Since the letter Q stands for East-north-East, the first sound heard—the first I—will be

half a point to the northward of East-North-East, and the last sound heard—the last T—will be a point to the southward of East. Halfway between these two will be the exact bearing, which is thus obtained within a quarter of a point.

At the present time one of these projectors is operating on the Island of Inchkeith, in the Firth of Forth, and another is being erected at the South Foreland.

Special receivers for use in connection with the wireless beam transmitter, are also shown. These receivers are used in pairs, each being fixed outboard on either side of the ship's bridge.

After the beam transmitter, the most striking exhibits are two "valve pillars." The "valve pillar" is the latest design of electric oscillation generator which has been developed by the Marconi Company for use in high-power wireless stations, and this is the first occasion upon which they have been exhibited. These pillars constitute power units which can be used collectively for any required power. Each pillar incorporates sixteen large type Marconi transmitting valves, and is capable

Continued page 12.

### Prescot Porcelain Insulators

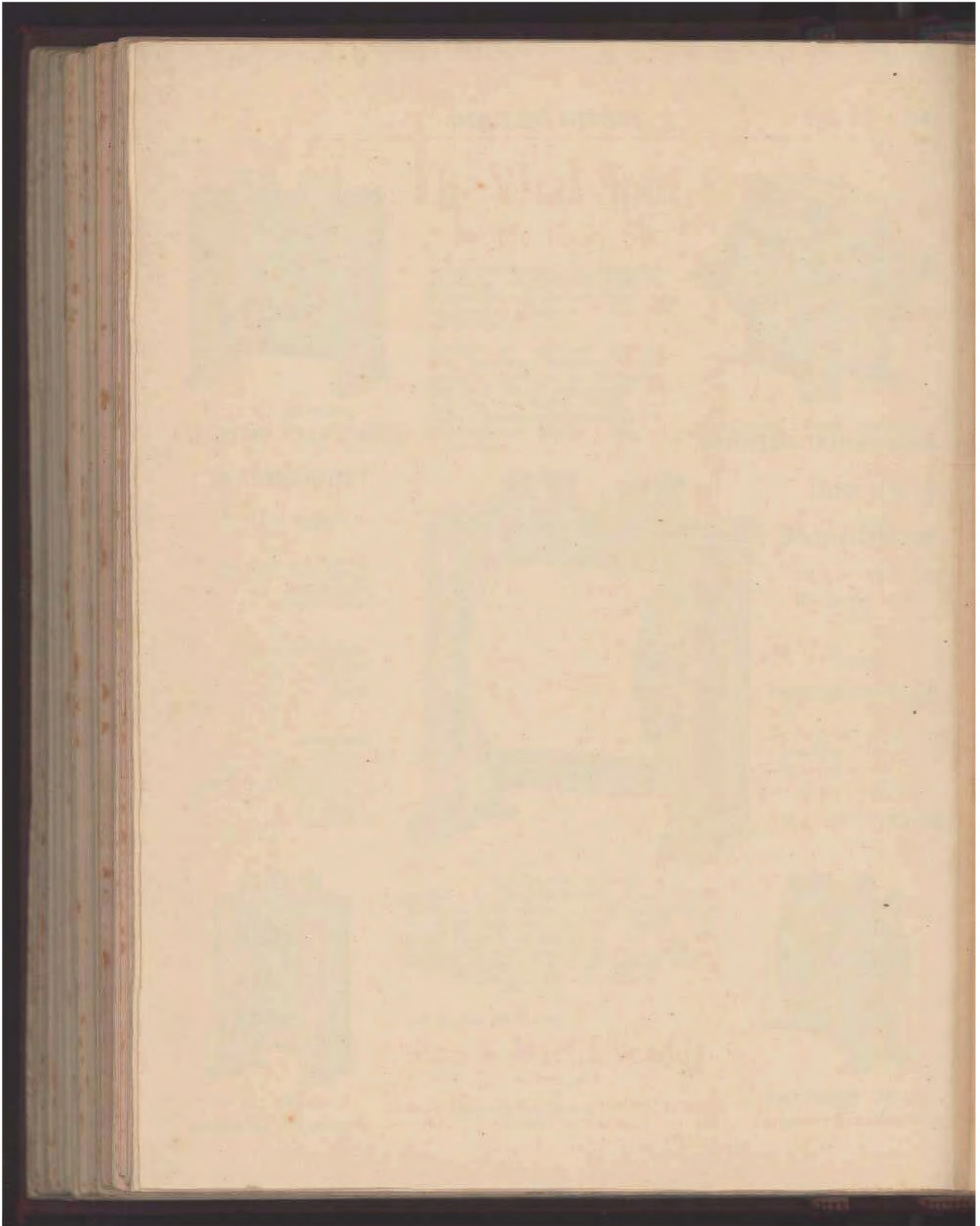
No. 4411  
3 in. x 1 in.  
Tested 20,000 V., A.C.



No. 4412  
4 in. x 2 in.  
Tested 30,000 V., A.C.

These Insulators are made of the best vitrified Porcelain, treated with dark green glaze. The material of which they are composed is non-absorbent, and they do not depend on the glaze for their insulating qualities. They are attractive yet inconspicuous in appearance, and as the design is such that they do not get out of alignment when erected, full advantage is obtained of their mechanical strength and electrical efficiency.

**William Adams & Company Ltd.**  
175 Clarence Street, Sydney





*Continued from page 11*

of dealing with 80 k.w., but the power can be regulated in sectional steps of 20 k.w., according to prevailing conditions.

The Marconi Magnetic drum recorder is an instrument operated on a new magneto-mechanical principle. It is primarily a recording and relaying instrument for high-speed commercial wireless reception, but it can also be used for recording time intervals between electric impulses, and can be made to rectify and oscillate and so perform electro-mechanically the same operations that a thermionic valve does electrically. It is extremely robust, and many times more sensitive than any other form of electro-magnetic recorder. It's performance is unaffected by the rolling of a ship, shocks or vibrations, and it is therefore especially suitable for use at sea.

Two exhibits of great popular interest are the complete 6 k.w. standard Marconi broadcasting transmitter, and the Marconi microphone, such as is used in the British broadcasting stations. With this microphone it is possible to speak in a natural voice more than 30 feet from the instrument, and still produce the required effect on the transmitter to ensure perfectly articulate speech at the distant receivers.

Other exhibits include amplifiers for commercial wireless stations; portable receivers, and complete cabinet sets

for wireless, telegraph and telephone working where other means of rapid long distance communication do not exist—sets which have been designed with the object of providing compact and self-contained installations of low power and moderate range for general use.

An exhibit of special interest is the Marconi Wireless bell, which performs the same function as the call bell on the ordinary land line system, and is principally used in connection with wireless telephone apparatus for communication between lightships and shore stations. This installation enables a coast station to call up any one of a group of lightship stations, or a lightship to call up a coast station, and dispenses with the need for operators or watchers giving constant attention to the instrument. Wireless telephone sets fitted with this device are operated entirely by non-technical men.

Wireless apparatus for use in connection with aviation includes a complete aerodrome ground station, embodying special receiving apparatus and including provision for aircraft direction finding; three types of aircraft transmitters and receivers as fitted to aeroplanes on the principal air routes; and a new Marconi direction finder for installation on aeroplanes to enable the pilot to obtain his bearings direct.

Field sets include a portable trans-

mitter and receiver, with masts and aerials, and a mule pack unit on saddle frames, for military use and for other purposes in the field.

The Marconi "popular" wireless telephone set is shown as a practical example of a wireless outfit suitable for the needs of the colonial farmer, who is isolated from the facilities for communication afforded by more thickly populated areas.

The exhibits of The Marconi International Marine Communication Company, Ltd., are arranged in three ship's cabins. The first cabin contains spark and continuous wave equipment as installed in the wireless cabin of a large ship, and comprises the following:—

- (1) Main spark transmitting apparatus complete (1½ K.W. quenched spark).
- (2) Continuous wave transmitting apparatus. 1½ K.W.
- (3) Marine Receiver, No. 1.
- (4) Emergency apparatus.
- (5) Direction Finder.

The wireless instruments are fitted on a bench at the back of the cabin, while the emergency apparatus, the main switchboard, and motor starting panel, are mounted on the wall on the right of the operator. The space beneath the bench is enclosed by paneling, and contains the motor alternator and power transformer. The equipment is installed in a very compact

*Continued on page 15*

**ASK YOUR RADIO DEALER FOR**

TRIMM "PROFESSIONAL" HEADSET 3000 Ohms 45/- per set

TRIMM "DEPENDABLE" HEADSET 2,400 Ohms 32/6 per set

BAKELITE—SHEET ROD AND TUBE—FOR PANELS, KNOBS, ETC.  
Higher Insulator than Ebonite, is mechanically stronger, can be machined, takes a high polish, does not crack, warp or discolour with age, and stands the Highest Electrical Test.

WIRES—BELDEN MANUFACTURING CO.'S PRODUCTS.

COPPER—Beldenamel DCC SCC DSC, for general purposes and panel wiring.  
Resistance—1A1A, 193 Alloy, Nichrome, etc., for Resistances and Rheostats.

INSULATIONS—MICANITE & INSULATORS Coy. Ltd. PRODUCTS

Empire Cloth and Silk, Leatheroid, Friction Tape, Terminals,  
Resin Cored Solder, and Fibre Sheet, Rod and Tube.

*Obtainable in Sydney from all Wireless Supply Houses or wholesale from the Australian Agents*

**O. H. O'BRIEN & NICHOLL (Sydney)**

Phone : City 3302. 37-39 PITT STREET, SYDNEY Phone : City 10592.



# Broadcast Receiving Sets and License Forms

Together with the FREE SERVICE of Broadcasters (Sydney) Limited may be obtained from the following

**L. P. R. Bean & Co. Ltd.**  
229 Castlereagh St., Sydney.  
Telephone: City 353.

**United Distributing Coys. (N.S.W.) Ltd.**  
(Wholesalers)  
28 Clarence Street, Sydney.  
Telephone: City 3566.

**W. Harry Wiles**  
60-62 Goulburn Street Sydney.  
Telephone City 3688 1 door from Pitt St.

**Wireless Supplies Ltd.**  
21 Royal Arcade, Sydney  
Telephone: M 3378.

**E. R. Cullen**  
96 Bathurst Street  
Telephones: City 869, 2596.

**Radio House**  
619 George Street Sydney  
Telephone: City 1487.

**Colville-Moore Wireless Supplies**  
10 Rowe Street Sydney.  
Telephone: B2261.

**Ramsay, Sharp & Co. Ltd.**  
217 George Street, Sydney.  
Telephone: City 3176.

**The Home Electric**  
106a King Street, Sydney.  
Telephone: B 5565.

**Swains Ltd.**  
119-123 Pitt Street, Sydney.

*Continued from page 14*

manner, and all controls are readily accessible to the operator.

In the second cabin is installed the half K.W. quenched spark transmitter, marine receiver No. 3, emergency unit and switchboards. This installation, which is of moderate size, has been designed for service in vessels where ranges obtainable with the larger set are not required.

The third cabin contains the Marconi quarter K.W. spark set, designed with a view of obtaining the maximum possible range for the smallest weight, size and power. It complies with all Government requirements for an emergency set so that additional emergency apparatus is not required. In its design special attention has been given to the requirements of very small vessels such as trawlers, fish carriers and tugs.

The new Marconi wireless installation for ship's lifeboats is shown for the first time. This set has been specially designed with a view to the fact that it will be used under the most adverse weather conditions, and in a very confined space. The transmitter is cap-

able of attracting the attention of a ship using a crystal detector at a distance of 50 miles, and the receiver has directional properties, so that the lifeboat crew can ascertain the bearing of any ship which may be coming to their rescue, and inform her which way to steer.

A private telegraph line will connect the Marconi stand with Radio House, the central traffic control office of the Marconi organisation, and visitors to the exhibition will be able to hand in Marconigrams for transmission to all parts of the world.

The Marconiphone Company's exhibits include examples of their range of broadcast receiving sets, which have brought the pleasures of broadcasting to thousands of homes. The range of apparatus comprises 2, 3, and 4 valve sets and a beautiful cabinet de luxe model in "period" style.

The Marconi Scientific Instrument Company, which specialises in highly efficient broadcast receivers, are showing some of their beautifully designed cabinet de luxe models, and also a number of high-speed telegraph and wireless accessories and scientific instruments.

**BOOKS ON WIRELESS**

*Practical Wireless Valve Circuits*, by J. Scott Taggart. Price 3/9 posted.

*Wireless Valves Simply Explained*, by J. Scott Taggart. Price 3/9 posted.

*Construction of Wireless Receiving Sets*, by P. Tyers. Price 2/3 posted.

*Letts's Amateur Wireless Notebook and Diary*, 1924, leather bound, reduced from 3/6 to 1/9. Postage, 3d. extra.

**N.S.W. Bookstall Co. Ltd**

**FOR SALE.**

Motor Generator Set (at present used by 2HM. Specification: Motor 1/5 H.P., 240 volt, 50 cycles (General Electric); Generator: 420 volts, 500 m/a. In perfect order. Price £20. Wireless Supplies Ltd, 21 Royal Arcade, Sydney.

**"Federal"  
Audio Frequency Transformers**

**"Master of Every Note"**

Being the result of 25 years' experience in manufacturing telephone equipment. These Transformers give remarkable results and will reproduce both the highest and the lowest notes of the orchestra with absolute fidelity. This Transformer with its beauty of full tone reproduction is available to all at

**37/6**

**The Home Electric**

Phone B 5565.

**106a King Street  
SYDNEY**

Agents for "Federal" Apparatus.

Friday, June 6, 1923.

WIRELESS WEEKLY

17



## Ex A.M.S. "SONOMA"

We have just opened up a varied assortment of Radio Equipment from America including:

Giblin Remler Coils, Giblin Remler Mounts, Adjustable Grid Leaks, Eby. Engraved Binding Posts, Bradleystats, Switch Arms. Detector Parts, Etc.

Up to the time of going to press, we had not finished pricing these goods. We pay all railage throughout the State.

**Radio Company Limited**  
15 Loftus Street, Sydney

**A GENERAL REVIEW OF U.S.A. RADIO.**

By Toledo.

When we look at the then supposedly insurmountable obstacles of the dim radio past, about a year or two ago, and compare our present condition with those of yesteryear, we come to the conclusion that we are making considerable progress. Even though we consider ourselves "old timers," and call ourselves competent to judge without bias, it is hard to do so without direct and instantaneous comparison.

As an illustration, I at one time had a friend listen to a loud speaker I was particularly proud of, believing in its qualities, but my friend did not seem enthusiastic. He stated that he believed his speaker had as good qualities as mine. It was only when we brought the two together and switched from one to the other that we had impressed upon us the great difference.

It is not so long ago that all stations were operating on 360 metres. Then came the heaven-born idea of assigning another wave in order to handle the great increase in broadcasting traffic. We then obtained 400 metres. A great cry was heard from many ex-

perts and others that 40 metres separation was not sufficient—that it was impossible to receive from one station while the other was operating if both were in the same city as the listener. Here was a condition that had to be met and met it we did. By the simple process of improving antenna design and a few other minor changes everybody was happy again.

Then came the great increase in the number of stations operating or desiring to operate and it was necessary to allocate a greater number of wavelengths or frequencies for this traffic. A plan was put into effect whereby a greater spread of frequencies was made available and stations closely crowded together, the separation being but 10 kilocycles. Again a great howl went up among the great and near great of the radio fraternity that this was entirely too close a spacing and that it would be impossible to prevent the "beating" or heterodyning of the different stations and prevent confusion. I admit that when the plan was first placed in effect there was considerable trouble, but within a week or ten days things began to straighten out.

Since then much progress has been

made in the development of radio frequency standards and I believe most broadcasting stations now are equipped with such devices. These standards enable the stations to remain at least somewhere near their assigned frequencies. In the case of the station KDKA I have been informed by the Bureau of Standards that the greatest variation during the month was about one tenth of 1 per cent. Now, if all stations can do as well, and there is no reason why they cannot, this annoyance from the beat tone will be considered as solved.

So you see that there is no need of becoming a pessimist as to the future of radio. We must meet obstacles before we can overcome them. The more obstacles we meet the more we will be compelled to investigate this latest wonder in the electrical field and therefore the greater will be the development of this activity.

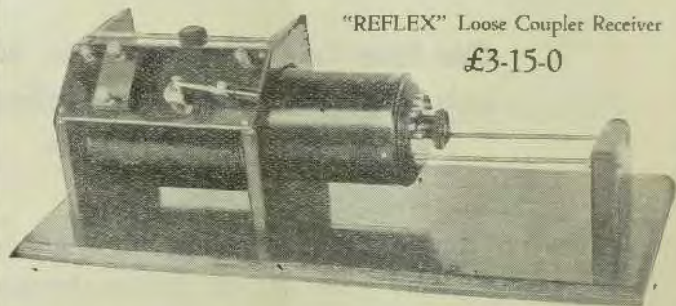
As an example, take the problem of satisfying our curiosity as to what some distant station is transmitting while a nearby station is on the air. For a time I received many letters from radio listeners complaining about their inability to tune out a local station. They viewed their problem in

OUR SPECIAL LINE

PEERLESS Head Phones

2000 Ohms.

30/-



"REFLEX" Loose Coupler Receiver £3-15-0

Complete Set of Parts to make the above Set 36/6

Postage 1/6

RADIO HOUSE  
619 George Street, Sydney



the light that they were correct and all the trouble was caused by the other fellow and that, therefore, something must be done to force this other fellow to stop by law if necessary. I might say that this is a common feeling and I would include a few radio writers in this category.

This interference from the local station became quite acute in several cities, and it developed upon the broadcasting interests to educate the general public. The construction and operation of traps, filters, etc., were described, and now in these very same cities there is very little complaint and everybody is happy. However, had the first impression prevailed we would have our statute book crowded with regulating hours of operation and the interference problem.

I wish to state now that all problems and difficulties in connection with radio that may arise can best be solved and will be solved by radio engineers through invention and development and not by politicians and laws. Let those who talk of laws first get up regulations and laws to enforce a more simply controlled problem, such as prohibition, before entering into a

field more difficult to regulate.

We are now confronted with an interference problem in the shape of receiver-re-radiation. This makes itself known by the whistling sounds or "birdies," as they are usually called. This, as has been explained so often, is caused by neighbouring receiving sets oscillating as in the case when receiving on zero beat.

I have noted the general tendency on some people's part to blame the single circuit receiver as the worst offender. All regenerative sets which do not have a stage or more of radio frequency ahead of the detector are capable of producing these "beats." It resolves itself into the proposition of having some regard for your neighbours and keeping your receiver from oscillating.

The most sensitive point on your dial is just before the detector tube begins to oscillate. With multiple circuit receivers it is very difficult to go over the range of wave lengths and keep the tickler adjusted at this most sensitive point as the operator is fished with but two hands usually. What does he generally do then. Why, he starts his detector oscillating and

tunes until he hears a carrier wave by the squeal and then he clears up the signal. However in doing this, he has disturbed the whole neighbourhood, and has had some terrible things said about him.

Now, with a single circuit tuner you can tune all you want without causing trouble because this type of receiver has usually but two controls, this is the tuner dial and the tickler adjustment. As this type of tuner is designed for the normal type of human being, that is, one having but two hands, the listener can very readily adjust the tuning dial and at the same time keep his regenerative control or tickler at the proper setting without spilling over.

I have intimated before that "necessity is the mother of invention," and that holds true in the case of re-radiating receiving sets. Time will cure this evil and the more aggravated the situation becomes the quicker we will find the solution. In England "birdies" are prohibited by law, in fact a receiver capable of re-radiating is prohibited, but I have been reliably informed that they are a nuisance there and very much so.

Have You Seen the Latest?  
The "Universal" Has It.



Push Pull type

Thordarson Audio Transformers.

Pathe Loud Speakers, Frost Radio Apparatus, Edison B. Batteries, etc.

Call on us Friday Night We will be pleased to show you our New Stocks which will interest you.



Saal Loud Speaker

**The Universal Electric Company**  
108 Market Street Phone M. 3411

## AUSTRALIA'S FIRST HEARING OF WESTERN ELECTRIC PUBLIC ADDRESS SYSTEM.

### THE SYSTEM DESCRIBED.

Public speaking plays such an important part in the lives of every community, be it social or commercial, that in the past it has frequently happened an important speech or address has been unheard by thousands because of the limitation of the speaker's voice to a comparatively small area.

Men and women who have vital messages for the public, can always be assured of audiences. As we have stated, the size of such audiences has always been limited by the relation existing between the carrying power of the speaker's voice and the size and acoustic properties of the auditorium; indoors or in the open air. Now, the introduction of the Western Electric public address systems of voice amplification have definitely removed these limitations. This was strikingly demonstrated at the official opening of the Mosman Anzac Memorial Hall, by His Excellency the Governor General, on Sunday, 4th May.

A gathering of people, estimated at about two thousand, being unable to obtain accommodation within the hall, remained outside in Military Road. Although under ordinary circumstances these people would have been deprived of participating in the dedication service, yet, through the use of Western Electric No. 3 Public Address System, they heard every word, even every inflexion of the voice of His Excellency and the other speakers, quite as clearly and easily as those persons only a few seats away from speakers inside the hall.

An impressive incident connected with the demonstration was the military guard of honour, drawn up on the roadway, presenting arms, as the Last Post, rendered by buglers inside the hall, was conveyed through the loud speaking projectors to the crowds in the street outside, with such volume as to be clearly heard at the Spit, several hundred yards away.

The demonstration at Mosman was unique, for although the public address systems are very extensively used in England and the U.S.A., this was the first occasion that one had been publicly demonstrated in Australia. The varied programme, which included community singing of hymns, the intonation of prayers and scripture reading, and also a special octave

rendition of "Comrades in Arms," in addition to the addresses of the various speakers, admirably demonstrated the scope of the apparatus, which although primarily designed for voice amplification, is not restricted to that alone. It can be used just as successfully for transmitting music from one part of a building to another—in hotels, for example—or in conjunction with a suitable radio receiving set it can be used to amplify and distribute broadcasting entertainments, either in large indoor auditoriums or in the open air, for example in public parks.

The system used at Mosman, and described in this article, is the smallest of three public address systems developed by the Western Electric Company. The largest being capable of projecting a speaker's voice, with sufficient volume to enable 125,000 people assembled in the open air to hear distinctly, and the second largest covering a distance of one-half mile. Despite the enormous volume that can be obtained from these public address systems, an outstanding characteristic is that the amplified voice or music is perfectly natural, and entirely free from distortion. A description of this remarkable system of amplification follows, and will doubtless be of interest.

The Western Electric No. 3 Public Address System comprises a sensitive microphone, a vacuum tube amplifier with a control system, loud speaking projectors, and batteries to supply electrical energy.

The microphone, which is exactly similar to that recently used by His Majesty the King, at Wembley, on the occasion of the opening of the British Empire Exhibition, and, as used by Messrs. Farmer and Company's broadcasting station, 2FC, for both studio concerts and theatrical programmes, is of the double-button stretched-diaphragm type. It transmits both speech and music with great fidelity, as it is designed to be equally sensitive to all the pitches contained in the musical range. It is so sensitive that it is operated satisfactorily by the voice of a speaker standing from four to six feet away. This gives him ample freedom of movement.

Because of its extreme sensitiveness the microphone is mounted in a special housing which protects it from

mechanical vibrations which would otherwise be transmitted through the base of the instrument and be emitted as noise by the loud speaking projectors.

The loud speaking projectors used as part of the No. 3 Public Address System consist of a receiver element and a horn. These projectors will give an audible sound from very weak currents. At the same time they are capable of handling without distortion a large amount of energy at voice frequencies. This is accomplished by the use of a balanced armature receiver.

The energy operating the loud speaking projectors is obtained from a vacuum tube amplifier which magnifies the voice frequency current produced by the microphone so that by the time it reaches the projectors its energy has been enormously increased.

The amplifier has been especially designed to minimise frequency distortion, and to obtain the requisite amplification throughout the essential range of frequencies without sacrifice of the quality of reproduction. One important feature which contributes to the absence of distortion is the employment of a special arrangement of vacuum tubes and coils for the final stage of the amplifier, two separate vacuum tubes being used in what is commonly called a "push-pull" circuit.

The Public Address System is controlled by means of three switches, which are mounted on the front of the amplifier panel. They regulate the current supply to the microphone, and from it the flow to the amplifier; the supply for the amplifier itself and the current flow from the amplifier to the projectors.

Station 2LO, London, now broadcasts time signals from Big Ben in the 320-foot tower of Westminster. Every day the Greenwich clock, by means of observation of certain stars made during the previous night, is adjusted to mark accurate time. The ticks of this clock are now sent into space by radio. The clicks of each second are the sound of the escape wheel, which is permitted to touch a spring with six successive teeth. This makes an electrical current contact which transmits current to 2LO. Big Ben was constructed in 1856. Its accuracy is guaranteed to the fraction of a second.

Col-mo new Price List is nearly ready. Send in your name for a copy.

*Western Electric  
Projector Holder.*

*Western Electric Loud  
Speaking Projector.*



*Opening of Mosman Anzac Hall, using Western Electric  
Public Address System.*

There's only one Best Crystal and its N.H.M. Galena.



**THE LEICHHARDT AND DISTRICT RADIO CLUB.**

On Tuesday, May 27th, members of the Leichhardt and District Radio Society held their 82nd general meeting in the club room, 176 Johnston St., Annandale.

The attendance was excellent, and the chief business of the evening was a lecture on "Audio-frequency Amplification," by Mr. F. Thompson, who dealt with the various methods of obtaining this particular increase in signal strength.

Mr. Thompson's lecture was the 8th lecture of the syllabus, and on Tuesday next the 9th will be delivered by Mr. F. Lott, who will talk on "Radio Frequency Amplification."

Inquiries regarding the activities of the society should be addressed to the Hon. Secretary, Mr. W. J. Zech, 145 Booth St., Annandale.

**MARRICKVILLE AND DISTRICT RADIO CLUB.**

At the Club Rooms, School of Arts, Illawarra Rd, Marrickville the usual weekly meeting of the above club was held on Monday 26th May 1924 Mr. W. L. H. Hamilton presiding.

Much discussion was entered into regarding the business to be brought up by the Delegate to the Affiliated Club's meeting.

A home made 3 valve experimental receiver owned by Mr. E. Kirk was explained and demonstrated.

Secretary A. W. Hemming of 23 Central Avenue, Marrickville will be glad to hear from experimenters who wish to join this progressive club.

**WIRELESS INSTITUTE OF AUSTRALIA.**

New South Wales Division.

The first meeting of the delegates' council of the affiliated societies was held at the Institute's headquarters, 82 Pitt Street, Sydney, on Tuesday, 27th May. In all, 13 clubs were represented, and much important business was transacted.

A full report of the proceedings will be published at a later date, but it can definitely be stated that much good will accrue from the affiliation of the various radio bodies.

A great deal of work lies before the Council and it cannot be urged too strongly that those clubs which have not yet completed their bonds of affiliation should do so at the earliest possible moment so that they may have a voice in framing the conditions under which the amateur and experimenter will work.

The following clubs were represented at the first council meetings:

Leichhardt and District Radio Society, Newcastle and District Radio Club, Katoomba School of Arts Radio Club, Railway and Tramway Radio Association, Campsie and District Radio Club, Wyong Radio Club, Northbridge and District Radio Club, Waverley Radio Club, Marrickville and District Radio Club, Artarmon Radio Club, Wentworth Radio Club, Balmain and District Radio Club, Concord Radio Club.

**ALL EXPERIMENTERS' NIGHT**

Experimenters and members of Radio Societies are reminded that Mr. Alec Hector will give his lecture on "Radio activity—its educational value" on Friday, 4th July, in the Assembly Hall, Education Building, Loftus St., at 8 p.m. Everyone interested in radio should make a point of attending.



**Radio Products of Quality and Character**

**T**HE new type K. & C. Variable Condenser is the first choice of the discriminating experimenter and radio enthusiast. All that is desirable in a good variable capacity unit will be found incorporated in this one. It has moulded end plates; pig-tail connection to the rotating plates, clamped and soldered at each end to prevent breaking off; insulated mounting screws, easily adjusted tension spring for control of the rotating plates; stationary plates permanently locked, preventing disarrangement; "straight-line" curve giving gradual change of capacity, and accuracy to two-thousandths of an inch in plate spacing.

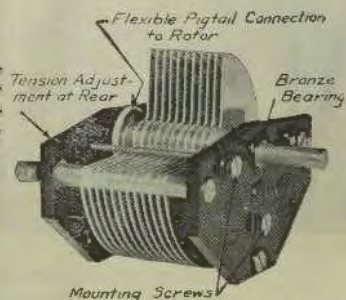
The K and C condenser is made in 3, 7, 13, 17, 23, 31, 43 and 63-plate sizes, and each size above the 3-plate is obtainable with vernier attachment. The new condenser is presented with the usual K and C satisfaction or money back guarantee.

*Accuracy and dependability. That's K. and C.*

**PACIFIC ELECTRIC CO.,**

**38 Martin Place, Sydney.**

*Sole Australian Distributors.*





Friday, June 6, 1921.

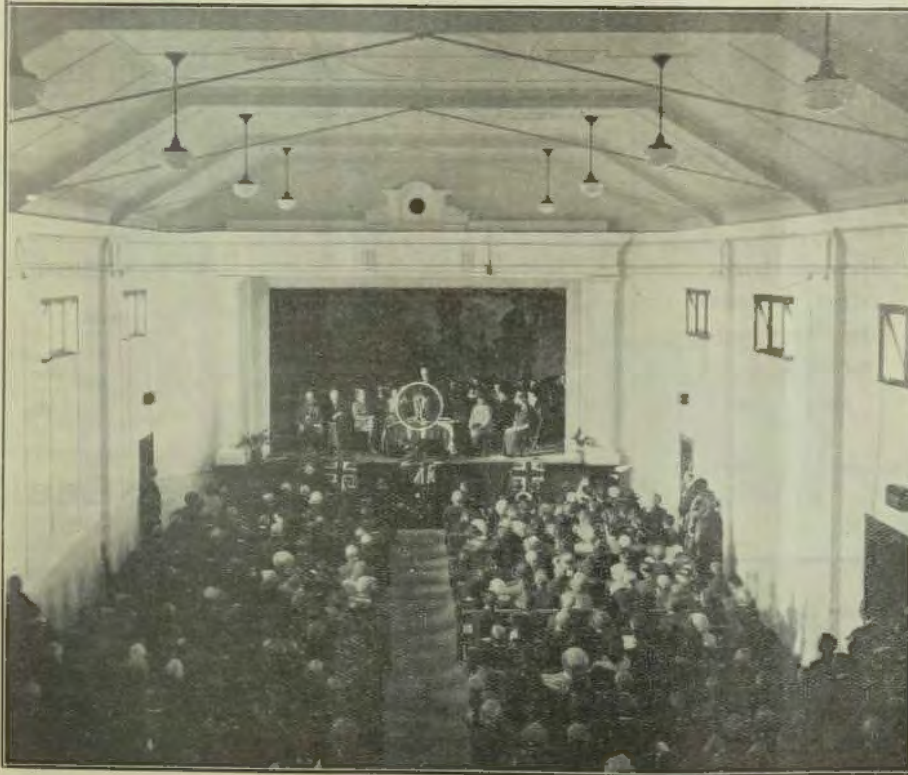
WIRELESS WEEKLY

23

*Western Electric  
Amplifier.*



*The Microphone used in  
Western Electric Pub-  
lic Address System.*



*Note the Microphone on Table.*

See WILES' WONDERFUL WIRELESS on Outside Back Cover.

**Before you  
Expend  
Money on  
Radio  
Equipment  
Consult  
Anthony  
Horderns'  
Wireless  
Experts.**

**Your inspec-  
tion of the  
big display  
of  
everything  
that is new  
in the world  
of Wireless,  
is invited.**

**(Wireless -- Second  
Floor)**

**Anthony Hordern & Sons  
Limited,**

Brickfield Hill, Sydney

Phone City 9440. Box 2712 G.P.O.

**Q.S.L.**

A most interesting assortment of Q.S.L. cards and letters is that of Len Schultz (2 LO), Lane Cove, Sydney, who has spared no efforts to get his station to the high state of efficiency which is the goal of every enthusiast.

His latest D.X. report is from C. Smethurst, White St., Kalgoorlie, who received 2 LO strength 3 on a detector and 1 audio. The distance is approximately 2000 miles airline and of course over land the whole way. Mr. Smethurst mentioned that the only other N.S.W. amateurs he has heard are 2 CM and 2DS.

A report from the operator of a ship lying at Port Adelaide states that 2LO came through strength 9 on one valve. J. Fitchett, Melbourne, finds it easy to receive 2LO on a 2h aerial while T. A. C. Preston whose location at Queenstown, Tas., is in a hollow surrounded by tall hills reports 2LO signals good through heavy QRN.

Over in Hamilton, N.Z., R. J. Orbell receives phone conversation from 2LO, and "Buck" Buckerfield, who hits up a big noise at times around the leafy lanes of Parkside, S.A., says, "Your signals good here o.m." "Buck" states that 2CM and 2LO are the two king pins in the 2nd District.

Trevor Watkins, Hobart, Tas., sums 2LO up in the following clear and illuminating terms. "Mni tnx fr ur crd o.m. Thor 1 QSL d u B4 sci—Ur CW, alys QSA hr es wave stdi 2." "Trev" appears to be deeply bitten by the bug because he pleads guilty to often falling asleep with the phones on in the stilly hours of 2 a.m.

Mr. Cox, Elsternwick, Vic., has heard 2LO on two tubes several feet away from phones.

And so, the rest of the big collection of cards and letters tells the same story of the efficiency of this remarkable amateur station. Mr. Schultz believes in that old motto, "If a thing is worth doing, etc.," and some other transmitters might well take a leaf out of his book.

**ANSWERS TO CORRESPONDENTS.**

T. H. Fitzgerald Manly. We much appreciate your letter but your results have been obtained by many others using similar apparatus. In fact in some cases the results have been considerably better.

G. Blackwell, Bundarra. The Radio Inspector's office informed us that your papers have all been forwarded to Melbourne. The delay is probably due to the anticipated early framing of new Regulations.

**WIRELESS  
APPARATUS**

**New or Second-hand,  
Bought, Sold or Exchanged**

**HOWELL'S**

**19 Barlow Street**

*Published by A. W. Watt, "Sirathaird,"  
East Crescent St., McMahon's Point,  
for the proprietors and printers, Pub-  
licity Press Ltd., 33/37 Regent St.,  
Sydney.*

**Look at the Prices - Gee!!**

TRIPLEWEAVE LATTICE COILS and TAPPED  
LOADING COILS.

URNS	PRICE	URNS	PRICE
25	1s. 4d.	100	2s. 1d.
30	1s. 5d.	150	2s. 10d.
40	1s. 7d.	200	3s. 4d.
50	1s. 9d.	250	4s.
75	1s. 11d.	300	4s. 8d.

*Complete Set to Tune 100 to 3,500 Meters, 21s.*

Dealers Write for Special Prices.

**TRIPLEWEAVE COIL COMPANY,  
15 CROYDON AVENUE CROYDON.**

"THE AIR IS FULL OF THINGS YOU SHOULDN'T MISS"



## Get ready now for winter radio

A GREAT Radio winter is at hand. To enjoy winter radio at its best, equip your receiver with the best batteries you can get. Put in new American Radio "B" Batteries and see what wonderful long-lived service they will give.

Made especially for radio use, American "B" Batteries will operate the loud speaker at a maximum volume for long or short periods, depending on how rapidly the current is taken out of them. Packed full of pep and punch and go, American "B" Batteries pour out their power the moment you turn on the tubes.

American "B" is the standard amplifier "B" Battery, and gives 45 powerful, dependable, zippy volts. Five sturdy Fahnestock Clips make this big "B" Battery available for detector tube as well - varying the voltage from 16½ to 22½ as required.

Insist on American "B" Batteries, remembering that they are the product of thirty years of experience and know-how in battery making. For maximum battery economy and service buy American Radio Batteries—they last longer.

Manufactured and guaranteed by  
NATIONAL CARBON COMPANY, Inc.  
New York San Francisco



Storage "A" Battery



**EVEREADY**  
Radio Batteries  
—they last longer

If you have any question regarding Radio Batteries write to Eveready Service Co., 52-54 William Street, Sydney.

# WILES' WONDERFUL WIRELESS EXPERIMENTERS

Construct your own Crystal Set. We supply complete building instructions and advice with each order.

	s.	d.	£	s.	d.
4 Impregnated C.B. Tube . . . . .		6			
2 Maple End Supports . . . . .	2	0			
8 ozs. No. 22 Enamel Wire . . . . .	2	0			
1 Nickel Plated Slider and Bar . . . . .	3	0			
1 Piece Ebonite . . . . .	2	0			
1 Set Detector Parts . . . . .	2	3			
1 Q.S.A. Crystal . . . . .	1	6			
4 N.P. Terminals . . . . .	1	8			
1 .001 m.f. 'Phone Condenser . . . . .	1	6			
				16	3
1 Pair 2000 Ohm. Murdoch Head 'Phones . . . . .	1	7	6		
100 ft. 3/20 Aerial Wire . . . . .	2	9			
2 Reel Insulators . . . . .		8			
30 ft. Lead-in Wire . . . . .	1	3			
1 Lead-in Tube . . . . .		6			
1 Aerial Switch . . . . .	2	0			
<b>TOTAL</b> . . . . .			<b>£2</b>	<b>10</b>	<b>11</b>

SPECIAL PRICE FOR COMPLETE PARTS, £2/6/6 - - - INCLUDING POSTAGE.  
COMPLETE STOCKS OF ALL PARTS FOR AMATEUR CONSTRUCTION.  
SEND FOR OUR PRICE LIST, R4.

## W. HARRY WILES

Electrical and Radio Supplies—60-62 Goulburn-street, Sydney

(1 Door from Pitt Street)

Established 1904.

Same Day Service.