

WIRELESS WEEKLY

THE HUNDRED PER CENT AUSTRALIAN RADIO JOURNAL

Vol. 3
No. 12



Dec.
28th
1923

3^D

REGISTERED AT THE GENERAL POST OFFICE SYDNEY
FOR TRANSMISSION BY POST AS A NEWSPAPER

SPECIAL FEATURE
THIS WEEK:

Australia's Second
Wireless Station



Model A—Three Valve



Model F—One Valve



Model B—Two Valve

“Radiovox” Receiving Sets

RADIOVOX Receiving Sets are the result of years of experience in Radio, and in sound wave treatment in other musical instruments.

In refinement of tone and simplicity of control, we are confident that in the RADIOVOX we have attained results yet to be equalled by any other Radio Receiver offering on the World's markets to-day.

Made in Australia of the finest imported electric parts, and furnished in designs and at prices to suit every locality and purse, the RADIOVOX Series of Sets will reward your attention at the Exhibition and at our Showrooms.

Write for our Catalogue explaining in detail the patented features and advantages of our self-contained loud speaker construction.



The United Transformer

CLEAR :: SWEET :: NO DISTORTION
Sold by all Up-to-date Dealers
TRY ONE FOR RESULTS

UNITED DISTRIBUTING COMPANY LTD.

Distributors of the Famous “UNITED” and “SIGNAL” Radio Parts
Wholesale Only

28 CLARENCE STREET, SYDNEY and at 592 BOURKE STREET, MELBOURNE



OFFICIAL ORGAN OF THE AUSTRALASIAN RADIO RELAY LEAGUE.

Vol. 3.

December 23, 1923.

No. 12

WHAT OF 1924

Standing as we do now at the close of the old year the wireless world must, in looking back, feel that something has been accomplished which has perhaps had a greater effect on the world's progress than anything else of recent years.

In a few short years wireless has been simplified to such an extent that a child can operate a receiving set.

Broadcasting stations are springing up like mushrooms all over the world.

Thousands are buying sets. Every day its

utility is being demonstrated, and every day someone is producing a new idea.

Wireless has found its way to the ice-clad peaks of the Arctic, the scorching desert of Sahara, and the waving grass plains of Australia.

Nothing has yet gripped the world's imagination like the romance and mystery of wireless.

In saying good-bye to 1923, we realise that it has been a red letter year—but, what of 1924?

Roster for Week ending 3rd January, 1924

	7.30 to 8.0	8.0 to 8.30	8.30 to 9.0	9 to 9.30	9.30 to 10
Thur, Dec. 27		2 FA	2 ZG		
Friday,28		2 ZG			
Saturday, ..29		2 ZG			
Sunday,30	7 to 7.45		7.45 to 9.15	9.15 to 10	
Mon.,31	2 GR	2 FA	2 UW	2 YA	
Tues., Jan. 1			2 ZG	2 FA	
Wednes., ... 2		2 FA	2 ZG	2 LO	
Thursday, . 3		2 LO	2 ZG		2 LO

Australia's Second Wireless Station Now Almost Completed

Situated on the heights of Willoughby and overlooking the lovely reaches of Upper Middle Harbour, 2FC, the station which has been erected for use in connection with the broadcasting service which is being inaugurated by Farmer and Company, Limited, is now nearing completion. This station, together with that of Broadcasters (Sydney) Ltd., are worthy monuments to the progress of wireless in Australia.

Already test programmes have been transmitted, and in the course of the next few days a regular broadcast service will be instituted. This will include service from "Sydney Morning Herald" and "Evening News," weather reports, stock exchange intelligence, entertainments from the J. C. Williamson and J. and N. Tait Circuits, market reports from Dalgety and Co. Ltd., and musical items provided by Farmer's special studio orchestra.

From almost any point on the higher portions of North Sydney two huge steel towers, each 200 ft. high, built in a lattice fashion and supporting the aerial system are plainly visible. Placed 574 feet apart, they support a squirrel cage type of aerial consisting of four wires stretched taut and held in

position by large brass hoops, each of which is about 6ft. in diameter.

Directly beneath the aerial and almost in the centre of the span are situated the main station buildings which comprise the operating room and quarters for the staff and store rooms.

A great deal of attention has been given to the aerial system which does not take the form of a direct contact with earth, but is in the nature of a counterpoise. Quite a small forest of steel masts, each about 15 feet high, support the elaborate system of counterpoise wires which stretch over the area directly below the aerial, and so shield or screen it from the earth. The "leads" from this earth screen and also from the aerial are connected to a special small, square, steel tower set

in concrete and placed at the side of the operating house and which serves to act as a support for the wires prior to their being actually taken into the instruments via insulating material. The station itself, when actually completed, will operate at 5,000 watts, and it is anticipated that Australian programmes of speech and music will be clearly heard in America..

Elaborate Studios.

Although the actual radiation of speech and music by means of wireless telephony takes place from this station, the programmes are provided at special studios which have been constructed on the roof garden of the Company's premises in Pitt Street. Built in a sound-proof manner, and designed after consultation with interests in all parts of the world, they represent the last word in modern wireless studio construction. No stone has been left unturned to insure the very best results being achieved, and the studios have been planned accordingly.

Built so as to be absolutely sound-proof they comprise a large and a small transmitting room, the instrument room and a special reception room for artists. The instrument room adjoins both studios, and the engineer is able to watch the progress of the concerts being broadcasted through a special double sound-proof, plate-



The main operating room and store at 2FC. One of the hoops used in the large aerial is in the foreground to the left.

glass window. Walls and ceilings have been draped carefully so as to deaden all sounds and echoes, and the floors have been carpeted with thick felt. All doors are double the glass in them has been mounted on to chamois leather, and consequently they are sound-proof.

When the service is in full swing, the use of two studios will result in their being very little delay, the manager of this service being able to arrange his artists in one room while the item is actually being rendered in the other.

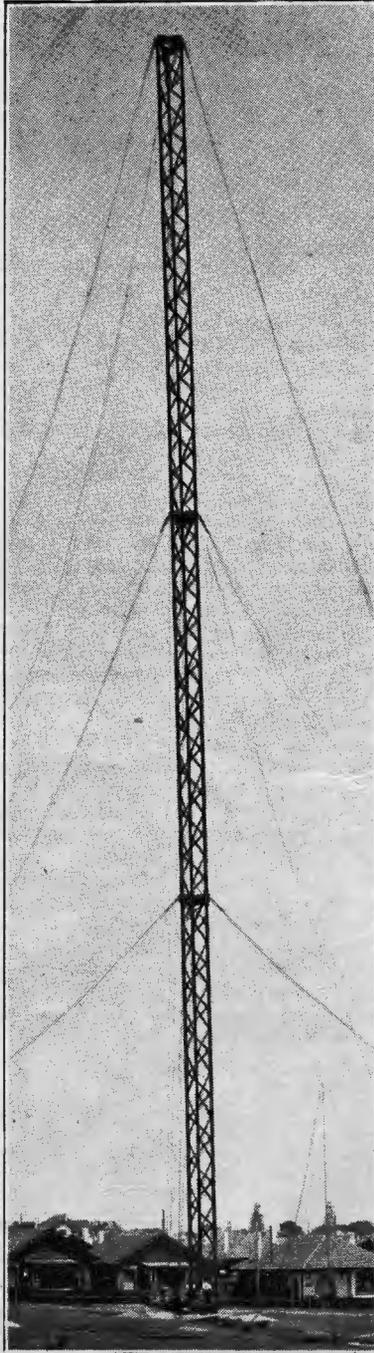
The microphones into which the artists sing or speak are placed in their correct positions in the studios, and the sound is stepped up by a 3 valve power amplifier and is then carried by a land line to the station at Willoughby from which it is radiated. The working of the studio demands very careful attention on the part of the manager and his staff. It will be readily seen that when the switches are thrown in and the microphone is connected via the amplifier to the station, anything sung or spoken, or even the slightest noise created in the studio is transmitted.

A special series of switches enables the studio manager to control operations with the utmost simplicity, and a series of signal lamps has been arranged so as to automatically flash and remain alight as long as the microphone switch is thrown in. When this switch is in the "on" position, a red light glows near the engineer's table in the instrument room. Another red light glows in the studio and warns the artists and staff, whilst a third red light glows outside the door and serves as a warning to those who may unthinkingly attempt to enter the studio during the course of transmission.

DON'T FINGER CRYSTALS.

A very common mistake made by users of mineral detectors is to subject them to a good deal of handling in the process of mounting in their cups. The practice is one to be deprecated most strongly, for the sensitiveness of a crystal depends in large measure upon the condition of its surface; a mediocre crystal with a perfectly clean fresh surface will often give better results than a far more sensitive specimen which has become dirty and greasy with excessive handling.

It must be remembered that the human skin is always slightly moist and greasy and hence apparently "clean" fingers are capable of dirtying crystals to a serious extent.



One of the two huge steel towers in use at Farmer and Co's. Station (2FC) at Willoughby. Two of the smaller steel posts used to support the counterpoise are shown in the picture.

AN ADJUSTMENT TIP.

With fairly strong signals it is usually somewhat difficult to decide when one has got the best possible adjustment on the crystal, since the ear is much less discriminating where loud sounds are concerned than in the case of weak ones.

The difficulty can be easily overcome by adopting the following method of adjustment; First, tune in the desired station and set the detector to give what appears to be maximum signal strength, then alter the tuning until the signals become very nearly inaudible and carefully re-adjust the pressure upon the crystal, and perhaps try different spots upon it until you strike an adjustment which brings the signals in a little more loudly again. Then detune the set still further, and repeat the procedure already outlined until confident that the best possible adjustment has been obtained, whereupon the tuning may be restored to the correct value and the signals will come in with an increase of volume which is often surprising.

An incidental advantage of this method is that it enables one to estimate the relative merits of various crystals, by noting how far the detuning process can be carried before the signals become inaudible with even the best adjustment. The number of degrees through which a condenser or variometer can be turned, or the distance which the slider contact can be moved, can be used as a measure of the sensitiveness of the crystal.

AT PITCAIRN ISLAND.

Mr. H. A. Veen returned from New York to Sydney by the Port Adelaide, and came through the Panama Canal. The vessel was in touch by wireless during the whole of the voyage, and daily news bulletins were published on board. An unusual feature of the voyage was a visit to Pitcairn Island, where a paternal Government has allowed the installation of a wireless station with which the inhabitants are kept in touch with the happenings of the world. The people on Pitcairn Island are the remnants of the descendants of the Mutiny of the Bounty, which historic event took place in 1787. In all, they number some 174 souls, and pursue their lives on a communal plan, living solely on the produce of the island.

Experiments for the Radio Amateur

Lokalis

By MAURICE CHILD,
Vice-Chairman of the Radio Society of
Great Britain.

TO measure the approximate natural wave length of the aerial.

Apparatus required:—

- 1 unshunted or sparking buzzer.
- 1 Dry cell.
- 1 Wavemeter with crystal detector and telephones.

The object of this experiment is to determine the approximate wave length of the aerial circuit, i.e., the wave length to which it will most readily respond without the addition of any inductance or condenser in conjunction with it.

It is important for every serious experimenter to know the wave length to which his aerial, when joined to earth, is most sensitive, and this wave length is called the natural wave length. Putting the matter in another form—if the aerial is caused to oscillate, and radiate electric waves, the length of these waves and frequency of the oscillating currents will be governed by the inductance and capacity, and, to a very slight extent, the resistance of the aerial circuit, and these constants therefore determine the natural period.

A precaution should be taken that the aerial is thoroughly well insulated, especially at the free end.

The sparking or unshunted buzzer is joined up to a dry cell, and the aerial joined to either the iron frame or contact pillar of the buzzer.

The earth wire should make a small loop of one or two turns of approximately 4 ins. diameter (Fig. 13). This

can be done quite easily by stapling the earth wire to the wall just above the level of the table, and may be permanently left. This loop will be found useful if it is desired now and again to energise the aerial for any purpose.

The wave meter inductance is brought within an inch or two of this earth loop. The buzzer is now set in operation, and very weak high frequency oscillations will be generated in the aerial circuit.

The wave meter must be tuned to give a maximum response in the telephones to these oscillations, and, when this has been done, a reference to the condenser position and the inductance coil employed will give the wave length on comparison with the chart or curve.

With small aeriels, somewhat under the maximum usually licensed by the Post Office, a 25-turn Igranite coil will be found to cover the wave length range, but with larger aeriels, a 35-turn coil will be needed. The wave length recorded should come within the range of from 150 to 250 metres.

Note.—It will be found that the maximum position of the resonance is not very sharp, and, for this reason, care should be taken to keep the wave meter inductance as far as possible from the earth loop, and also from close proximity to the buzzer itself, as sometimes direct inductive effects from the buzzer magnets may be produced, and make the experiment difficult to perform with accuracy.

You have, no doubt, read of the fascinating adventures of Mr. Commissioner Sanders, Hamilton and Bones, who, Edgar Wallace tells us, discovered a wireless system of their own. The mysterious trembling beat of drums carry messages across Africa, from the East coast to the West, in an incredibly short time are called the "Lokalis," the newspapers and broad stations of the African tribes.

There are Lokalis all over the world—"drums" built of thin wire and wooden masts.

The chief Lokalis in this country—in fact, the "big noises"—are the broadcasting stations!

Every day they talk to "Receiving Lokalis" on the tops of mansions in towns, villas in suburbia, and cottages by the countryside.

Even as Sanders interpreted a message from the thump of a drum many miles away, so may you by the agency of the "Radio Lokali."

As a microphone switch is closed at the Broadcasting Station the resultant click in your phones tells you a definite piece of information. An artiste speaks or sings—air waves from his voice strike the microphone—and you all hear and are entertained.

From speech through miles of wire, we retrogress to speech through miles of—nothing.

There's broadcasting of some kind wherever you may go in this world; here's health to the Lokali—a pioneer broadcaster.

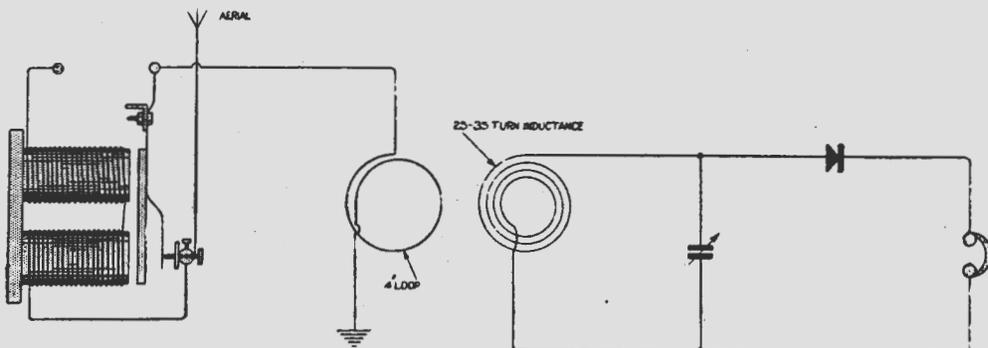


Fig. 13. Method of energising the aerial in order that the natural wavelength may be measured by calibrated receiving circuit

*Spoke to Millions**President Coolidge's Address*

Millions of Americans heard President Coolidge's message to Congress on December 6th and caught every phrase as it passed from his lips, says the New York correspondent of "The Times." They cheered with the Senators and Congressmen when the President expressed particularly telling sentiments, as if they were sitting in his presence, instead of hundreds or thousands of miles away.

President Coolidge's voice could be heard coming from the doorways of scores of shops, to which it had been transmitted by wireless from Washington, and made audible by amplifiers. Receiving instruments were set up in restaurants, throughout the city, enabling patrons to hear while they ate or stood at counters or cigar stands.

The President spoke in clarion tones from barbers' shops and haberdashery stores. In some places his words were so plentiful that the very walls seemed to be talking, debating the proposals for soldier bonuses, world courts, and cancellation of war debts. Extraordinary as it was to have the

MAKING THE UNDERWORLD SAFE.

Washington reports the nomination of a special officer by the Bureau of Mines to make further experiments at Bruceton mine in connection with life-saving. The Department of Commerce have promised their aid, and their radio supervisor will co-operate whenever necessary. The experiments at Bruceton consisted of sending and receiving messages from one part of the mine to another at various depths. Signals from outside were also heard, but on the whole the experiment was only partially successful. It was proved that radio waves could be sent through the solid strata of coal mines, but that the short wave lengths used rapidly lost their intensity with distance. The present consideration is to find a practical method of radio communication underground, so that all sections of a mine may be in constant touch.

message broadcast, it was more extraordinary to see the way in which people listened and followed every statement. Not a word was lost, except when the cheers of the listeners drowned the end of a sentence.

A GOOD DAY'S WORK.

Germany put in a good record when she sent forth 51,139 words in one day recently. Of this, 35,420 words went to America, the rest were divided amongst Italy, Russia, Spain and Egypt. It was almost entirely handled by two stations, those at Nauen and Eilvese. Nauen is still undergoing many improvements, for a new Buenos Aires service will be opened in a month's time. The station will operate in liason with Monte Grande, near Buenos Aires, and the service is to be operated under the auspices of a combine—composed of English, German, American and French companies. Separate antennae have been constructed for the various services, Asia, Africa, Europe and America now owning one each.

FOR SALE—Twenty Yard Aerial, complete with fifteen feet masts and Telephone Head Set. Apply, Frank Smith, Box 2234, G.P.O., or City 9148.

Don't forget to mention "Wireless Weekly," when dealing with our Advertisers.

"Burginphone" Broadcast Receiver

These receivers range in size from 2 valves up to 7 and in price from £33/10/- up to £150 for Complete instruments. NOTE THAT THE PRICE IS "COMPLETE" WITH THE EXCEPTION OF A LOUD SPEAKER.

We will be pleased to give you a practical demonstration on any of our receivers at our Demonstration Rooms, 1st Floor, 391 George St.

We are Sole N.S.W. Agents for "Kellogg" Radio Equipment which is considered the most efficient and most attractive apparatus yet put on the market.

We are also Agents for Farmer's Broadcasting Service and are licensed to issue their Broadcasting license together with the Government Broadcast license.

Experimental Receiving and Transmittin^g equipment specially catered for. Send for New Price list and Illustrated Pamphlet.

BURGIN ELECTRIC CO.

WIRELESS ENGINEERS & SUPPLIERS

Show Rooms and Sales Dept., 1st Floor, Callaghan House,

391 GEORGE ST.. SYDNEY

THE OUTLINES OF WIRELESS

By Lieut.-Col. C. G. CHETWODE CRAWLEY, R.M.A., M.I.E.E., Deputy Inspector of Wireless Telegraphy, General Post Office.

This article will be found especially interesting by those who are just starting Wireless.

The energy which produces heat and light is radiated in the form of waves in this ether, just as the energy of a stone dropped into a pond is radiated in the form of waves in the water, the waves consisting of movements up and down of the little particles of water. The transference of energy by this means, whether in the form of light, heat, or wireless waves, takes place at a speed of about 186,000 miles a second, that is, instantaneously for all practical purposes so far as radiation over the earth is concerned, though, of course, very far from instantaneously when the stupendous distances of astronomical space are being considered. The speed of travel, therefore, over the earth we may consider the same for light, heat and wireless waves, viz.: instantaneous, but the rates, or as they are usually called, the frequencies, of the ether movements which produce the waves are very different. The more rapid the movements, that is the higher the frequency, the shorter are the waves, the length of a wave being the distance from the crest of one wave to the crest of the next one. The most important similarity, therefore, between light, heat, and wireless is that they all consist of ether waves travelling through space at the same speed, and the most important dissimilarity is in the lengths of those waves. The highest frequencies, i.e., the shortest ether wave lengths, produce the Rontgen or X-rays, then come the Actinic rays, which are used in photography, and then the visible light rays at frequencies of about 1,200 billions a second for those which produce the sensation of violet light, down through indigo, blue, green, yellow and orange, to some 600 billions a second of red, and then further down through the frequencies which produce heat rays, until at last are reached the wireless waves with frequencies of from a few thousand to a few million oscillations a second.

It is clear, therefore, that the process of signalling by light, by means, for example, of a flashing lamp, must be similar to some extent to that of signalling by wireless. Take, for instance, the process of signalling by a flashing lamp. Each flash consists of a series of ether waves radiated in all

directions at a speed of 186,000 miles a second, long flashes being noted by readers anywhere within range as dashes, and short flashes as dots in the Morse Code, in which each letter or figure consists of dashes or dots, or a combination of dashes and dots. In wireless, it is very similar, the ether waves, as before, being radiated in all directions at the same speed, long series of waves being received as dashes, and short ones as dots, the disturbance of the ether becoming weaker and weaker as the distance from the source increases.

How, then, are these long ether, or wireless waves produced, and how are they received? Ether movements, which take place at a rate suitable for the radiation of wireless waves, are produced by an electric current oscillating to and fro at that rate. This fact was fully demonstrated for the first time by Professor Heinrich Hertz, in Germany, thirty-five years ago, and that year, 1887, may well be considered as the date of the birth of wireless, or, as they are often called, Hertzian waves. If we cannot in this country take credit for the birth, we can certainly do so for the earlier work which led up to Hertz's famous experiments. To lay claim to this earlier work, we need mention only two names, two of our greatest electrical pioneers: Michael Faraday, who in 1831, discovered electro-magnetic induction, the foundation of all electric signalling, and Clerk Maxwell, who, in 1867, laid down the fundamental theory of electro-magnetism, and predicted the possibility of producing these electric, or Hertzian waves.

The methods used by Hertz, for producing an oscillating electric current suitable for the production of wireless waves, was by means of an electric spark. This method of producing the waves was called the Spark System, and is still used in most of the installations fitted on board ships, and at many small stations. The possibility of so using it was first foreseen and practically demonstrated by Senatore G. Marconi, who produced the oscillating current in an elevated wire, called the antenna. Senatore Marconi, who is universally known, and rightly known, as the inventor of

wireless signalling, commenced his famous investigations at his father's home in Italy, in 1895. Again, we cannot claim the great inventor as a fellow countryman, though we can at any rate boast that on his mother's side, he is of Irish descent.

Within the last ten years or so, three other systems, besides the Spark system, have been developed. The first in the field was the Arc System, where an electric arc, similar to the arc used for lighting purposes, was substituted for the spark. This arrangement was patented by Valdemar Poulsen, of Denmark, in 1903, and is based on work done in this country by W. Duddell some six years before. Many large stations are fitted with this system, including those near Oxford and Cairo, the first two stations of our Imperial Wireless Chain. Then came the Alternator System, where the oscillating currents in the antenna are produced by a high speed electrical alternator. This system was first developed in Germany, the United States of America, and more recently in France. Like the Arc System, it is fitted in many high power stations throughout the world.

Lastly, we come to the Valve System, which is used extensively in small installations, including the new broadcasting stations. The Valve is similar to the ordinary electric light bulb, but contains two metal elements inside the bulb in addition to the filament of the lamp. The valves used in sending stations are much larger than the usual electric lamp, and are connected up electrically in such a way as to produce the required oscillating currents in the antenna. It is a most efficient transmitter, not only for small stations, but also for large stations, though in the latter case, little commercial experience has been gained.

For sending messages by wireless telegraphy, a signalling key is used, so arranged that by pressing the key for long and short periods, waves are radiated into space, and work the apparatus at the receiving station so as to produce the dashes and dots respectively of the Morse code, either as long and short buzzing sounds in the telephone receiver, or as long and short strokes on a paper tape. In the

case of wireless telephony, a continuous stream of waves, modulated by the voice instead of being interrupted by a signalling key, is radiated into space, the modulations, i.e., the note, being heard at the receiving station in a telephone receiver, instead of long and short buzzing sounds as in the case of telegraphy.

The reception of wireless messages depends, primarily, on the fact that Hertzian waves, on meeting any electrical conductor, produce in it oscillating electric currents similar, though, of course, much weaker, than those by which the waves were produced at the sending station. The conductor at a receiving station consists of an antenna, as in the case of a sending station, and in small installations, such as those in ships, the same antenna is used for both purposes, being connected up to the sending or the receiving instruments as required. The actual receiving arrangements consist, therefore, of an antenna connected to apparatus, which can record in some way or other, the fact that these very weak oscillating currents produced by the waves from the sending station, are present in the antenna. Various devices have been tried, but the one now in general use is a valve, much smaller than, but otherwise similar to, a transmitting valve. The receiving valve is smaller than an electric light bulb, and like the transmitting valve, has been developed from a suggestion made by Dr. Lee de Forest, in 1906, in the United States of America. This suggestion, viz., to add a second metallic element to the original valve which had been invented by Dr. J. A. Fleming, in London, two years before, revolutionised wireless telegraphy and changed wireless telephony from an expensive toy to a commercial possibility.

FILING SMALL WASHERS.

It often happens that a thin washer must be still further reduced in thickness. Difficulty is usually encountered in holding the work so that it can be filed.

A very handy method for doing this is to place the washer to be filed on a small block of wood, over which is then put a piece of flat metal. Squeeze in a vice until the washer (or other similar part to be filed) is embedded in the block to a depth equal to half its thickness. The block is then put in the vice with the thin metal piece resting in the cavity, where it will remain secure while it is being filed. E.C.O.

Not Guilty

Radio has often been unjustly accused of attracting lightning. At Medford, Mass., U.S.A., when a very severe local storm raged, and lightning struck the Amrad Broadcasting Station, the blame was at once attributed to the radio apparatus. But a thorough investigation showed that the electric light wires were the culprits. The lightning demolished them entirely, and all service was at a standstill in the town. The broadcasting apparatus, a very powerful one, was untouched, likewise the 320 ft. antenna tower, which facts allow radio to stand up before the universe without a stain on its character.

WIRELESS WEEKLY CUP

TWO Silver Cups
will be presented
for the Best Valve
and Crystal Sets made
by any amateur in
Australia and New
Zealand.

Full details will
be published early
in January.

LONG DISTANCE WORK.

Mr. G. Shrimpton, of the Wellington Radio Club, N.Z., using a three-valve set with one stage of radio-frequency, has heard Morse from a number of American stations. The transmitters were: 1.E.R., Mr. A. C. Specht, 2 Kimball Road, Watertown, Massachusetts; 6A.J.F., Mr. Frank E. Jones, 1822 Hearts Avenue, Berkeley, California; 6A.R.B., Mr. C. Duncan, 3029 Baket St., San Francisco; 7 T.O., Mr. Arvid Herner, 119 Harrison St., Portland, Oregon, U.S.A. The distance covered was over 7,000 miles.

Naval Wireless Man

Mr. W. R. Watts, not an inappropriate name for anyone connected with wireless, has just taken charge of the Wellington Broadcasters' Ltd., station on Ford Buildings, and listeners in may look for something more than good in the very near future. Mr. Watts served 14 years in the British Navy, 12 of which were in the wireless service, and next week it is hoped to give one or two interesting narratives concerning his experiences. He came to New Zealand nearly a year ago, landing on New Year's Day. He went to Dunedin, and there took charge of the station 4YO, which is now being dismantled, owing to the proprietor being unable to continue the heavy expense of the service. This station is definitely closed down, and it was for this reason that Mr. Watts came to Wellington, where his services were retained by the Wellington Broadcasters, Ltd. He is at present engaged in finishing off the counterpoise at the station.

New Microphone

He has already set up a new microphone, and the results produced were excellent, both in volume and quality. Wellington Broadcasters are rapidly coming to the front in Dominion broadcasting, and letters of appreciation show how the concerts and other items are being received. Improvements are now being installed to bring the equipment thoroughly up-to-date, to which reference will be made in due course.

Another Record

Meanwhile the company has made another record by being the first to broadcast a theatrical company in its current preformance in New Zealand. This was the "Cat and the Canary" Company, which has been doing so well at the Opera House, and it may well be imagined how delighted listeners in were to get such an entertainment as this. It was certainly unique and Wellington Broadcasters are to be congratulated upon their enterprise.

AERIAL DIRECTION.

There appears to be some doubt on the question of which direction an aerial should be directed, but, as a matter of fact, it makes little difference unless the horizontal part is three or four times as long as the lead in. Under such conditions the aerial will receive the best from the direction in which the horizontal points, although no marked difference will be noticed.

*Broadcasters Ltd.**Programme.*

The following is the type of programme broadcast by Sydney Broadcasters Ltd. This was Thursday's programme:

12 noon.—General news.

12.30.—News, morning Stock Exchange calls, market reports, weather reports.

1-2.—Broadcasters' No. 1 Orchestra will play the following items: Selections from "Sally"; fox trot, "Bobby's"; song, "Mother Machree"; violin solo, "Humoresque," by Miss Doreen Douglass; fox trot, "Cootamundra"; waltz, "Sleepy Seas"; song, "In An Old-Fashioned Town"; barcarolle from "The Tales of Hoffman"; solo, "Cut Yourself a Piece of Cake" (fox trot); "Parted" (Tosti); fox trot, "Snowy." Accompanist, Miss D. M. Bertram; violinist, Miss Doreen Douglass.

2.30.—Mid-day exchange calls, general news.

3.—News.

3.15.—Afternoon chats to women.

3.30.—Weather reports.

3.45 to 4.45. — Orchestra: "Shepherds' Dance"; waltz, "Good Night"; fox trot, "You Tell Her I Stutter"; violin solo, "Danse Hongroise," by Miss Doreen Douglass; Indian Love Lyrics; "Aussie Land"; "Traumier" (Schumann); "Two Eyes of Grey"; fox trot, "I'm Wie'd About Billy"; waltz, "Somebody's Waiting For Me"; fox trot, "Bene."

5.—News.

5.30.—News.

6.—News.

6.30.—Stock Exchange calls.

6.45-7.45.—Bedtime stories.

7.45 to 8.—The Australian Orchestra will play, "I'm Going Back to My Mammy."

8 to 10.—Grand popular concert.

Part 1.—B (1) Miss Phyllis Aitkinson (soprano), "Love Sends a Little Gift of Roses"; 8.13 (2) Mr. Les. Herford (baritone), "The Blind Ploughman" and "The Cobbler's Song"; 8.20 (3) Miss Myra Gillon (contralto) "Sognat" and "Night of Stars and Splendour"; 8.30 (4) Sydney F. (entertainer), "A Minute to Seven Last

Night" (comic song); 8.40 (5) Mr. Norman Quong (baritone), "The Stormy Morning" and "Thou'rt Like a Lovely Flower" (Liszt); 8.50 (6), Selections, fox trot and "Barney Google," by Australian Orchestra; 8.58 (7), Mr. W. G. Adkins (humorist), "Shift up a Little Bit Further," and "She's Proud and She's Beautiful."

Interval of three minutes.

Part 2.—9 (8), Broadcasters No. 2 Orchestra will play; 9.8 (9) Miss Phyllis Aitkinson (soprano), "Waters of Minnetonka"; 9.16 (10), Mr. Les. Herford (baritone), "Young Man o' Devon" and "I Know of Two Bright Eyes"; 9.23 (11) Sydney F. (entertainer), whistling item, "All About Love"; 9.30 (12) Miss Myra Gillon (contralto), "She Heard the Great Sea Calling" and "Angus McDonald"; 9.35 (13) Mr. Norman Quong (baritone), "Yonder" and "The Yeoman's Wedding Song" (Pombabowski); 9.40 (14), "Thru the Night," Australian Orchestra; 9.45, Mr. W. G. Adkins (humorist), "I've Never Been Courting Before" and "Father Keeps on Doing It"; 9.53 (16) Broadcasters' No. 2 Orchestra will play. National Anthem.

Seek the Advice of
MR. F. BASIL COOKE, F.R.A.S.
on all Radio Matters

David Jones' have been fortunate in securing the services of Mr. F. Basil Cooke, F.R.A.S., and all those interested in Wireless or Broadcasting can take advantage of his expert advice and knowledge before purchasing a Broadcasting service.

In these early and experimental days when the science of Wireless is still new in Australia, it is necessary to have this expert advice so that the Public may feel that what they purchase will give the service they require.

Advice is given freely on any subject, small or large, relative to Wireless. You are advised to come to David Jones' Radio Department, 22 York Street, and have any point that you are in doubt about made plain.

D A V I D J O N E S'
Radio Department, 22 York Street, Sydney

What's Wrong with the Loud Speakers?

By Professor A. M. Low.

The loud speaker—the topic of to-day, to-morrow, and of every day until the ideal instrument is evolved. Professor Low tells of its iniquities and the paths along which it may be developed.

Loud speakers are in their infancy. That they will grow in popularity and improve in efficiency is as certain as is the establishment of wireless broadcasting.

At present, however, it is no use disguising the fact that they are far from perfect. Unless used in conjunction with an expensive receiving set and tuned constantly, they produce for the most part an indistinct imitation of the human voice on the instruments which are imparting music. In many cases the results are inferior to a poor gramophone, which, to say the least of it, is not what it should be. The ideal of "music for meals" by the simple pressing of a button is still a long way off. We find ourselves straining our ears to overcome the deficiency of the instrument. Unconsciously we look towards the mouth of the loud speaker

as if we could see its lips move, as would the lips of the man speaking the words we are endeavouring to distinguish.

Of course this is all wrong, but the question is how to remedy it.

Now, loud speakers have been my pet study, for it is in them that the future of wireless lies, and I have made hundreds of experiments in connection with them. What I have learned may prove not only interesting to the amateur wireless enthusiast, but also of assistance to him.

The principal difficulty in producing an efficient loud speaker is the fact that in the performance of its duty of magnifying the instrument does not unfortunately confine itself only to the notes we wish to hear. It magnifies everything which the diaphragm records. It magnifies the sound imparted by atmospheric conditions, and it magnifies notes produced by its own vibration.

By means of a special instrument of my own invention I have photographed certain sounds as actually produc-

ed and as recorded by various loud speakers, and have found in most instances serious distortion. I have come to the conclusion that the distortion is largely caused by the shape of the horn of the loud speakers, and by the material used and the method of their construction. Much efficiency seems in fact to have been sacrificed to obtain pleasing symmetry and aspect in the finished product.

For instance, I believe that many all-metal loud speakers are faulty because they possess a definite period of resonance, which means that they set up definite vibrations which interfere with the vibrations produced by the diaphragm. A simple method of remedying the defect is to discard the "tin" horn, and substitute a megaphone type of horn made from ordinary cardboard bound with insulating tape. The appearance of the latter may be against it, but the resultant increased efficiency will probably more than counterbalance this. This improvised horn should be about two feet long, one inch wide at the diaphragm end, and one foot wide at the mouth. It will register very little vibration of its own to interfere with the production of the wireless sound.

Another method of achieving the same end is by the use of materials

The PACIFIC RADIO COMPANY

— SYDNEY —

COMPLETE SETS

for

Reception of Broadcasted Programmes from £7/7/-

PACIFIC De Luxe Model Four Valve Receivers, housed in floor model, highly polished cabinets, complete with loud speaker, Willard storage batteries, H.T. batteries, aerial wires, insulators, and flagpoles, installed free within 50 miles of Sydney

Price £105 : 0 : 0

EXPERIMENTAL STOCK includes New System Telephones, Headsets, Magnavox Loud Speakers, Western Electric Co's. Apparatus, and all makes of high-class Apparatus used in experimental Receivers.

The attention of the trade is called to the fact that we are now prepared to receive enquiries for the supply of sets tuned to the various broadcast stations.

COUNTRY AGENTS REQUIRED

LIBERAL DISCOUNTS TO LICENSED DEALERS

TEMPORARY CITY ADDRESS:

C/o Mr. Henry, Architect, 2nd Floor, 121 Pitt Street

Trade enquiries to F. THOMPSON, Manager, PACIFIC RADIO COMPANY
Works and Experimental Station: 38 DONNELLY STREET, BALMAIN

which possess varying periods of resonance all united to form a horn. Some cabinet loud speakers constructed of different kinds and thicknesses of wood are quite efficient for this reason.

Many people have tried to avoid the expense of purchasing a loud speaker by using a telephone receiver with a horn attached. If the horn is of the home-made cardboard type I have described, fair results may be obtained, but unavoidable distortion of the sound must be expected.

It is wise to keep the instrument well away from all electric wires, as the current has a peculiar effect on it. If an electric light switch is moved the tone of a loud speaker will generally alter, and occasionally distinct interference is noticeable, and particularly if a bad commutator is in use on any of the dynamos at the generating station. If alternating current is on the system, a slight tremble in the tone of the loud speaker will result. Naturally such interferences should be avoided.

The perfect diaphragm has not yet been discovered. I doubt very much

if the material at present in use will survive very long. I have obtained certain improvements in reproduction of sound by means of damping a diaphragm with glycerine, but it is still doubtful if this is of any real value.

Diaphragms are really a study by themselves, and it may be possible that the diaphragms of the future will be made of water.

This may sound a shade ridiculous at first thought, but when I mention that by impinging two tiny jets of water against one another from a distance of about half an inch apart, a perfect diaphragm is formed, the reader may more readily understand what I mean. Such a diaphragm is beautifully sensitive, and already I have got results with it—though I confess they are not what I would call good.

An interesting method of forming an extremely sensitive diaphragm for experimental purposes is to dissolve celluloid in amyl acetate, and pour a few drops on to a bowl of water. It spreads out over the surface of the water instantly and solidifies in a few minutes, forming a diaphragm thinner than a soap bubble. It should be lifted

from the water by means of a loop of wire placed underneath it.

Such a diaphragm is so sensitive that it responds instantly to the slightest disturbance. If small pieces of silvered mirror are laid upon it very carefully with the glass side uppermost, a tiny beam of light can be thrown on the ceiling. As the diaphragm vibrates these beams of light move so that the shapes of different sounds can be observed and actually photographed.

It is interesting to note that a steel diaphragm, as much as one sixteenth of an inch thick can be used for transmission purposes, the tiny vibrations being magnified by wireless transmitter valves to produce speech with remarkable clarity over long distances.

It is quite possible that the loud speakers of the future will consist of more than one diaphragm on the ground that different types of diaphragm are at their best when producing different notes. For example, the sound S-S-S is difficult to produce, but several diaphragms combined can produce a perfect result. In gramophone tests the multiple diaphragm sys-

Continued on page 12



Radio Company

Limited

15 LOFTUS STREET

Circular Quay

SYDNEY



*Of importance
to Experimenters
and to those
about to enter the
field of Wireless*

DURING the month of December **LARGE REDUCTIONS** will be made of our stocks of **EXPERIMENTAL SETS and PARTS** at **COST and under COST PRICES**, all of which will carry our guarantee to give satisfaction.

A Small Transmitter with Tube Modulation complete with Valves and Batteries ready for use at £25 is just one of our many bargains.

Stocks limited. Send your Order as early as possible

NEWS IN BRIEF

ONCE BIT—

Even if Dr. Cook would like to repeat his famous Polar stunt, radio has made it impossible for him. Every Polar party which sets forth must now be equipped with the new radio compass, which at the Pole shows all radio stations picked up as bearing dead South, whilst at all radio stations in taking their communications their position would be due north. The great naval airship LR I carries radio, and if she does not reach the North Pole this summer, she will start early in next spring.

If it is reached, proof positive will be forthcoming by means of the radio set and radio compass. Radio messages and weather reports have been received daily during the winter from Spitzbergen, latitude 78 north. Therefore, if radio will carry through the Aurora, the whole radio world will hear of it when the LRI reaches the Pole.

Very little has hitherto been heard of amateur activities in Portugal, but the announcement has now been made that the first amateur organisation has been formed under the name of Radio-Academia de Portugal. The offices are at Rua Anthero do Quental, 15 Primeiro, Lisbon.

Not only in England, but in Belgium, the new broadcasting station in Christiania is making itself heard. On September 17th, Mr. P. Mahieu, residing at Braine le Compte, Belgium, re-

ceived Christiania very loudly on 390 metres, using a receiver with three H. F. valves.

On the same day this transmission was received by Mr. H. Hunt, Jun., of Northampton, employing a single-valve set.

A new radio station has been erected at Timisvara, in Rumania, English apparatus being employed.

During the recent military manoeuvres in Sussex, England, experiments with wireless telephony "in action" were carried out by the Royal Air Force. The equipment used was mounted in a specially built motor van and extreme dexterity was shown in the manipulation of the apparatus. Indeed, the operators claimed to be able, in less than three minutes, to erect an aerial and establish communication with aeroplanes on reconnaissance work.

According to a report in the New York Herald, certain dairies in America have installed loud speakers. It is said that an appreciable increase in the production of milk results when melancholy music is being played.

The Macmillan Arctic Expedition.

In a very decided manner, the members of the Macmillan Arctic exploration party are keeping in wireless touch with civilisation.

Quite recently the explorers were entertained with a dance programme specially transmitted from Calgary. Operator Mix, on board the exploration ship "Bowdin," states that there is no difficulty in receiving the wireless "talks" which are regularly transmitted from the Government station at Calgary.

Tell your friends about
Our Big Competition

Come in and see our

Radio Display

Information Freely Supplied

We are Sole Agents for
the World Famous

FEDERAL RADIO APPARATUS

Moderate Cost
Highest Efficiency

The
Home Electric
106a King Street, Sydney

Phone B 5565

WIRELESS APPARATUS

New or Second-hand,
Bought, Sold or Exchanged

HOWELL'S

19 Barlow Street



Receiving Messages above the
Clouds

Continued from page 10

tem has proved a distinct improvement.

In my article on "Seeing by Wireless," I predicted that in the future kinema shows would be broadcasted by radio, and shown at dozens of theatres throughout the country simultaneously. In the same manner in time to come will the music for these kinemas be transmitted.

When the perfect loud speaker is evolved, the reproduction of the human voice and musical instruments will be as perfect as the originals. Thus instead of each theatre employing an orchestra, the whole of the music will be radioed, and each instrument will be reproduced as faithfully and accurately as if it were actually being played before the audience.

Such an ideal state of affairs is not very far distant, at least in connection with the loud speaker. The slowness of progress made in the reproduction of sound by means of the gramophone cannot be taken as an indication that radio developments will be equally sluggish. The gramophone, we must remember, can only hope to create an imitation of the human voice, a sort of second-hand reproduction, but the radio loud speaker transmits first-hand to the hearer the voice of the person talking. For this reason alone, it is

MEDICAL ADVICE ON PACIFIC.

The first use of radio for medical advice in the Pacific Ocean, so far as is known, took place on July 4th, when medical attention was prescribed over several hundred miles of water by Dr. A. B. Carmichael, Los Angeles. Dr. Carmichael was a passenger on the s.s. H. F. Alexander, sailing between San Francisco and Seattle, when the radio operator picked up a medical call from the freighter Floridian, then off Puget Sound. The Floridian reported having a serious case of illness on board, and asked for medical advice for the sick sailor.

Dr. Carmichael was called to the radio room on the Alexander, the duplex telephone transmitter was turned on and a two-way conversation carried on between the doctor and Capt. Schermerhorn, of the Floridian. Late that night word came from the latter ship that the doctor's instructions had been followed and that the sailor was well on the road to recovery.

more capable of perfection, even without regard to the fact that a far greater amount of research work is being done in connection with it than has been carried out on Edison's invention.

BY RADIO CODE MESSAGES.

A new German machine for the transmission of wireless messages by cipher has been successfully tested in Berlin, says the correspondent of "The Times."

Telegrams exchanged between Dr. Hofe, Minister for Posts, and the Swiss postal administration at Berne, have been correctly decoded and it is claimed as the outcome of the experiment that no unauthorised recipient can decipher the messages.

There is no loss of time in transmission.

Tell your friends about
"Wireless Weekly"

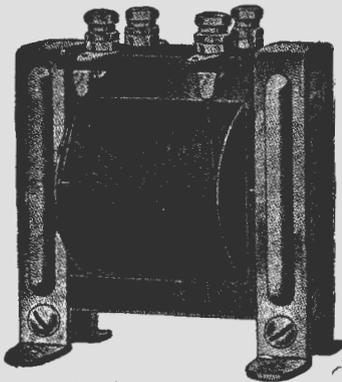
N.S.W. RADIO ASSOCIATION.

The delegates to the Association will meet at Laurel Cafe, Royal Arcade, Sydney, on Wednesday next, 19th inst., at 8 p.m.

There is special business for this meeting and delegates are particularly requested to attend.

Clubs not already represented on the Association are requested to send along a delegate to see what is being done.

T
H
E
J
E
F
F
E
R
S
O
N



T
R
A
N
S
F
O
R
M
E
R

AMPLIFYING

World's Leading Transformers stocked by Colville-Moore, Wireless Supplies, Radio House, Radio Co., A. Hordern and Sons, Ramsay Sharp, Universal Electric, Wireless Supplies Ltd., Harry Wiles and all Leading Wireless Stores

Sole Agents for Australia

FOX & MacGILLYCUDDY

DAILY TELEGRAPH BUILDINGS

KING ST., SYDNEY

PHONE CITY 3062

Wireless Cabinets

Radio Cabinets and Boxes
Base Boards, Aerials, and
all Wireless Woodwork

WHOLESALE ONLY



Harding's Limited

87-101 York Street North

Sydney

Over Argyle Cut

2 Minutes from Circular Quay : Phone 3773 City

England's Trans-Ocean Radio System

Newly Developed Group of Stations with High-Power Tube Transmitters Controlled from London Maintains Constant Service with Europe, Canada and America.



Waverley Radio Club

Broadcasting Fees.

A large batch of correspondence was read at the meeting of the Waverley Radio Club, of the 13th December, with Mr. M. Perry in the chair.

A letter from Farmers Ltd., was included, asking the Club's co-operation in the firm's broadcasting tests. The Secretary was instructed to acknowledge the letter, and say that the members would do their best.

Lengthy discussion arose from a communication from the authorities intimating that experimenters may be asked to subscribe to broadcasting companies at some future date.

At Mr. Perry's suggestion, it was resolved to write to the Wireless Institute, proposing that that institution approach the broadcasters in the matter of a nominal fee for those holding experimental licenses, so that experimenters, if they wished, could receive broadcasting free of any scruples.

The Treasurer (Mr. Marsland) presented his monthly interim report. Messrs. Burrows and Simpson were elected auditors. The following meeting being the last one in the year, the presidential and committee elections will be held. All members are requested to be present.

Discussion on technical matters closed the meeting.

Wireless Institute

N.S.W. Division.

The general meeting of the Wireless Institute this month will be held next Thursday, 20th inst., at 8 p.m., at Royal Society's Hall, 5 Elizabeth St., Sydney.

At this meeting an announcement of the result of the Exhibition will be made, and prizes won by Experimental Exhibits will be presented. All prize winners have been invited to attend this meeting.

Two of the most important of the many recent developments in radio communication, continuous-wave wireless telegraphy by means of tubes and remote control of the transmitting and receiving stations from a central city office have been incorporated in the new group of English Marconi stations comprising Radio House, London, the city control station, and Ongar, Brentwood and Carnarvon, from which high-speed commercial services are conducted between London and France, Switzerland, Spain, Canada and the United States.

The wireless stations at Ongar and Brentwood are situated in Essex, some 20 miles from London, but full control is centred at Radio House, Wilson Street, London, the relaying of signals from the land lines to the wireless transmitters at Ongar transmitting station and from the wireless receivers to the land lines at Brentwood receiving station being entirely automatic. The transmitting plant at Carnarvon used for communication to the United States is also controlled automatically from Radio House, and the signals from the United States are received at Brentwood and relayed automatically to Radio House.

The whole of the telegraphist staff is concentrated at the traffic headquarters, Radio House. Messages are thus actually dispatched from the building where they are handed in by the public, and are received at the telegraph office abroad at the same instant that the signalling apparatus is actuated in London, all the operations between the two offices being entirely automatic. Any number of commercial services are supervised by one general supervisor thus being brought under the per-
ervisor.

In the equipment of Radio House the special needs of speed and accuracy have been kept in mind, and wherever a design or piece of apparatus, has been forthcoming which could be proved to raise the efficiency of the Marconi service, that apparatus has been employed.

From the counter, in the public office, a conveyer runs into the main operating room, and deposits messages on the circulation table, which is equipped with numerous time-saving

devices. From this table each message is rapidly distributed to its proper circuit.

Having arrived at the circuit, the message is reproduced in Morse characters in the form of perforations on a paper tape. This is done by means of an instrument known as a keyboard perforator, which is operated in much the same way as a typewriter.

By the side of each of the automatic high-speed transmitting instruments is the receiving instrument for that particular service, and it is therefore possible for the operator engaged in transmission to receive immediate acknowledgment of the messages he sends.

The high-speed automatic apparatus employed in reception on the European circuits operates a printer which transforms the signal into Roman characters, and prints them on a continuous paper tape. This printed tape is drawn through a gumming machine and affixed in suitable lengths to a form ready for delivery. The message is then sent to the telephone room, or one of the private wire circuits, for immediate transmission to the addressee or to the messenger department for delivery by hand. Before passing to the messenger department the message is conveyed automatically to the "unpacking" room, where, by means of a comprehensive card index, an "unpacker" is enabled to place it in the appropriate envelope bearing the full address required for delivery.

In the card index cabinet there are 65,000 cards, each bearing full details concerning a particular telegraphic address. Many of the delivery envelopes bear addresses allocating any envelope instantly. Thus the whole process of decoding a telegraphic address and enveloping a message is a matter of a few seconds only.

One of the most interesting points about Radio House is the special provision made for express private delivery and collection where the traffic is consistently heavy. Apart from the number of telephone circuits available for the public, numerous private telegraph and telephone lines are rented by financial and commercial houses having traffic of a heavy and urgent

Continued on page 17

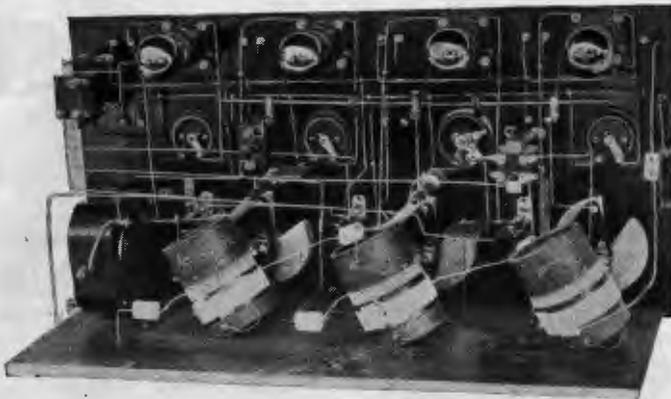
∞ HEARTY ∞

Radio Greetings

From RADIO HOUSE

May the old set behave itself and bring in the DX stuff Good and Proper, and may the Xmas Carols from Broadcasters come in sweet and clear for all the family to enjoy.

We can't wish you better luck than this.



Neutrodyne 4 Valve Set - PRICE £46. (Interior View)

IF you are not getting the best results, we may be able to help you. A small variable condenser may make all the difference

DONT forget that the young brother would think the world of you, if you were to give him a Crystal Set all for himself this Christmas.



Radio House

619 George St.

∴ SYDNEY. ∴



Crystal Set complete with Phones, Aerials, etc. - £7

Come and see the one illustrated. We have others for the Experimenter at much LOWER PRICES.

MOUNTING CRYSTALS.

The adoption of a good method of mounting of crystals is quite an important factor in their successful use, and much of the dissatisfaction which one often hears expressed regarding the performance of crystal sets originates from bad mounting.

The ideal method is probably the use of Wood's metal, provided that due care is taken not to overheat the crystal in the process. There seems, however, to be a general prejudice against this method, perhaps because it makes the substitution of a fresh crystal a slightly more troublesome operation, and screw-cup detectors are used to an extent far in excess of that which their merits really warrant. Their chief drawbacks are these; first, to grip the crystal firmly it is necessary

to apply considerable force to the screws, which often causes a fragile specimen to crumble; and, secondly, the crystal may only make contact at two or three quite small points with the cup, and these points may set up rectifying effects which oppose that produced at the cat-whisker contact.

The only really satisfactory way of mounting a crystal in a screw-type cup is to pack it in with tinfoil, tighten the screws, and then pack it all round with more foil until ample contact is assured.

BROADCASTING ABROAD.

Two new broadcasting stations have just been opened in Chile, South America. They do not commence operations until the Buenos Aires stations have finished for the evening, and one

belongs to a wealthy and ambitious amateur, who sends out a regular itemised programme. This one is at Vina del Mar, the other at Santiago de Chile.

There is a difference in time of an hour between the coast and the inland parts of Chile, hence the two new stations' tardy commencing time. Broadcasting in Italy, which, strange though it may appear in the country that produced Marconi, has previously taken rather a back seat, is now progressing very favourably.

The Government has hitherto rather cold-shouldered the idea of fostering new broadcasting stations; but the present Premier is keenly interested in radio, and great things are hoped for now that he has shown definite signs of taking steps to forward the science himself.

"Listen in" to the World



with

Volmax

Radio
Apparatus

BROADCAST SETS

ORDERS TAKEN NOW

"VOLMAX" R.C.
3 - VALVE SET

Price - - £45 10s.

"VOLMAX" Airphone
(Crystal Set)

Price - - £6 7s. 6d.

"VOLMAX" Airphone
(Senior) 1-Valve Set

Price - - - £20

WIRELESS SUPPLIES LTD

RADIO & ELECTRICAL ENGINEERS



21 ROYAL ARCADE
SYDNEY.

Phone
M 3378

Trans-Ocean Radio System

Continued from page 14

character. Some of the telegraphic circuits are operated with Teletype instruments by means of which messages are reproduced in typewritten characters at the other end of a telegraph line.

The Ongar group of wireless transmitting stations is built on a site just over one square mile in area. The site is on high ground, and in the centre of it there still exists one of the large but little known forts built many years ago for the defence of London, but since abandoned by the War Office. Near this fort is the power house which supplies all the electric current required for running the transmitters and auxiliary apparatus.

At present there are three separate transmitting stations at Ongar. One is carrying on a service with France, another with Spain and Switzerland, and a third with Canada. The aerial systems closely resemble one another, and consist, generally, of two circular cages with four wires suspended from two 300 feet self-supporting lattice towers. The antenna is not connected

directly to earth, but to an earth screen comprising a number of insulated wires supported on 30 feet lattice masts. The provision of this metallic conducting screen between the aerial and earth reduces the losses in the soil under the aerial, and results in greatly increased radiation efficiency and in stronger signals being produced at the receiving stations than would be the case with a buried earth.

The efficiency of a transmitting station, and the legibility of the signals under bad atmospheric conditions, depend largely on the steadiness of the transmitted wave. This steadiness is attained at Ongar by the employment of the independent drive or master oscillator system. The fundamental principle of this system is the control of the main oscillations, through the medium of a separate standard oscillation generator which, once adjusted to the required wave-length, maintains its adjustment with perfect constancy. The transmitting plant is actuated by high-speed signalling keys, which are themselves controlled direct from London central control office by means of land lines passing through the receiving centre at Brentwood. Due to this link

between the land line and the wireless plant telegraph operators are unnecessary at the wireless station.

The receiving station at Brentwood is less imposing in appearance than the Ongar transmitting station, because it is possible to carry on reception with much smaller aerials than are required for efficient transmission. The circuits are so arranged that simultaneous reception can be carried on from four continental stations and from six trans-Atlantic stations. The latest devices for filtering out atmospheric are in successful operation in a new type of receiving apparatus.

Special attention has been paid in the design of the apparatus to its operation under adverse atmospheric conditions, and to the maintenance of the adjustment with the minimum of attention. Here, again, there is no need for telegraphists, owing to an automatic linking device, and the duty of the attendant in charge of each set is merely to adjust and maintain it in such condition that clear signals of maximum strength are passed to the land lines for operating the recorders installed at the central control office in London.

Quality Radio Supplies

BESIDES Complete Sets for Listening on Farmer & Co., Broadcasters (Sydney) Ltd. Stations, we are still catering for the Amateur and Experimenter, and carry a comprehensive Stock of all component parts

Many New and Interesting Lines

WE PAY CARRIAGE

SEND FOR PRICE LIST POST FREE

W. HARRY WILES

Electrical and Wireless Supplies

60-62 Goulburn Street, Sydney

One Door From Pitt Street

Application for Membership.

Members are urgently needed and those who have not already joined up are requested to fill in the following form and forward it, together with a postal note covering fees, to the Hon. Secretary, "Milano," Edward St., Concord.

A.R.E.L. APPLICATION FOR MEMBERSHIP.

The Secretary,
Aust. Radio Relay League,
N. S. W. Division. 192

I,
of
beg to apply for admission as Active Member of the Australasian
Radio Relay League If accepted I agree to abide by the rules
and regulations of the League.

License No. Date of issue
Address at which Station is maintained
Postal Address of applicant
Particulars of License (transmitting or receiving)
Power of Station (if transmitter) I enclose herewith
being payment of fees for one year.

Usual Signature
Active membership only to persons operating transmitters for League.
Associate membership to holders of receiving licenses.

Qualifications for membership.

(A) A bona fide interest in wireless; (B) Holder of an experimental
license.

P.S.—This form must be accompanied by one year's subscription (ac-
tive member £2/2/-; associate member 10/6) and forwarded to
J. W. ROBINSON, Hon. Secretary, "Milano," Edward St., Concord.

Buy Your Xmas Gifts

at E. R. Cullen's

Electrical Supply Shop

Everything Electrical Supplied, Installed, and Maintained
also Complete Sets for Listening-in on Farmers & Co.,
and also Broadcasters (Sydney) Ltd. Stations.

A splendid range of Globes and Electric fittings

Call and Inspect our Stock of Christmas Gifts.

E. R. CULLEN, LATE
A.I.F.

96 Bathurst Street.

PHONES: CITY 869 AND 2596

World Stations

Wireless Weekly has been successful in securing a list of the principal wireless stations in the world, together with the times of operation and the matter broadcasted.

The Sydney mean time is given after the military style.

The figures 0000 represent 12 o'clock midnight; 0340 is 3.40 a.m.; 1640 is 4.40 p.m., etc.

Further lists will be published in each of our succeeding issues

Time. (Sydney)	Name.	Call.	Wave.	Type.	Remarks.
0200	Paris	FL	7,300	CW	European weather report.
0200	Tours	YG	5,500	CW	Press for Bucharest.
0200	Leafield	GBL	8,750	CW	Press.
0200	Moscow	MSK	5,100	Spk.	Working with PCG (Sambaak).
0230	Carnarvon	MUU	14,000	CW	Press.
0255	Annapolis	NSS	17,145	CW	Time signal and weather report.
0330	Tours	YG	5,500	CW	Press for Bucharest.
0340	Bandoeng (Java)	PKX	8,800	CW	Working with PCG (Sambaak).
0355	Balboa	NBA	10,100	CW	Time signal and press.
0400	Paris	FL	6,500	CW	Working with FF (Sofia).
0400	Paris	FL	5,000	CW	Calibration waves (3 minute dash on 2nd and 16th of each month).
0400	Moscow	MSK	5,100	Spk.	Press.
0400	Bucharest	BUC	7,000	CW	Working with OHD (Vienna).
0410	Paris	FL	7,000	CW	Calibration waves (3 minute dash on 2nd and 16th of each month).
0420	Lyons	YN	10,000	CW	Calibration waves (3 minute dash on 2nd and 16th of each month).
0430	Belgrade	HFB	4,600	CW	Weather report.
0430	Lyons	YN	15,000	CW	Calibration waves (3 minute dash on 2nd and 16th of each month).
0430	Nauen	POZ	9,400	CW	Working with MSP (Moscow).
0440	Gibraltar	BWW	4,800	CW	Weather report.
0445	Lyons	YN	15,000	CW	Exact values of calibration waves sent on 2nd and 16th of month.
0450	Christiania	LCH	8,000	CW	Norwegian weather report.
0450	Bucharest	BUC	7,500	CW	Roumanian weather report.
0450	Malta	BYZ	4,500	CW	Weather report.
0500	Air Ministry	GFA	4,100	CW	Weather report.
0500	Paris	FL	7,000	CW	Working with BUC (Bucharest).
0500	Rome	IDO	11,000	CW	Calls CQ, then works with IHM, ICW, IRB.
0500	Eilvese	OUI	9,600	CW	Press.
0520	Paris	FL	7,300	CW	French weather report.
0540	Konigswusterhausen	LP	5,700	CW	German weather report.
0545	Mediouna	CNM	5,000	CW	Moroccan weather report.
0550	Konigswusterhausen	LP	5,700	CW	European weather report.
0555	Bordeaux	LY	23,450	CW	Scientific time signals.
0555	San Diego	NPL	9,800	CW	Time signal.
0600	Paris	FL	6,500	CW	Working with HB (Belgrade).
0600	Leafield	GBL	8,750	CW	Press.
0600	Air Ministry	GFA	4,100	CW	Weather report.
0600	Bordeaux	LY	23,400	CW	Scientific time signals.
0605	Konigswusterhausen	LP	5,700	CW	European upper air report.
0610	Paris	FL	8,000	CW	Press in French.
0620	Sidi Abdallah	FUA	5,150	CW	North African weather report.
0630	Bordeaux	LY	23,450	CW	Press in French.
0630	Nauen	POZ	9,400	CW	German press (repeated on 4,700 ICW).
0630	Lyons	YN	15,100	CW	Press in English.
0630	Paris	FL	6,500	CW	Working with VSL (Vasluin).
0630	Prague	PRG	4,500	CW	Czecho-Slavokian weather report.

Salvation Army's Enterprise

FIRST WIRELESS CONCERT

What was said to be the first actual broadcasting of band music in Adelaide took place at the Salvation Army Citadel, Pirie Street, on Thursday evening. The concert, which was arranged by Envoy J. Boase, in connection with the band festival week, aroused considerable interest, and in addition to 1000 people who were accommodated at the Citadel, hundreds were listening in at the receiving sets throughout the State, and as far afield as Hobart, where it is stated the items could be heard quite clearly. A number of people had gathered by invitation at the Bald Motor and Electrical Works, in Pulteney St., where special arrangements had been made for them to listen to the concert in the large work-rooms at the rear of the garage. The items were heard with uncanny clearness. There were a number of band selections on the programme, and it was notable that there was no blurring of tone values in the transmission from the Citadel. A piano and clarinet duet, by Masters Durdin and Wigney, was remarkably sweet, and the cornet and euphonium items were much appreciated. Miss Ada Wordie's rich soprano voice rang out with all its accustomed brilliance of tone, and the faultless diction of the artist was exactly reproduced. A duet from "Il Trovatore," in which she sang with Mr. Walter Wood, was a feature of the performance. In "Trot Here and There" she was associated with Mr. Sable Grivell, and she sang with Miss Ivy Grivell. Messrs. Grivell and Wood contributed solo items and a duet, "The Battle Eve"; and Miss Gladys Percival's recitations were full of expression, which amply compensated for the lack of gesture to those listening in. The concert had been divided into two parts, Colonel Dutton presiding over the first section of the entertainment, which was opened with prayer by Adjutant Adams. During the second half of the programme, Mr. A. E. Gerard was chairman. Those taking part, in addition to the artists already mentioned, were Miss Olive Cox (piano solo), Miss Lorna Harris, the Unley Songsters, Adelaide and Unley Citadel bands, Bandmaster W. Baldock, the City Songsters, and Bandsman C. Horskins. Mr. E. A. Taylor, manager of the radio department of the Bald Motor Works, was in charge of the excellent transmitting arrangements.

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

Your inspection 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.



Broadcast License Forms

*May be obtained from
the following firms:—*

L. P. R. BEAN & CO.,
229 Castlereagh Street.

CONTINENTAL RADIO CO.,
Equitable Building, George Street

COLVILLE-MOORE WIRELESS SUP-
PLIES, 10 Rowe Street.

ELECTRICITY HOUSE, 387 George Street

HOME ELECTRICS, 106a King St., Sydney

N. P. OLSEN, 18 Hunter St., Newcastle

O. H. O'BRIEN & NICHOLL, 37-39 Pitt St.

PITT, VICKERY, Ltd., 335 Pitt Street

PACIFIC RADIO CO., c-o. Edgar A.
Henry, 121 Pitt Street, Sydney

RADIO HOUSE, 619 George Street

RADIO COMPANY Ltd., 15 Loftus Street

RAMSAY SHARP & CO. Ltd., George St.

UNIVERSAL ELECTRIC CO., 244 Pitt St.

UNITED DISTRIBUTING CO., LTD.
28 Clarence Street

WIRELESS SUPPLIES Ltd.,
21 Royal Arcade

W. HARRY WILES, 62 Goulburn Street

*Further Lists will appear each
week as Agents are appointed.*

Published by W. J. Mac'ardy, of 58
Murdoch St., Cremorne, for the Pro-
prietors and Printers, Publicity
Press Lt., 33/37 Regent St., Sydney.

COL-MO RECEIVING SETS

Broadcast and Experimental

1 Valve from £16 to £20

2 Valves from £25 to £30

3 Valves from £37 to £45

4 Valves from £42 to £50

The above sets complete with Batteries, Insulators, Aerial Wire, etc.

Loud Speakers from £3 15s. to £17 10s.

Broadcast Sets will respond to both Broadcasters (Sydney) Ltd. and Farmers' wave length.

Buy your Christmas Gifts Now.

For further information call or write to

The Colville-Moore Wireless Supplies

Specialists in Radio Receiving Set Parts
10 ROWE STREET, SYDNEY

WRITE US FOR PRICE LIST OF OTHER RADIO APPARATUS

YOUR DEALER CAN SUPPLY

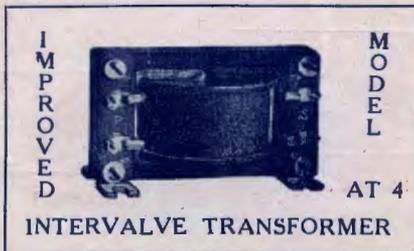
RADIO TRADE MARK GOODS

TO
ELIMINATE
NOISES



TO
INCREASE
VOLUME

The only Transformer the Core (Lamination Plates) of which is properly Insulated to ensure distortionless Amplification.



A Test shows these to give better results with the new dry cell tubes C 299 and equal results with 4 or 6 volt tubes to any transformer on the present market.

SOLD BY ALL LICENSED RADIO DEALERS THROUGHOUT AUSTRALIA & N.Z.

Ask for Bulletin F1.

PRICE 30/- Throughout Australia

Manufactured by CLARKE & HAGBLOM 165 Cardigan St., CARLTON, VICTORIA and

Sole Representative for N.S.W. : JOHN V. REX, 82 PITT STREET, SYDNEY.

BROADCAST RECEIVING SETS AND LICENSE FORMS

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

Radio House

619 George Street Sydney
Telephone: City 1487.

Ramsay, Sharp & Co. Ltd.

217 George Street, Sydney.
Telephone: City 3176.

United Distributing Company Ltd.

(Wholesalers)
28 Clarence Street, Sydney.
Telephone: City 3566.

W. Harry Wiles

60-62 Goulburn Street Sydney.
Telephone: City 3688.

Wireless Supplies Ltd.

21 Royal Arcade, Sydney
Telephone: M 3378.

Pitt, Vickery Ltd.

335 Pitt Street, Sydney
Telephone: City 6053.

E. R. Cullen

96 Bathurst Street
Telephones: City 869, 2596.

Radio Company Limited.

15 Loftus Street, Sydney.
Telephone: B 5586.

L. P. R. Bean & Co.

229 Castlereagh St., Sydney.
Telephone: City 353.

Colville-Moore Wireless Supplies

10 Rowe Street Sydney.
Telephone: B2261.

Continental Radio & Electric Company

Equitable Buildings, George St., Sydney
Telephone: B 2467.

The Home Electric

106a King Street, Sydney.
Telephone: B 5565.

Pacific Radio Co.

Temporary City Address:
2nd Floor, 121 Pitt St., Sydney.
And 38 Donnelly St., Balmain.

O'Sullivan's Electric Shop

(Frank E. O'Sullivan)
296 Pitt Street, Sydney.
Telephone: City 8070.

Swains

119-123 Pitt Street, Sydney.

N. P. Olsen,

18 Hunter Street, Newcastle.