

RADIO

IN AUSTRALIA
& NEW ZEALAND

Incorporating "Sea Land and Air"

VOL. I.

JANUARY 9, 1924

No. 21



Louise Lorraine, Universal Film Star, is evidently enjoying her talk over the radiophone.

Registered at G.P.O., Sydney, for transmission by post as a newspaper.



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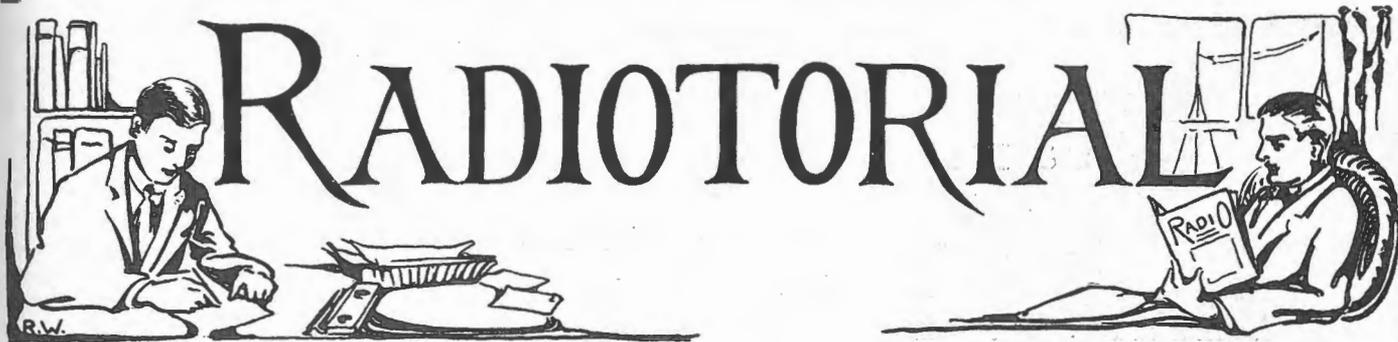
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RADIOTORIAL

1924 A Real Radio Year

IN reviewing the tremendous strides made in Wireless during 1923, it seems that the New Year will prove to be even more progressive than the last.

PARTICULARLY does this apply to Australia and New Zealand.

DURING the year just ended, much has been accomplished. Regulations for broadcasting in Australia were drawn up and gazetted. Two broadcasting stations in Sydney were erected. One was officially opened and is now providing a daily service, while the other station is carrying out tests preparatory to operating regularly. Shortly, other broadcasting stations will be erected in every state of the Commonwealth.

THAT experimental wireless also developed was demonstrated at the recent Wireless Exhibition in Sydney. It was a brilliant success. Experimenters certainly showed they could build and operate most efficient apparatus.

THE commercial side of Wireless also advanced considerably, and much is expected from this direction in 1924.

INDICATIONS are that we will see many new and wonderful developments in wireless generally during the forthcoming year.

CABLE news published in the press last week states that Dr. Willis Whitney, research engineer of the General Electric Company of America, demonstrated the lighting of electric lamps by current transmitted by wireless!

AN entertainment broadcasted in the United States of America was received in London and re-transmitted, so that every one with a simple receiver in England was able to hear the entertainment practically simultaneously with listeners-in in America!

THE same cable states that great progress is prophesied in 1924. It is predicted that Signor Marconi's experiments with directional wireless will revolutionise wireless communication generally.

AND so, we are now on the threshold of what should be a record wireless year.

EVERY experimenter and listener-in, in fact, everybody interested in wireless, should endeavour to make the progress in this part of the world a significant success. This will surely be realised if everybody co-operates towards the ideal of making 1924 a real progressive and successful Radio year, especially throughout Australia and New Zealand.

Broadcasting of Plays

FOR the first time in Australia a legitimate stage play has been broadcasted.

THE first test took place on Thursday evening, January 3, and further tests were carried out on the next two days, Friday and Saturday.

J. C. WILLIAMSON, LTD., hold the distinction of being the first theatrical firm in Australia to have one of their productions broadcasted.

THE play, "A Southern Maid," at Her Majesty's Theatre, Sydney, was the performance selected for the tests.

FARMER & COMPANY, of Sydney, hold the distinction of being the first to actually broadcast a musical play in Australia.

IT was from their high-power broadcasting station, 2FC, at Willoughby, that the transmissions were so successfully effected.

THAT the transmissions were perfect is evidenced by the fact that every word spoken and sung on the stage was plainly audible, as well as the music and the applause from the audience.

THESE tests open up a very wide field of possibilities for broadcasting in Australia.

THE man on the land, hundreds of miles from the city and nearest theatre, can now, by means of a broadcasting receiver, sit at home after his day's toil and listen to the productions at Her Majesty's, The Criterion, or any other theatres that are connected up to the transmitting station as well as the general programme.

IT seems that we in Australia will soon be able to hear world famous artists performing in London, Paris or New York.

WHAT is known as re-broadcasting can effect this today, but the day is not far distant when we should be able to hear these artists and musical performances direct without re-broadcasting.

BUT there is a whole wealth of wonderful entertainment here in Australia which will soon be on the air for subscribers to the various broadcasting services.

"2FC"

Farmer's Broadcasting Service

Elaborate Studios

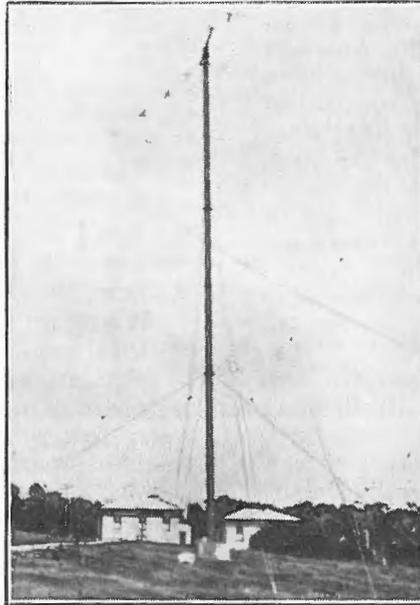
(Exclusive to "Radio.")

IN a previous issue of *Radio*, a full description of the big, high-powered station which has been erected at Willoughby, Sydney, for use in connection with the broadcasting service established by Farmer & Company, Limited, was given.

During the past few days a series of tests have been carried out from this station, and some exceptionally fine results have been achieved. Experimenters in all portions of the State have been unanimous in declaring that the speech and music which has been received has been of excellent quality, and that Farmer & Company, Limited, have at last shown Australia what can really be accomplished in connection with wireless telephony.

It has already been explained that the actual broadcasting of speech and music transmitted from Farmer & Company's broadcasting station is not provided at the station itself, but is given in special studios which have been constructed on the roof of the Company's premises in Pitt Street. These studios compare very favourably with any others in the world, and are most assuredly the best in Australia. Their design was decided on after consultation and communication with the world's broadcasting experts, and while embodying the sound scientific principles of many of the world's big broadcasting studios, they do not include the slight faults which have been discovered in some of the structures erected overseas. Built of special sound proof bricks,

lined and padded, with floating floors, sound proof windows and special double sound proof doors, and a ventilating system which ensures the circulation of air without the entry of noise, they represent the last word in modern studio construction.



Flinders Island Radio Station.

The main instrument room, into which the sound collected by microphone from the studio is delivered and "stepped-up" and from it is transmitted by land line to 2FC at Willoughby, adjoins both the large and small studios and runs the full

breadth of both. The large amplifying panel is placed between the windows of the studios, and consequently the engineer is able to operate the apparatus, and watch the progress of the concert from the one position, no matter which studio is being used. The instrument room includes an array of telephones which enable communication to be maintained with all points of the service at the transmitting end with a minimum amount of delay. On the amplifying bench small switches thrown in the various lines to the theatres and public halls of the towns are used when theatrical entertainments are being transmitted. A double bank of batteries rests on special shelves in a zinc lined corner of the room, and a neat charging board with fittings nicked, makes the operation of all very simple. A small 500-watt transmitter for use in connection with the Junior Service is now being installed in another portion of the instrument room, and this, together with the receiving apparatus completes the equipment.

The studios themselves are draped and carpeted, are fitted with hanging lamps and are beautifully furnished. They are entered from a special reception room nicely decorated and furnished in drawing room style. The heavy expenditure which has been necessary in order to establish the studios, stations and the service demonstrates very clearly the confidence which the Directors of Farmer & Company, Limited, place in the future of broadcasting in this country.

Coloured Photo's Radioed

HITHERTO, it is reported, ordinary black and white photographs have frequently been transmitted per Radio, but now a marked step in advance of this has been made by the sending of coloured photographs from one station to another. This

feat has just been accomplished in America.

Signor Marconi recently foretold the sending of photographs round the world by wireless, and judging by this latest successful experiment, the

time will not be long in coming when Australian newspapers will be publishing photographs of events occurring on the other side of the world; but a few hours after they have occurred.

Early Radio Work in America

IN the early days of radio, following the splendid achievement of Marconi in transmitting the letter S across the Atlantic, scientists and engineers in England and America believed that reliable, long-distance transmission and reception could be obtained by increasing the power on the antenna and by building higher antenna masts. As much as one hundred kilowatts were used on spark sets and the masts were sometimes 500 feet high.

Mr. J. T. H. Dempster, an engineer in the research laboratory of the General Electric Company at Schenectady, N.Y., and a pioneer in the field of radio, explains that the American amateurs are to-day communicating with English amateurs with 1000 times less power than was used with indifferent results twenty years ago. "Insensitive receiving equipment," says Mr. Dempster, "was the cause of uncertain reception, and it was not until the vacuum tube came into its own that rapid progress was made.

Back in 1904, a few years ago after Marconi startled the scientific world with his experiment that promised to revolutionise long-distance communication, the General Electric Company engineers were actively interested in the new art and they, like others, tried for a long time to offset the shortcomings of receiving apparatus by boosting the power at the transmitting end. R. A. Fessenden, formerly a professor at the University of Pittsburgh and then head of the National Electric Signalling Company, was engaged to instal transmitting and receiving equipment at the Schenectady, N.Y., and Lynn., Mass., plants of the General Electric Company with the expectation that this method of communication would replace the telegraph and telephone lines.

Mr. A. A. Isbell, now Pacific Coast manager of the Radio Corporation of America, was placed in charge of the installation by Mr. Fessenden. A spark transmitter of the straight gap type was built. In order to keep the gap from arcing it was necessary to blow air across it at about 100 pounds pressure. The power was supplied by a 20 Kw transformer

charging a condenser composed of steel plates, separated by glass plates, all immersed in oil in a steel tank. A special relay breaking a very large current in the primary circuit was designed by Mr. Dempster, in cooperation with Mr. Isbell. In operation air was blown across the carbon contacts of the relay. Because of the high potential in the antenna it was

RECORD AUDIENCE.

When General Smuts delivered a notable speech on European problems in London recently, he had a record audience of a million "listeners in."

Commenting on the fact the "Manchester Guardian" said:—

"The event was very significant. For the first time, hundreds of thousands, who never attend meetings, heard every word of the vital oration of a great statesman.

"The effect of the speech has been astonishing, and it is everywhere discussed, many realising the imminence of the European crisis for the first time.

"If they hadn't listened-in, most of them would not have known about it."

What a striking testimony to the value of radio broadcasting! In a little over 12 months it has reached tens of thousands of people who, on a great daily paper's own admission, could never otherwise be touched.

possible to draw sparks from any insulated conductor within 100 yards of the masts. The antenna mast was 180 feet high and 95 amperes were used in transmission.

The receiving apparatus consisted of the famous Fessenden liquid barretter, or, in better known terms, the electrolytic detector, which was used in connection with the Fessenden interference preventer circuit. The electrolytic detector consisted of a platinum wire coated with silver. This was known as Wellaston wire. The silver coating gave mechanical strength to the wire, which was less than ten thousandths of an inch in diameter. The nitric acid in a platinum cup into which the wire dipped formed the electrolytic. The platinum cup was the other pole of the cell.

The electrolytic detector was a marked advance over the Marconi coherer, but it was still much less sensitive than the crystal detectors now in use. Static frequently burned the point from the platinum wire, temporarily destroying the use of the detector.

With this equipment sporadic communication was established between the two plants of the company during the cold months but reception was very uncertain in the summer. In efforts to improve transmission more power was used without improving reception. The test signal used by the operator in the two cities was the letter D a long dash and two shorts, repeated hour after hour at a stretch. This became so tiresome that Mr. Dempster built a motor driven transmitter set for Schenectady and the machine relieved the tedious work of the operators.

The headphones adopted were especially made according to the Navy standard, and they were wound for the first time with enamelled wire. These 'phones were about one twenty-fifth as sensitive as the cheapest headphones on the market to-day.

In the early days of radio the signal acted directly on the receiving apparatus, whereas to-day, by means of circuits and B batteries the signal is magnified from one to 25,000,000 times, the signal acting as a valve to regulate the B battery current. Back in the old days signals were occasionally received when fifty kilowatts were impressed on the antenna, using 100 feet masts. To-day, an operator in Lynn with a three-bulb receiving set can get Schenectady signals 1000 times stronger than was possible in 1903 and that from a transmitter using but five watts and a mast fifty feet high.

At the same time experiments were being carried on in Schenectady and Lynn. Prof. Fessenden was operating two very high-powered stations, using 100 kilowatts with 480 feet steel masts and umbrella antenna. One of these stations was located at Brant Rock, near Plymouth, Mass., and the other was at Machrihanich, Scotland.

Robinson Crusoe the Second

Life on an Eleven Acre Island

Wireless Operator's Lonely Post

WHAT it feels like to live for six months at a time on an island whose highest point is 28 feet above sea-level and whose circumference can be covered in 15 minutes, makes interesting hearing and in being told this week to *Radio* by Mr. K. Lawry, the tale lost nothing in the telling.

Mr. Lawry has just been relieved from continuous duty as officer-in-charge of the wireless station on Willis Island, which is about 300 miles east of Townsville, and perhaps one of the loneliest and most desolate spots in the Southern Seas. Almost perfectly flat, with an area of 11 acres, the outpost is sparsely covered with long, coarse, brown grass, while here and there, breaking through the earth's crust, may be seen the volcanic rocks of its origin. A few miles away and it is impossible to see the land.

As a wireless receiving point Willis Island is very nearly perfect all the year round, and it is possible to "hear" vessels all up and down the East Coast. Conditions on account of its situation make the station peculiarly suitable for the gleaning of meteorological information, and being thoroughly equipped with a complete scientific installation, this additional factor of the station's usefulness, is greatly appreciated by the residents on the mainland. Readings are taken daily at 9 a.m., 3 p.m., and 9 p.m., during the "off" season, but in the cyclonic period, of course, much more frequently, and these reports are wirelessed to the mainland.

Quarters for an operator and caretaker, together with the aerial poles are the only break in the island's flat contour, while the six-monthly supplies of food are "cached" in an underground "dug-out," together with the benzine and other stores. Tanks of 6,000 gallons capacity provide the drinking water—that is, if

there is any rain, which generally is not the case. During Mr. Lawry's sojourn of six months the rainfall totalled two inches 93 points! Nor is the hardship of shortage of water in any way alleviated by the clouds of dust and sand which are continuously blowing about the island during the dry periods.

Goats provide the two inhabitants with milk, and most vegetables are

Despite the presence of Man, thousands of seagulls, cormorants, and many other kinds of sea-birds make the island their nesting and resting place, so that at evening and early morn the air is made hideous by their raucous cries, while all over the island wherever one goes, one comes upon their eggs.

Besides the natural features of the island, which lend themselves to re-



General view of the wireless station and quarters on Willis Island. Additional to the wireless staff two men, the other life on Willis Island is plainly visible in the shape of thousands of birds!

grown in a kitchen garden of respectable dimensions.

Some additional idea of the chronic loneliness of this spot may be gained from the fact of the sighting by Mr. Lawry of but one vessel during the whole time of his long vigil—a Japanese lugger which put in for water.

Fish forms an important item of the daily menu, and to catch them in the surrounding waters where they swarm is merely a matter of throwing in and pulling out a baited hook and line.

creation such as swimming, etc.,—but not far out!—the surrounding waters fairly bristling with sharks, is a concrete tennis court upon which many a hard fought "game and sett" is hammered out.

In conclusion, if there be any who doubt the advantages of life on an eleven-acre island with nothing but a mate and the goats and the sea-birds for company, we would refer them to Mr. Lawry; he looks the picture of health and fitness and must tip the beam at anything around 16 stone!

General Information

Long-Distance Messages — England-America-Australia.

An Ambitious Proposal.

The success achieved by Australian experimenters in the reception of low-power wireless signals from America has fired the enthusiasm of a number of Australian amateurs to attempt something far more ambitious.

Briefly the proposal is that messages from England to Australia should be relayed through America, the whole work being carried out by amateur stations in the three countries.

An effort will be made to arrange for one of the several high-power amateur stations in England to transmit messages to experimental stations on the east coast of America, from whence they will be relayed across the Continent to powerful amateur stations in California and thence flashed across the Pacific to Australia.

Mr. S. M. Newman, one of the best known of Australian experimenters, who is now in England and will shortly return to Melbourne via America has been asked to assist in making the arrangements.

By the middle of next year it is hoped to have a reliable relay route between England and Australia and

in that event the King will be asked to send a message to the Governor-General through the amateur stations.

Later on it is hoped that as a result of the experience gained in the test now under consideration it will be possible to undertake the direct reception of messages transmitted by English experimental stations.

* * *

Do Buildings Interfere with Wireless Signals?

The question is often asked: Does the proximity of buildings interfere with the reception of wireless signals?

If they contain large quantities of metal and are situated close to the receiving aerial and in line between it and the transmitting station they will absorb some of the energy from passing waves and thus weaken the signals proportionately.

This "screening," as it is generally termed, is frequently experienced in cities where receiving aeriels are erected in the neighbourhood of high buildings which contain large masses of iron and steel. So far as ordinary houses are concerned they do not contain sufficient metal to interfere with wireless signals to any serious extent.

Wood, bricks, motor and slate are non-conductive of electrical energy, and wireless waves pass through them quite easily without losing any appreciable amount of energy.

* * *

The Length of a Wireless Wave.

So many beginners in wireless are confused over the meaning of wave-length that a simple explanation of how the length of a wireless wave is measured is bound to prove of interest.

The length of a wave is the distance from the crest or top, of one wave to the crest, or top, of the next one. In other words, the wave-length is the distance between any two adjacent waves in a series of waves. This distance is calculated by reference to the speed at which all waves travel. This speed is estimated at approx. 186,000 miles per second, which, translated into metrical units is equal to 300,000,000 metres per second. Thus it follows that by ascertaining the frequency at which wireless waves are transmitted from an aerial it is possible to calculate their length by dividing the speed by the frequency.



Two fair bathers at Neptune Beach, California, receiving all the latest news and music while displaying their latest in bathing costumes. It should not be long before similar sights on Australian beaches will be common.

Wireless Transmission of Power.

By G. J. W.

WHAT in your opinion will be the next important development in wireless?"

This is the question which was thrown at the writer as he joined a group of wireless engineers recently. The nature of the question indicated that something extraordinary was occupying their minds. Even to them, trained as they were in radio work, they would not be easily surprised by the wonders of wireless. As a matter of fact, they had all just taken part in the test of duplex wireless telephony apparatus which had been landed and the success of which had given rise to the question, "What next?"

The query was answered promptly and without hesitation "the transmission of power by wireless."

Although the listeners were, one might say case-hardened against surprise as to what wireless will do or will not do, it was not altogether strange that the answer should be received in comparative silence. Their attention had been concentrated upon the telephone apparatus, and in the circumstances the suggestion was not readily assimilated.

But after all is the idea so very far-fetched? It is relatively a very short time back to Hertz' experiments and still less to Marconi's practical application of ether waves, and continued development at the same rate of progress for another quarter of a century will certainly include the transmission of power by ether waves!

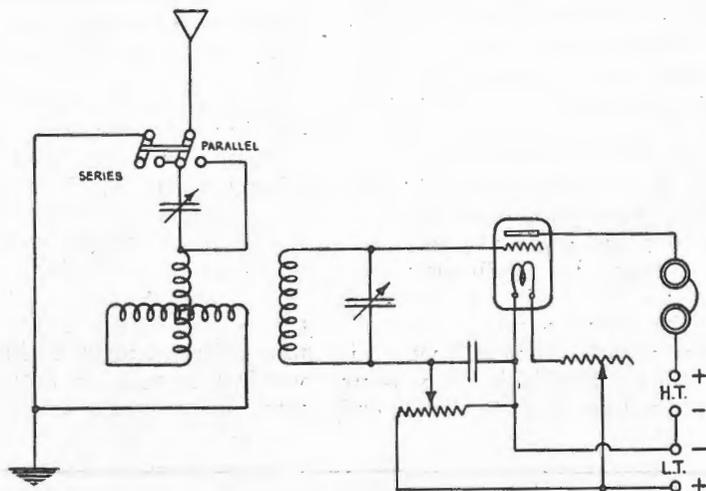
The writer has actually seen the tuning lamp of one ship illuminated to full brilliancy by signals transmitted from another ship, certainly the ships were comparatively close together, but the fact remains that although the energy consumed was trifling, what there was of it was transmitted by means of ether waves.

It is doubtful whether the wonders of resonance, especially electrical resonance, are wholly understood, or whether the effects are measurable or even controllable; we do know that

without this phenomena the receptive qualities of wireless receiving apparatus would be considerably less, hence we are faced with the conclusion that we augment the ether waves received by an aerial by some peculiar property of the circuit without drawing upon an outside source of energy, it looks as though we are getting "something for nothing."

ance where vibrations are a few per second. What the possible effect of electrical resonance with vibrations at thousands or perhaps hundreds of thousands per second is no one can estimate.

Professor A. M. Low in "The Nineteenth Century and After" suggests wireless telephony, sight, heat, power and writing, and adds the wireless



INDUCTIVELY COUPLED VALVE RECEIVER
USING
RECTIFYING VALVE and GRID POTENTIOMETER

What secrets the phenomena of resonance has in store for us it is hard to suggest. Certain instances of its power are already known, such as the collapse of a building vibrating in resonance with mechanical vibration—the dangerous vibration set up by the uniform marching of a body of soldiers over a bridge, the peculiar sympathy exhibited by vases, pictures and lamp globes to certain notes struck on a piano. These are all well known instances of mechanical reson-

controlled torpedo equipped with a wireless sighted periscope, as well as wireless controlled tanks and aeroplanes are all probable developments in the near future.

If the idea of the universality of ether waves is grasped, imagination can truly run riot without fear of over-stepping the bounds of reason for with the transmission and control of ether waves a reconstruction of practically every phase of the world's activities must follow.

Wireless as a Profession

By KWAT.

WIRELESS is probably the most modern profession of the day. It is a profession that has not only come to stay, but has most wonderful possibilities of expansion, and a power to do good, perhaps second only to that of medical research.

Its adaptability as a modern utility is all embracing. One has but to peer into the dim future and visualize, as it were, wireless, developed as the wonderful present day progress foretells. The question that then presents itself is, "Just where will this marvel of the age extend to?"

As wireless development proceeds, it appears more and more as one of Nature's greatest gifts. The day is surely coming when it will be available to all mankind, high and low, rich and poor. Into lives that were previously commonplace it will shed the light of progress.

Many of these deeper and finer points are, perhaps, not realized by many of those adopting wireless as a profession. While the practical use of wireless is fortunately becoming so simple that the layman will be able to employ it to his own particular advantage, there still remains an ever-extending field open to wireless workers. It is this radio profession that we, the pioneer wireless operators of to-day, must carefully cherish, not only for our own benefit but that of posterity. We must do our best to win from the world at large recognition similar to that enjoyed by many of the older professions.

From a marine viewpoint the altruism of wireless operators has been legion. The grand traditions of the sea have at all times been manfully upheld, by the men, many of them mere youths, who have stuck to their posts until the last.

It behoves each and every one of us to make a great effort to win from the world that respect which is due to wireless, and to firmly establish it upon a pedestal, from which, unfortunately, some by their own selfish desires for personal aggrandizement attempt to drag it.

Now, wireless operators, engineers, and experimenters, should cultivate a professional dignity by the golden gift of silence. Let us anchor our pride in our splendid profession to that beautiful rock of tradition which has been so nobly laid by many

of our colleagues now sleeping the sleep of a life nobly and cheerfully given.

Surely a profession that makes an appeal to the best in human nature deserves a better fate than being made ridiculous before the cold eyes of unsympathetic strangers.

Radio Music for Hospital Patients.

An overseas exchange records that in Hahnemann Hospital, Philadelphia, there are no less than three loud speakers and 350 headsets for the entertainment of convalescent patients.

Dr. John H. Smith, Superintendent of the Hospital, is enthusiastic over the way in which radio has brightened the lives of his patients.

"Radio is now considered a part of the hospital," he said, "and when a patient comes here he or she expects

was installed they have had ocular proof of the brightening influence of radio on patients who are slowly being nursed back to health after long periods of illness."

The set is of the single-circuit type using a forty-three plate variable condenser, a vario-coupler, one detector, two stages of audio frequency amplification and one of radio frequency amplification. It was built by the men in the Hospital and the total cost of the installation amounted to



Patients enjoy radio music.

to be able to 'listen in' as soon as they are able. If the set happens to be out of commission for ten minutes there is a chorus of complaints from the patients whose enjoyment of the programme has thus been interrupted.

"Many of the nurses were sceptical of the idea at first, but since the set

about 2000 dollars. It is operated by the telephoniste, who simply swings round in her chair at the appointed time and "tunes in."

"It is the best 2000 dollars' worth ever spent on the hospital" is the verdict of all concerned—doctors, nurses and patients.

Notes and News

The British Broadcasting Company has agreed to pay royalties to the Society which represents composers, authors and publishers under the title of the Performing Rights Society. This royalty will cover all copyright songs and music broadcasted, and will be retrospective. It will place the Company in a very sound position and enable it to transmit high-class programmes for the entertainment of its patrons.

* * *

A keen desire to erect their aerial at the earliest possible moment, and lack of suitable timber out of which to construct the masts led two youths at Cardiff (Wales) to select a larch tree from a wood belonging to Lord Tredegar for the purpose. The law did not uphold them, however, and they figured in a police court action some little time later. Moral, one should never allow one's enthusiasm to cloud common-sense.

* * *

At a police court in England recently a Greek shipmaster was fined £50 and 20 guineas costs for wilful disobedience of Board of Trade regulations regarding wireless apparatus. Orders had been issued to him to have his apparatus overhauled, but he put to sea without complying with the instructions.

* * *

The Music Publishers' Association of America has now decided that it will no longer object to the broad-

casting of copyright music without fee.

The Association includes most of the big publishers and in its latest decision it is backed up by Producing Managers' Association.

A decision to ban the broadcasting of copyright music was recently arrived at by several broadcasting stations, and the publishers realised that they stood to lose by such a move. It has been demonstrated that the broadcasting of music increased the sales.

MARCONI'S LATEST.

As a first step towards secret wirelessing, Signor Marconi hopes soon to transmit wireless beams, which will not be capable of being tapped except at points between the sending and receiving stations.

This announcement has been made in connection with the tests at present being carried out in trans-Atlantic telephoning. The development would revolutionise wireless communications.

Apparently as a satisfactory result of a visit of inspection paid by Gen. Sir Harry Chauvel to the disused wireless station known as the Randwick (Sydney, N.S.W.) Wireless Station, Mr. E. K. Bowden, Minister for Defence, stated last week that the buildings will shortly be taken over by the Air Force.

* * *

"Since Gutenberg devised his rude wooden type blocks and made printing possible nearly five centuries ago,

there has been no single invention so closely touching human welfare as radio, the latest miracle of the ages," recently stated James G. Harbord, president of the Radio Corporation of America.

"Its messages are flashed over land and sea with the speed of light; the enemy submarine cannot cut the cables of the wireless, the winter storms cannot weight it down with sleet or summer's suns expand it to slackness. Its potentiality includes utility and recreation, it charms the ear with the strains of music, it saves life and property on stormy seas, it annihilates distance and penetrates the cottage of the farmer as easily as it does the mansion of the millionaire. It is the romance and the inspiration of the world's splendid prime."

* * *

Phonograph records of the cylindrical type make excellent inductance tubes. They are far more rigid than cardboard and are quite as good as ebonite tubes, besides being much cheaper.

A piece of red-hot wire will make clean-cut holes through the tube through which the wires can be inserted.

If the tubes are cut down lengthways and then immersed in hot water they become soft and pliable and can be easily flattened out. They can then be cut into squares or any shape desired and used as mounts for small pieces of apparatus.

RADIO RALF AND HIS FRIENDS---

By Jack Wilson

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Instruction for the Beginner.

Simple Facts that All May Understand.

WIRELESS telephony followed close upon wireless telegraphy, but to many people it is infinitely more mystifying than the transmission of Morse signals. Before explaining radio telephony, it will be helpful to apply a few words to explaining the principles of voice transmission over copper wires. When one person hears another speak over the landline from a distant centre it is not actually the voice of the speaker that is heard. Instead the voice is translated into electrical impulses which travel over the wire to the receiving end where they are made audible. When the transmitter is spoken into the voice strikes against a thin metal diaphragm, which is

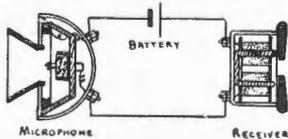


Diagram of Simple Telephone Circuit.

thereby caused to vibrate, such vibration operating in sympathy with the voice of the speaker.

At the back of the diaphragm a little compartment full of carbon granules forms part of the telephone circuit. The vibration of the diaphragm causes a pinching effect amongst these granules, which makes a better electrical contact between them. This has the effect of lowering their resistance to the passing current.

This simple arrangement of carbon granules enables an electric current

(This is the third of a series of simple articles for the absolute novice in wireless. We believe there are thousands of men, young and middle-aged, who are anxious to make a study of radio, but do not know where to begin. It is for their especial benefit that these articles are being written.)

to be impressed with all the fluctuations of the human voice, which are reproduced in the receiver at the other end through another diaphragm vibrating in unison with the one at the transmitting end.

In wireless telephony the voice vibrations are transmitted through the ether but transmitters and receivers are both necessary.

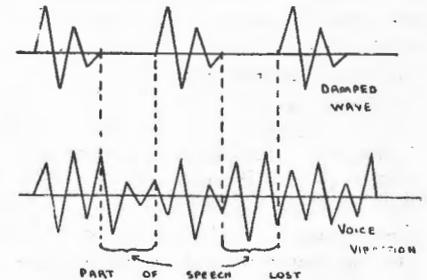
The difference between damped and undamped waves has already been explained, and the fact that voice waves are continuous indicates that spark transmission (which has also been explained) is unsuitable for carrying them. The gaps shown in the diagram which occur in spark transmission make it apparent that much of the voice would be lost if that method were employed.

There are no interruptions in C.W. transmission, and, therefore, if the voice is properly superimposed upon these waves it will be carried faithfully to its destination.

For transmission work an ordinary arc, when "shunted" with a condenser will produce continuous waves. If a telephone transmitter is placed in the proper part of a C.W. trans-

mitter the voice will alter the waves in such a way that it will be audible at the receiving station. The process by which waves are impressed upon a continuous current is known as "modulation" and modulation becomes a problem where heavy currents are employed in a high power station. In this case the telephone transmitter is entirely inadequate; the heavy current would soon render it useless by fusing the small carbon granules.

The problem was finally solved by the use of the vacuum tube which is so constructed that it is possible for it to cause a very weak current to



The top waves are "damped" and the lower continuous.

control a very heavy current. In other words, the heavy current will vibrate in unison with the weak current when the transmitter is spoken into.

The successful application of the vacuum tube to wireless telephony has practically revolutionised radio work, and, as might be expected, was only made possible after a great deal of experimentation.

"A RECEIVING SET IN EVERY HOME."

No home in which it is desired to create the real "home atmosphere" should be without a broadcast receiving set. The cost is small; the value great. Investigate the matter for yourself, and you will soon follow the lead of thousands of other happy home makers.

Wired Wireless Telephony.—What Is It?

By J. W. RICHARDS.

DURING the last few years there have been many disjointed references to what is known as "Wired Wireless," but no information has been given as to the actual principles of the system. There are, no doubt, a good many amateurs who would welcome a short account of the system explaining briefly and simply the principles underlying it. This article has therefore been written with this object in view.

In the first place, it may be said that most of the experimenting and commercialising of wired wireless has taken place in the United States, mainly on account of the suitability of application of the overland telephone lines thereto.

In England the General Post Office has been maintaining a wired wireless telephony service between London and Bristol, a distance of 100 miles, for well over a year. The further extension of the system in England has been limited by the fact that at present there are difficulties attendant upon using it on underground cable circuits.

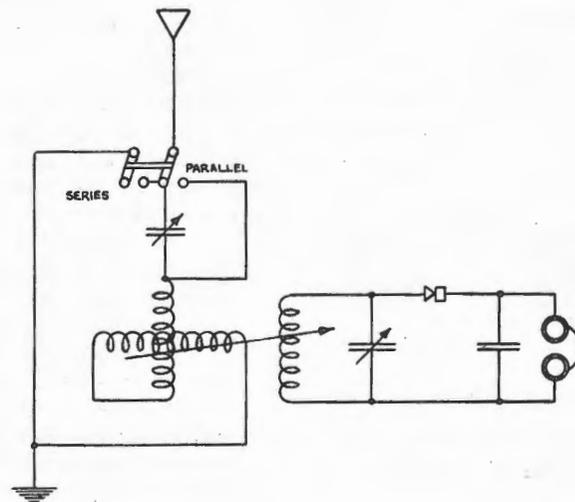
To understand wireless telephony one must understand how the ordinary telephone system "works," which I think is understood by almost every amateur. It is necessary, however, to repeat it here for the sake of completeness. The continuous electric current from the batteries is strengthened and weakened by the transmitting instrument according to the modulations of the sound waves coming from the speaker. By this means the current is changed from a steady direct one into an irregular series of impulses varying according to the voice of the speaker. These fluctuating waves travel over the connecting line with the speed of light and cause the receiver to respond and convert them into human speech through the medium of the diaphragm. The frequency of the transmitted wave currents will vary, of course, according to the pitch of the voice of the speaker, and will be between about 300 and 2,000 per second.

On some telephone lines it is possible to load on to the circuit a high

frequency alternating current, which, if it has a frequency high enough, will be of a pitch far too high for the human ear to hear, and will therefore create no sound in the receiving telephone. Now this inaudible high frequency, or carrier wave as it is called, possesses a peculiar property, in that it can be modulated and broken into groups of irregular impulses by the action of the human voice, which acts as a low frequency modulator, in a similar manner to that occurring in the ordinary telephone circuit just described. We have, therefore, discovered the means

they are of different frequencies, and without these interfering with the ordinary line speech, or the line speech interfering with them. This means that about four separate conversations can be carried on over the one suitable line entirely without interruption.

The telephone lines in which the carrier currents are flowing do not act as ordinary wireless aerials and radiate the waves, because they are not tuned to oscillate at all, which is proved by the fact that they can carry simultaneously carrier waves of varying frequencies.



INDUCTIVELY COUPLED CRYSTAL RECEIVER

of carrying on another conversation over the same wire, for the high frequency carrier wave can be made irregular by the action of the sound waves from another telephone transmitter and can be used in the same way to reproduce speech. We can, however, even accomplish more than this. It is possible to produce in the circuit simultaneously several carrier waves of differing frequencies, each being controlled by its own separate low frequency speech modulations. These different operations can be carried on without either of the several high frequency carrier waves conversations interfering with each other, as

A conversation transmitted by wired wireless is, therefore, private to the same degree as that of an ordinary telephone conversation, which indeed it is.

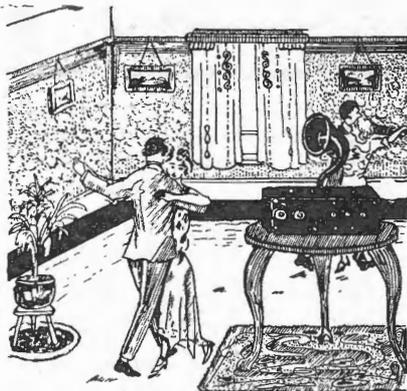
If the physical conditions of most of the telephone lines in the world would permit it, there would be rather a useful and important field for the development of wired wireless.

It is interesting to note that the wired wireless system is practically not effected by an "earth" on the line. Such a condition generally precludes ordinary telephone conversation from being possible.

Indoor Aerials

For Summer Reception

Some Useful Tips



Until an effective method of eliminating atmospheric disturbances is discovered big outdoor aerials will not be of much use for experimental purposes during summer weather, but with modern sensitive apparatus a small indoor aerial—either of the loop type or otherwise—is sufficient for the reception of all save the most distant stations.

Of course it must be understood that a crystal receiver will not give results in connection with an indoor aerial, except from powerful local stations, but a two valve set—preferably one utilising a reflex circuit—will give wonderful results.

An economical but highly efficient set would consist of two stages of tuned radio-frequency amplification, crystal detector and one or two stages of reflex audio-frequency. With apparatus of this nature, Victorian and Queensland amateurs may be received in Sydney on a loop.

Single valve circuits, such as the plain regenerative, Armstrong super-regenerative and Flewelling may be employed.

The absolute freedom from atmospherics and the selective qualities of a loop receiver should endear this type to experimenters. Another feature is the highly directional effect which enables the operator to eliminate unwanted stations by swinging the loop.

For instance, it is possible to receive amateur telephony perfectly

while another station is transmitting, provided the two are not in exactly the same direction. If the directional effect is not required it may be eliminated by using an earth connection in the usual way; the loop then functions in the same way as an indoor aerial.

LOCATION OF THE LOOP.

A loop should be placed well away from the outside aerial leads, as energy and atmospherics are likely to be transferred and deceptive results attained. Attention should be given to its position with regard to electric light and telephone wires or other possible sources of induction. Care also should be taken that no conducting bodies—including the operator himself—are interposed between the

loop and the station it is required to receive.

A loop suitable for the wave-length band 200-400 metres consists of six turns of No. 18 gauge wire spaced $\frac{1}{4}$ inch apart on a frame four feet square and so mounted that it can be turned through an angle of 90 degrees.

Practically the same conditions apply to this type as to the loop. This aerial usually consists of a number of wires forming a flat-top with down leads, and is slung in a suitable location inside the house; an earth connection must be used. This type possibly gives louder signals than the loop, as it is more extensive, but it is capable of picking up atmospherics and is more likely to be affected by induction. Its action is similar to an outdoor aerial of the same dimensions.

An interesting type of loop is the double earth. Two connections are made to earth some distance apart. Fair distances can be covered by this method, but if the receiver is located anywhere near an electric tram or train service induction effects are very troublesome, probably owing to current leakage.

A point well worth keeping in mind is that the amateur who consistently uses some form of indoor or loop aerial for reception cannot possibly cause interference to others, and this fact alone should commend it to those who wish to experiment with regenerative circuits.

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The Experimenters' Corner



A CAPACITY COUPLING FOR THE TELEPHONES AND LOUD SPEAKER.

THE manufacturers of telephone headsets and loud speakers design their products to work with maximum efficiency at a critical field strength from the permanent magnetic system with which both are fitted. If a steady direct current of electricity is passed through the windings it will tend either to assist or oppose the original magnetic field depending upon its direction. In the first case there will

battery circuit, as well as encouraging electrolysis due to the condensation of moisture when in operation.

Figure 1 gives a circuit in which the direct current component of the plate circuit is passed through a high impedance and the alternating speech and signal currents filtered off through the telephones and the condensers C. The choke should have as high an impedance as possible. A suitable value is ten to fifteen thousand turns of No. 40 gauge enamel wire on a spool three inches long with an iron wire core half an inch diameter. The condensers "C" should have as high a capacity as possible, such as half a microfarad as used for telephone switchboard work.

INSULATING THE FILAMENT BATTERY.

THE insulation of the filament battery in valve receivers goes a long way towards silent operation, especially when using single circuit tuners or reflex amplification. After being in use for a short time the storage battery accumulates a surface layer of acidulated dust and other foreign matter which causes a slight leakage of current between the cells and to earth to other parts of the circuit at a different potential. It is this latter

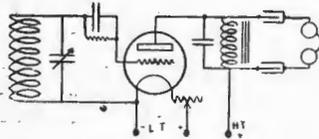


Fig. 1.

be an extra pull on the diaphragm which will prevent it from moving as freely as it was intended, and in the latter case a grave risk will be run of demagnetising the telephones and rendering them temporarily useless. In addition to the undesirable magnetic effect of the direct current, it also places a heavy strain on the insulation of the windings if they are coupled directly in the high tension

Many experimenters report an improvement in the quality of speech and music after adopting this circuit.

In Fig. 2 will be seen the method in which this capacity coupling can be put to good advantage in simplifying the switching problem for a multi valve audio amplifier. The phones in each instance are connected in parallel with another winding, which provides the path for the direct current component. There is practically no loss of signal strength when employing this circuit.

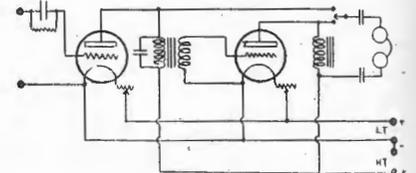


Fig. 2.

leakage that causes the parasitic noises and loss of reflex signal strength. A simple way in which to obtain a high insulation resistance to earth is to stand the whole battery in a flat glass dish of suitable size. If a glass container is unobtainable a very good substitute is a large size celluloid developing tray as used by photographers. In addition to insulating the battery, the glass or celluloid tray also serves to catch any electrolyte that may leak from the batteries.

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Radio Doings in N.Z.

(By Our Special Correspondent.)

It is pleasing to note that after much consideration amongst representatives of radio business throughout the Dominion something definite is likely to result in the formulation of a satisfactory scheme of broadcasting. A conference was held in Wellington this week, when the suggestions recently embodied in a statement by the Postmaster-General, Mr. J. G. Coates, were exhaustively discussed. The Conference drew up a scheme, which it is claimed will give satisfaction to all concerned. This programme provides for the installation of 500 kilowatt transmitting stations at Auckland, Wellington, Christchurch and Dunedin. The proposed service will be a day and night one, and the programmes will include highclass and popular musical items, lectures, market reports and weather forecasts. The Government will add an additional sum to the license fee of all listening-in sets, and part of this money will be handed to the broadcasting company to defray the cost of transmitting. At present the service is purely gratuitous, and therefore much inferior to what would be provided under the new proposal. A deputation will await on the Postmaster-General forthwith and the scheme should be in working order at an early date. The stations will operate simultaneously on different wave-lengths, and those who have more powerful sets can select pro-

grammes without any extra charge, the one fee covering the four centres.

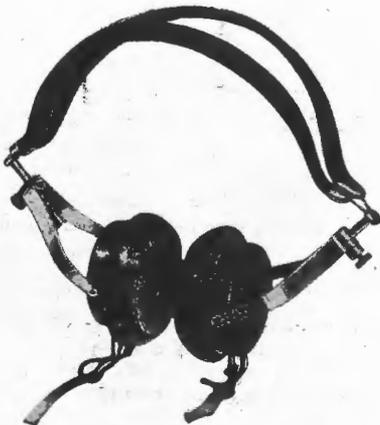
The excellent transmission results achieved by the Hamilton Radio Club have been much appreciated throughout the Dominion during the past year, and therefore much concern was expressed in wireless circles from the North Cape to the Bluff when it was announced that the Club intended to cease operations through lack of financial support. The question was discussed at a special meeting of the Club called for the purpose, and happily a way out was found. The secretary, Mr. R. F. Haycock, read letters from all parts of the Dominion expressing appreciation of the Club's transmissions. He also mentioned that it would cost about £3 per week to carry on. After a long discussion it was decided to continue activities by making a levy of 1/- per head per week on senior members and 6d. on members under 16.

A report from the South records a remarkable reception feat by Mr. W. K. Lane, of Molueka, on a de Forest reflex set. The reception was carried out in the presence of Mr. R. P. Hudson, M.P., and several pressmen. The following broadcasts from North America were picked up: CFAC, Western Radio Coy.; KHJ, Times Mirror Coy., Los Angeles; KFI, Earle C. Anthony Inc., Los Angeles; KEO, San Francisco. All these were heard distinctly as also was the Ambassador Hotel in California.

The Prime Minister of New Zealand is a "live wire" in matters concerning wireless interests in the Pacific, and it is interesting to learn that at one dinner which he attended in London, his speech was broadcasted by wireless over the United Kingdom, a receiver having been concealed in a bowl of flowers in front of him. He had been informed of this enterprise but had forgotten it and was rather surprised to receive letters from his native town of Limavody, in the North of Ireland, and from a N.Z. family in the South of Scotland, stating that his speech had been heard and enjoyed.

The Auckland Radio Service Ltd., continues to give excellent concert programmes on Wednesday evenings. The one given by Mr. Cyril Towsey and party was of exceptional merit.

Mr. J. L. Davies, who recently took up the management of Radio Ltd. (Auckland), was for upwards of 20 years with the Post and Telegraph Department, and has held many important positions in wireless. During the war he was a lieutenant in the Wireless Corps and was awarded the Croix de Guerre by the French Government for his services in reconstructing the high power wireless station captured from the Germans at Samoa. Previous to severing his connection with the Government, Mr. Davies was radio inspector for the Wellington district.



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International Call Letters.

The International Bureau has allotted to signatories of the Convention a list of combination of letters to be used as call signals for stations proper to the respective countries. The letter limitations of these lists are given in this section, together with the names of countries with which they are connected.

- AAA to AMZ Germany.
- ANA to APZ Netherland Indies.
- AQA to AWZ Norway.
- AXA to AXZ Poland.
- AYA to AYZ Venezuela.
- AZA to AZZ
- B Great Britain.
- CAA to CEZ Chili.
- CFA to CKZ British Possessions and Protectorates.
- CLA to CMZ Spain.
- CNA to CNZ Morocco.
- COA to COZ Great Britain.

- CPA to CPZ Bolivia.
- CQA to CQZ Monaco.
- CRA to CRZ Portuguese Colonies.
- CSA to CUZ Portugal.
- CVA to CVZ Roumania.
- CWA to CWZ Uruguay.
- CXA to CXZ Spain.
- CYA to CZZ Mexico.
- DAA to DSZ Germany.
- DTA to DTZ Danzig (Free Town of).
- DUA to DZZ Germany.
- EAA to EHZ Spain and Colonies.
- EIA to EZZ Great Britain.
- F French Colonies and Protectorates.

- G Great Britain.
- HAA to HAZ Hungary.
- HBA to HBZ Switzerland.
- HCA to HCZ Ecuador.
- HDA to HEZ Holland.
- HFA to HFZ Serbs, Croates and Slovenes (Kingdom of).
- HGA to HHZ Siam.
- HIA to HIZ Dominican Republic.
- HJA to HKZ Columbia (Republic of).
- HLA to HNU Spain.
- HNV to HNZ New Hebrides.
- HOA to HZZ France and Colonies and Protectorates.

- I Italy and Colonies.
- J Japan and Colonies.
- KAA to KAY Germany.
- KAZ Danzig (Free Town of).
- KBA to KBZ Germany.
- KCA to KCZ Lettonia (Latvia).
- KDA to KZZ U.S.A.
- LAA to LHZ Norway.
- LIA to LRZ Argentine Republic.
- LSA to LUZ Great Britain.
- LVA to LVZ Guatemala.
- LWA to LWZ Norway.
- LXA to LZZ Bulgaria.

- M Great Britain.
- N U.S.A.
- OAA to OBZ Peru.
- OCA to OFZ Great Britain.
- OGA to OIZ Denmark.
- OJA to OJZ Finland.
- OKA to OKZ Czecho-Slovakia.
- OLA to OMZ Holland.
- ONA to OTZ Belgium and Colonies.
- OUA to OZZ Denmark.
- PAA to PIZ Holland (Home).
- PJA to PJM Curacao.
- PJN to PJZ Surinam.
- PKA to PMZ Netherland Indies.
- PNA to PPZ Brazil.
- PQA to PSZ Portugal.
- PTA to PVZ Brazil.
- PWA to PWZ Cuba.
- PXA to PZZ Holland (Home).

- Q Reserved for abbreviations.
- RAA to RQZ Russia.
- RRA to RZZ
- SAA to SMZ Sweden.
- SNA to STZ Brazil.
- SUA to SUZ Egypt.
- SVA to SZZ Greece.
- TAA to TEZ Turkey.
- TFA to TFZ Ireland.
- TGA to THZ Greece.
- TIA to TOZ Spain.
- TPA to TUZ Norway.
- TVA to TZZ Holland.
- UAA to UMZ France and Colonies and Protectorates.

- UNA to UNZ Serbs Croates Slovenes (Kingdom of).
- UOA to UOZ Austria.
- UPA to UZZ Italy.
- VAA to VGZ Canada.
- VHA to VKZ Australian Commonwealth.
- VLA to VMZ New Zealand.
- VNA to VNZ Union of South Africa.
- VOA to VOZ Newfoundland.
- VPA to VSZ British Colonies and Protectorates without autonomous Government.
- VTA to VWZ British Indies and Persian Gulf.
- VXA to VZZ British Colonies and Protectorates.
- W U.S.A.
- XAA to XDZ Mexico.
- XEA to XMZ Great Britain.
- XNA to XSZ China.
- XTA to XZZ Great Britain.
- Y Great Britain.
- Z Great Britain.

CALL LETTERS OF AUSTRALIAN COAST STATIONS.

- VIA Adelaide.
- VIB Brisbane.
- VIC Cooktown.
- VID Port Darwin.
- VIE Esperance Bay.
- VIF Woodlark Island.
- VIG Port Moresby (British New Guinea).
- VIH Hobart.
- VII Thursday Island.
- VIJ Samarai (British New Guinea).
- VIL Flinders Island (Tasmania).
- VIM Melbourne.
- VIN Geraldton.
- VIO Broome, W.A.
- VIP Perth.
- VIQ Macquarie Island.
- VIR Rockhampton.
- VIS Sydney.
- VIT Townsville.
- VIU Kieta (Solomon Islands).
- VIV Madang (British New Guinea).
- VIW Wyndham.
- VIX Misima (British New Guinea).
- VII Mount Gamber.
- VIZ Roebourne, W.A.
- VJZ Rabaul (New Britain).
- VKT Nauru (Marshall Islands).
- VLA Awanui.
- VLB Awarua.
- VLC Chatham Islands.
- VLD Auckland.
- VLW Wellington.
- VMR Raratonga.
- VPD Suva, Fiji.
- VPE Labasa, Fiji.
- VPF Taviuni, Fiji.
- VPK Cocos.
- VPW Singapore.
- VQK Ocean Island.
- VQL Savu Savu, Fiji.
- VQJ Tulagi (Solomon Islands).
- VSB Nukualofa (Friendly Islands).
- VZE King Island.
- VZK Morobe (New Ireland).
- VZO Manus (Admiralty Islands).
- VZR Kaewieng (New Island).
- VZX Eitape (British New Guinea).

DAVID JONES' RADIO SECTION.

Directed by
Mr. F. Basil Cooke, F.R.A.S.

Consequent upon the demand for high-grade Wireless Apparatus, David Jones' have installed a special section for the sale of these goods. This presents an opportunity for all interested in wireless to avail themselves of ideal purchasing conditions. Licenses will be issued upon payment of required fee.

Of interest to experimenters — David Jones' have made a special feature of providing all wireless accessories, including the following:—

- Accumulators, 2-volt units, priced at 21/- 33/- 40/- and 50/-
- Valves, all standard makes, including Cunningham type "300." Price 35/-
- Type "301A." Price 42/6
- Type "299." Price 42/6
- Marconi R Valves. Price 25/-
- Phillip's Detectors or Amplifiers, Price 22/6
- All gauges of Winding Wire kept in stock.
- Silver and Nickel-plated Terminals. Price Each 6d.
- Silver and Nickel-plated Switch Studs. Price Dozen 1/6
- Transformers, Jefferson type, 45. Price 55/-
- Transformers, Jefferson type, 41. Price 37/6
- Transformers, Jefferson Star type. Price 37/6

DAVID JONES'
Radio Department,
22 York Street,
SYDNEY.

A Receiving Set in Every Home

New Slogan for Australia.

British P.M.G. Gives a Lead

THE British Postmaster-General (Sir L. Worthington Evans) stated a few weeks ago that there were now nearly half-a-million broadcast receiving licenses in Great Britain. "But," he added, "I will not be content until the number is quadrupled. Every cottage ought to have a receiving set."

In these words the British P.M.G. coined a slogan which all who are desirous of seeing radio broadcasting occupy its proper place in Australia should not hesitate to adopt immediately.

For several years past hopes have been cherished in some quarters that broadcasting would commence at any time, but the more thoughtful people recognised that a vast amount of preparatory work was necessary before a beginning could be made.

That work has been going on for many months, but it reached fruition within the last week or two when two broadcasting stations commenced operations.

It may be taken for granted that those who are looking after the commercial end of the venture will see to it that the general public are fully informed regarding the pleasure and value of radio broadcast programmes.

Quite apart from that, however, all who believe that true national progress consists in making available to the great mass of the people the means of living happier and more contented lives will welcome the advent of broadcasting.

It offers possibilities for home education and entertainment, no matter how remotely located, which were undreamt of a few years ago.

The warm-hearted welcome extended to radio programmes in America and England is a guarantee that broadcasting is worth while, and in a country of scattered settlement like

Our people are recognised as a sport and amusement loving community, but beneath the surface they possess a keen critical faculty which demands quality service always before their approval can be won.

Such services are now being provided, and in order that they may receive adequate recognition it is essential that every home throughout Australia should have a radio receiving set.

The initial outlay is comparatively small, and when one considers the unlimited opportunities for education and enjoyment which are unlocked the moment a home is placed on the airline it is inconceivable that cost will deter any great number from tapping this new source of entertainment.

When motor cars were first introduced they were regarded as costly, unreliable and dangerous, and not even the greatest optimist expected them to live down all these disadvantages and become so outstandingly popular.

But they did it, and what motoring is to the people now radio broadcasting will be, only multiplied many times, a few months hence.

Both afford almost limitless opportunities for enjoyment and in addition fill a most important place in the commercial life of the community.

Therefore let the slogan for Australia now be:—

"A Receiving Set in Every Home."

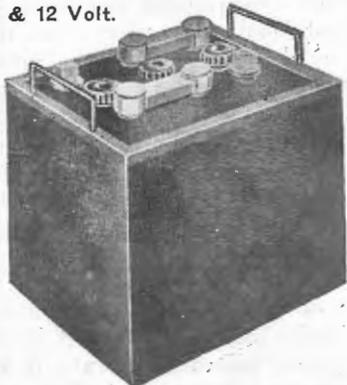
A NEW SLOGAN.

Australia is now about to adopt a new and valuable slogan. The commencement of broadcasting has unlocked the door leading to wonderful possibilities in home entertainment, and all that is required is a general understanding on the part of the public that such opportunities are theirs for very little cost. The slogan "A Receiving Set in Every Home" is really part of a campaign to educate the people to make use of this new factor in home education and entertainment. That its adoption will mean more and better home-life in Australia is one of the strongest reasons why it should be adopted.

Australia it will prove of infinitely greater value.

The people of Australia are probably less imaginative than those of the United States, where broadcasting first boomed, but the fact that it afterwards captured conservative England is a guarantee that its compelling power will not be lost on Australia.

6 & 12 Volt.



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Special Concessions to Amateurs.

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Radio Activities of an Automobile Club

How Car Owners are Aided in California

By ERNEST McGAFFEY

WHEN the latest possibilities of radio first began to unfold, the Automobile Club of Southern California at once became keenly interested.

It was seen, immediately, that here was a medium which could be used in a practical way, to render extra service to its members and the traveling public.

The situation in Southern California as regards automobiling is unique. With more than 5,000 miles of paved roadway in the 13 Southern Counties of the State, and more than one million automobiles registered within its boundaries, half of which are owned in the southern portion of the State, the motor car is a dominating influence in business and social life.

The membership of the Automobile

Club is over 85,000, and is increasing at the rate of more than one thousand monthly. Amongst the services rendered by the Club, one of the important ones is the recovery of stolen cars.

By reason of the paved highways, the stealing of cars is made easier, as greater speed can be made in getting out of the State. Various means have been employed to minimize this advantage on the part of the thieves, and radio has lately been used to excellent purpose in bringing them to book for their crimes.

Every day the Automobile Club broadcasts the numbers of the stolen cars all over the country. This has been the means of recovering many cars which would otherwise have slipped past the barriers and escaped. The almost universal distribution of radio apparatus among the people advertises the loss of these cars, and sets thousands of eyes on the qui vive for their appearance.

While numbers on automobiles are readily changed, the thief is usually obliged to get away in such a hurry that he is forced to defer this for a time, and during the interim he is likely to be picked up through the radio warning. When it is remembered that something like 5,000 automobiles are stolen in Los Angeles County alone every year, or an average of 14 a day, it will be seen that broadcasting the numbers of stolen cars is a matter of great importance.

Hundreds of car thefts are reported to the Club's theft bureau by non-members of the Club. Therefore, this excellent, free service is available to everyone.

The Automobile Club also broadcasts every day road and route information concerning the condition of the highways all over the State, and those leading into and even passing through adjacent States. This gives not only Club members, but all users of the highways, up-to-date and accurate knowledge as to just how the

roads are. They are thus able to make their plans accordingly. This data saves them time and money, and its distribution would not be possible except by the use of radio.

All matter relating to the use and care of automobiles is sent out daily by the Club by radio, so that members and non-members alike may profit by it. Minute instructions, compiled by experts, are gathered and disseminated for the benefit of all drivers of automobiles. All legal matters of interest to car users, such as new ordinances or laws, decisions, etc., are also sent out by the same system.

The Safety Bureau of the Club issues a daily bulletin, which is in like manner broadcasted each day. This urges the use of care and caution on the part of all motorists in the streets and at the railway and electric tram-car crossings, and cautions parents to warn their children of the dangers in the city streets from automobiles and commercial vehicles.

Still another stream of information is sent out daily by the Outing Bureau of the Club. This Bureau advises all motorists who intend to go camping, fishing or shooting, just where to go, and how to reach there in the shortest and easiest manner. It tells them where the best angling is to be found, the kind of lures best adapted to certain lakes and streams, the most convenient camping sites, the best shooting territory, and all details concerning life in the open in Southern California.

This radio service is now a regular and highly valuable adjunct to the information distributed to motorists, and has only been made possible by the wonderful scope and efficiency of modern radio apparatus.

Even as it is, the Automobile Club believes that this great invention is still in its infancy, and that the coming years will demonstrate it to be one of the outstanding mile-stones of progress in the history of civilization.

For Farmer's Broadcasting Wireless Tests

you need larger inductance coils, and we recommend

Giblin Remler Coil

35 Turns..	4/10	150 Turns..	7/-
50 "	5/1	200 "	7/3
75 "	6/-	300 "	7/9
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Universal Uses of Radio Receivers.

By M. BERGER.

The nature of a radio receiver is such that it peculiarly adapts itself so that it may be classed as an item of universal use and interest. It is a device which appeals to human nature because of its being catered to by a host of people, each offering something different. It has its appeal to the inventor, the scholar, the music lover, the banker, the business man, the farmer, the seaman, the labourer and, most important of all, to the women and children in the home. In fact, it has its use for people in every walk of life.

The housewife and mother find in the radio receiver a power which lightens her daily routine. It affords a source of knowledge for the proper

upbringing of her children, from prenatal days to maturity. She finds in it daily suggestions as to food, clothes and other affairs of the home which offer new thoughts and help to lighten her tasks.

A radio receiver enhances the comfort and stability of the home and makes for a better home environment. It presents a powerful appeal towards the broadening scope of education.

The farmer finds the radio receiver a valuable adjunct to his business as well as a source of pleasure for his home. It brings the latest information as to market prices, thus enabling him to determine when to take his products to the markets. It gives

him daily weather reports. It provides a source of entertainment which the farmer and his family appreciate, and in these days of farm-labour scarcity, tends towards attracting labour.

The labour and the uneducated also find in radio concerts and lectures a source of pleasure, education and contentment. The entertainment offered is always of a clean character, and this makes for personal improvement. The educational features are such that truthful and concise information is given on various topics which are interesting and easily intelligible to all. Such an influence is a valuable help in increasing happiness, knowledge and industry in the home and the community.



CLEAR AND TRUE *Western Electric* LOUD SPEAKERS

When used with a correctly designed and adjusted radio receiving set, Western Electric Loud Speakers give a clear and true reproduction of speech and music over the entire musical range, including the low bass notes of a pipe organ and the high tremolo notes of a violin.

Western Electric Radio Equipment can be obtained direct and also from Radio dealers in town & country. We are at all times pleased to give expert advice and help regarding Radio installations and equipment.

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The "Homcharger."

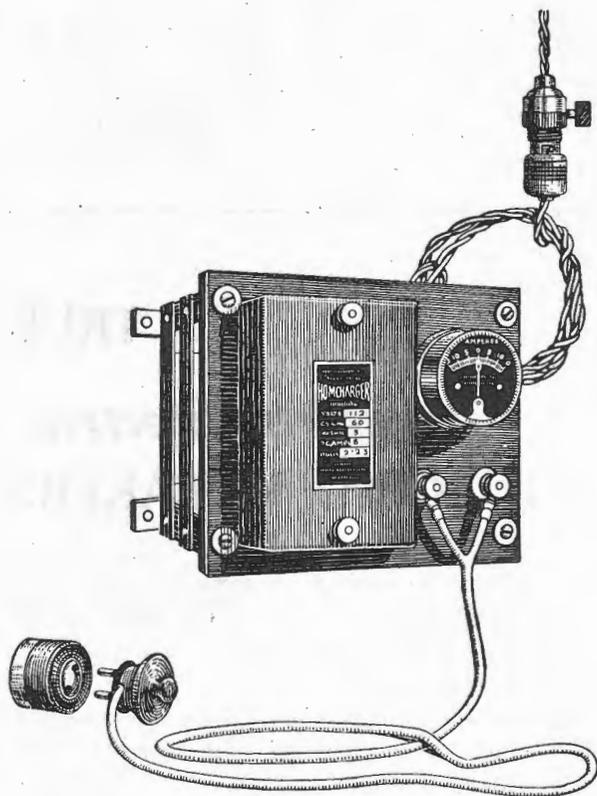
Many experimenters living in districts supplied with alternating current are always faced with the trouble of carrying in their accumulators to a battery charging station in order to replenish their "supplies of current." This difficulty can now be avoided by installing a battery Homcharger, which charges all small accumulators from alternating current. All the experimenter has to do is to connect two leads to the Homcharger, one to an electric light socket and the other to his accumulator and the work of charging is commenced.

It disconnects battery upon failure of line voltage and automatically restarts charging when power is restored.

It stops operating when battery is disconnected, thus rendering short circuiting and sticking of contacts impossible should charging leads be shorted.

When battery is disconnected, no appreciated current is consumed from the line.

Guaranteed not to injure battery even though left connected indefinitely.



Here are a few of the "Homcharger's" characteristics:—

It operates over a wide variation of frequency and line voltage, and is therefore unaffected by line surges, etc.

It is self-polarizing. Battery may be connected either way and will always charge.

Charging leads of any reasonable length and size may be used.

It automatically gives a tapering charge and will fully charge any motor car battery overnight.

Vibrator may be perfectly synchronized and adjusted for the individual characteristics of charging circuit or battery by the turning of but one thumb screw.

It has but one moving and two wearing parts, which could last several years with ordinary use. These may be replaced.

Requires no close or delicate adjustments.

Highest efficiency of any rectifying device.

Vibrator assembly removable as a unit.

Wireless in W.A.

(By Our Special Representative.)

Thirteen new members were elected at a recent meeting of the Mount Lawley Radio Club. Thanks to the generous assistance of Mr. A. A. Wheatley, manager of the Lyceum Theatre, a regular programme of meetings and instruction classes will now be held in the Assembly Hall of the theatre.

Mr. Wheatley has been made an honorary life member of the Club in recognition of his services.

The W.A. Division of the Wireless Institute of Australia has drawn up definite rules of affiliation, which may be obtained from the Hon. Sec., Mr. A. E. Stevens, Ruth Street, North Perth. The Mount Lawley Radio Club has already affiliated.

Mr. Cecil, 6AB, secretary of the Goldfields Radio Society, has arranged to transmit regular telephony programmes on 400 metres. The tests will take place probably on Monday and Thursday evenings, and there is little doubt that "listeners in" on the goldfields will warmly appreciate them.

There is a movement on foot to make a suitable presentation to Mr. W. E. Coxon, the pioneer of broadcasting in W.A., in recognition of the excellent work he has done in popularising radio in the West. The proposal is bound to meet with the enthusiastic approval it deserves.

No sparking at contacts.

Automatic features obtain without the use of any relays or other complications.

Has no permanent magnet to lose its strength and necessitate constant adjustment.

Furnished for one-half or full wave operation.

Only one simple adjustment, which is seldom required.

Not affected by temperature changes—no danger of fire.

Two or more Homchargers may be operated in series or parallel.

Charges Radio B as well as A batteries.

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Movements of Wireless Officers

Mr. E. I. Hyde signed off s.s. *Euwarra*, at Melbourne, December 3, and relieved Mr. W. Hill on s.s. *Oonah*, at Melbourne, December 4.

Mr. A. C. Hickey signed off s.s. *Dilga*, at Sydney, November 27, and returned to Melbourne.

Mr. H. J. Byrne relieved Mr. W. H. George on s.s. *Kowarra*, at Melbourne, December 4.

Mr. W. H. George signed on s.s. *Moeraki*, at Melbourne, December 4.

Messrs. H. Taylor and E. C. Bouel signed off s.s. *Changsha* as 2nd and 3rd operators respectively at Sydney, December 7.

Mr. H. Taylor signed on s.s. *Echunga*, at Sydney, December 7.

Mr. F. L. Scott signed off s.s. *Eugowra*, at Sydney, December 7.

Mr. E. I. Hyde signed off s.s. *Oonah* at Melbourne, December 7, and relieved Mr. C. R. Waite on s.s. *War Spray*, at Melbourne, same date.

Mr. F. Kettlewell signed off s.s. *Gilgai*, at Sydney, December 10, and signed on s.s. *Emita*, at Sydney, December 11.

Mr. R. Jordan signed on s.s. *Marsina*, at Sydney, December 11.

Mr. J. F. McGinley signed off s.s. *Australmount*, at Sydney, December 10.

Mr. A. C. Hickey signed on s.s. *Euwarra*, at Melbourne, December 10.

Mr. K. W. Downey signed off s.s. *Parattah* as 3rd operator, at Sydney, December 12, and relieved Mr. J. R. Hain on s.s. *Largs Bay* in same capacity at Sydney, December 13.

Mr. F. L. Scott relieved Mr. E. S. Bailes on s.s. *Nauru Chief*, at Sydney, December 13.

Messrs. E. S. Bailes and J. Ridler signed on s.s. *St. Albans* as 2nd and 3rd operators respectively, at Sydney, December 14.

Mr. E. T. Prentice was relieved by Mr. F. M. Basden on s.s. *Yarra*, at Port Augusta, December 17.

Mr. S. C. Austin relieved Mr. F. M. Basden on s.s. *Kangaroo*, at Fremantle, December 13.

Messrs. H. J. Edwards and J. Thompson signed on s.s. *Parattah* as 3rd operators, at Sydney, December 14.

Mr. E. J. Glaisher signed on s.s. *Iron Master*, at Melbourne, December 13.

Mr. A. C. Hickey signed on s.s.

Iron Knob, at Melbourne, December 10.

Mr. W. Hill signed off s.s. *Oonah* at Melbourne, December 14, and signed on s.s. *Loongana*, at Melbourne same date.

Mr. A. W. Hodge rejoined s.s. *Parattah* as senior operator, at Melbourne, November 27.

Mr. A. G. Ross relieved Mr. D. N. Quinn on s.s. *Riverina*, at Sydney, December 17.

Mr. D. N. Quinn relieved Mr. A. G. Ross on s.s. *Zealandia*, at Sydney, December 17.

Mr. J. R. Gilligan signed off s.s. *Age*, at Newcastle, December 13.

Mr. H. Kirk relieved Mr. F. E. Duggan on s.s. *Wahine*, at Wellington, December 14.

Mr. J. H. Bennett signed off s.s. *Mararoa* and joined s.s. *Maori*, at Lyttleton, December 13.

Mr. E. F. Hayes signed off s.s. *Cycle*, at Melbourne, December 17.

Mr. N. W. G. Scott signed off s.s. *Barunga*, at Sydney, December 19, and proceeded on Home Port leave.

Mr. V. E. Stanley was relieved on s.s. *Macumba*, at Sydney, December 21, and proceeded on Home Port leave.

Mr. R. T. Murray signed off s.s. *Catulu* as Senior Operator, at Sydney, December 20.

Mr. V. B. Rippingale signed off s.s. *Catulu* as 3rd operator, at Sydney, December 20, and signed on s.s. *Changsha*.

Mr. E. C. Bouel signed on s.s. *Changsha* as 3rd operator, at Sydney, December 21.

Mr. H. W. Warner signed off s.s. *Hobart*, at Melbourne, December 19.

Mr. J. B. Ponsonby signed off s.s. *Moorabool*, at Geelong, December 20, and relieved Mr. W. H. George on s.s. *Moeraki*, at Melbourne, December 21.

Mr. C. M. Allison signed on s.s. *Boonah* as 3rd operator, at Melbourne, December 22.

Mr. F. J. Patriek signed on s.s. *Boonah* as 3rd operator, at Melbourne, December 22.

Mr. E. I. Hyde signed off s.s. *War Spray*, at Newcastle, December 24.

Mr. K. L. Simpson signed off s.s. *Yankahilla*, at Sydney, December 24, and relieved Mr. H. A. de Dassel on s.s. *Largs Bay* as senior operator, at Sydney, December 27.



Queries Answered

"Ohm Sweet Ohm" (Broken Hill) asks: (1) What is the essential difference between "Spark" and "Continuous Wave" transmission? (2) Can the D.V.1 "Dull Emitter" valve be obtained in Australia, if so, from what firm? (3) What are the maximum and minimum wave-lengths of two coils (particulars submitted)? (4) Wave-length of honeycomb coils (particulars submitted)? (5) Is receiving Norfolk Island on a crystal set a good performance?

Answer: (1) Spark transmission is accomplished by means of trains of damped oscillations, while C.W. has no decrement. (2) Yes. Any Radio firm advertising in this journal. (3) Approximately 400 to 1500 metres used as a vario-coupler, with .001 m.f. condensers. (4) Both about 300 to 1000 metres. (5) ? Norfolk Island, if CGI (Willis Island) it is excellent reception.

J. K. (South Singleton): As you have written on both sides of paper, it is impossible for us to answer your queries. Number your questions, and write them as briefly as possible and we will be pleased to answer them.

D. P. P. (Cheepie, Qld.) submits diagram and particulars of aerial and receiver and asks: (1) Which would be more suitable, the single wire or twin wire aerial? (2) Would coils be suitable up to 6,000 metres?

Answer: (1) The twin wire aerial is preferable. (2) You should get

good results with the coils you mention.

W. H. (Toowoomba) asks for particulars for winding transformer for the Neutrodyne circuit published in issue *Radio*, No. 16.

Answer: Use honeycomb coils for this transformer. The two sections of the primary should have 25 turns each, and the secondary or centre coil 35 turns for 200-350 metre work. For either wave-lengths use larger coils, according to the table on page 360 issue *Radio*, No. 15.

G. W. A. (Gilgandra) submits diagrams of two circuits which he has used and asks why satisfactory results cannot be obtained with No. 1 circuit, although good results are obtained with No. 2 circuit.

Answer: Please supply additional particulars regarding your trouble. Other experimenters report excellent results with No. 1 circuit as published in *Radio*, No. 13. See the "Experimenters' Corner" of this issue, which gives an improved circuit for crystal reflex reception.

R. E. L. (Elwood) submits diagram and particulars of receiver, and asks how to prevent it oscillating when aerial condenser is placed in for 300 metre work, although good results are obtained on 600 metres.

Answer: All valves with tuned anode circuits tend to oscillate when used for the reception of short waves.

Sufficient damping to overcome this can be introduced by connecting directly in series with the grid inductance, a variable resistance of 0-200 ohms, such as a variable potentiometer used as a rheostat.

S. L. S. (Chatswood) asks particulars for constructing 'phone transformer (particulars of circuit submitted).

Answer: Use a transformer with a 1:1 ratio or the capacity coupled arrangement, as described in last issue of *Radio*. To construct a transformer, use a core half an inch diameter and three inches long. The primary for the telephone and inter-valve pattern will require 10,000 turns of No. 44 Belden wire, and the secondaries respectively 10,000 turns of No. 40 and 40,000 turns of No. 44. See previous issues regarding constructional data.

"Alternating" (Armidale) asks for particulars for using A.C. current on valve filaments.

Answer: In issue *Radio*, No. 5, a circuit was given, in which a valve, acting as a radio frequency amplifier in conjunction with a crystal as a detector was shown acting from an A.C. source. The use of a potentiometer across the filament, and the use of inductive coupling to the aerial will reduce the humming considerably, especially the latter, owing to the removal of the earth connection from the grid circuit.

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Club Notes & News



Wireless Institute of Australia N.S.W. DIVISION.

THE December meeting of the N.S.W.

Division of the Wireless Institute of Australia was held at the Royal Society's Rooms on Thursday, December 20, and some very interesting information was made available to members. The President, Mr. C. D. Maclurcan, presided.

Mr. F. Basil Cooke, F.R.A.S., first extended a welcome, in a few well-chosen words, to newly-elected members, and this was responded to by Mr. Scott. Three new members and one Associate Member were then elected.

The results of the recent Wireless and Electrical Exhibition disclosed a very satisfactory state of affairs. Over 12,500 people attended the Exhibition, the percentage of children being 11.85 per cent. Mr. Cooke stated that at the Electrical Exhibition recently held in London, only 30,000 people passed through the turnstiles, so that our figures, with a population only one-sixteenth that of London, compare more than favourably. The prizes won in the Experimental Exhibits were then presented to the winners by Mr. C. P. Bartholomew. The names of the prize winners have already been published. It is interesting to note that Mr. Bartholomew, who is one of the foundation members of this division, holds No. 1 experimental licence for New South Wales.

Mr. G. A. Taylor then presented to the Institute a valuable souvenir of the recent Exhibition in the form of an album con-

taining the originals of the communications received from Senatore Marconi and others, expressing good wishes for the success of the Exhibition.

The efforts of the various committees in charge of the arrangements for the exhibition were then acknowledged, particularly those representing the trade. Only one of these gentlemen is a member of the Institute, yet all gave their services freely and willingly, and it is due to the efforts of these gentlemen and the co-operation of the members of the Institute that the Exhibition was such a success.

After the meeting, coffee and biscuits were served in an adjoining room, and as this was the last meeting of the year the toasts of the Institute, our President, and our only lady member, were duly honoured.

The next meeting will be held at the Royal Society's Rooms, Sydney, on Wednesday, January 16, 1924, when Dr. S. P. Woolnough, D.Sc., will deliver a lecture on "Wireless and Geological Conditions in Central Australia." This will be an extremely interesting lecture and all members should make a point of attending. Note the date.

MARRICKVILLE AND DISTRICT RADIO CLUB.

The usual weekly meeting of the above club was held on Monday, December 17, 1923, in the club rooms, School of Arts, Illawarra Road, Marrickville, Sydney.

After the business was transacted Mr. P. Sewell (2CI) delivered a most interesting lecture on "Radio of the Future." The speaker handled his subject in a worthy manner, and certainly earned the ovation

of the members which was given at the end of his lecture.

This club caters for Experimental Licence holders only and at present a few vacancies are available.

Secretary F. W. Hemming, of 23 Central Avenue, Marrickville, Sydney, will gladly furnish all particulars to interested parties.

Free Advice

Mr. E. Walker Sawyer, a member of the Institute of Radio Engineers, and known to many through his magazine articles and his radio work in America and Europe, has cheerfully volunteered to assist P. C. Kullman & Co., of New York City in their efforts to PUT RADIO ON THE MAP OF THE WORLD. Mr. Sawyer has there promised that he will answer directly, any technical or commercial questions, and give free technical advice.

You may write to him unhesitatingly in English, French, Spanish, Italian, German or Portuguese and you will receive a prompt answer by mail, cable or radio, as you may direct.

Address him:—Ernest Walker Sawyer, B.A., C.E., I.R.E., I.E.E., c/o. P. C. Kullman & Co., 110-116 Nassau Street, New York, U.S.A.

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