ISSUED EVERY — — SECOND WEDNESDAY

SIXPENCE

RADIO

IN AUSTRALIA & NEW ZEALAND

Incorporating "Sea Land and Air"

VOL. I. JUNE 27, 1923 No. 7

—*Special Press.*

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Mr. Lennox Lockner, of Hampstead (England), tuning up the instrument he has invented to improve the wireless voice. This instrument casts out all unwanted sounds, and amplifies the voice, but not its imperfections.

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RADIO
IN AUSTRALIA & NEW ZEALAND
Incorporating "Sea Land and Air"

Managing Editor: S. E. TATHAM Associate Editor: M. DIXON

CONTENTS

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The Broadcasting Boom

AUSTRALIA is on the eve of a new era in home entertainment. The gazettal of the broadcasting regulations is expected at an early date, and the path will then be clear for those prepared to undertake the transmission of programmes that will go right into the homes of the people throughout the length and breadth of Australia. The extent to which the people of the Commonwealth will appreciate the new form of entertainment is something that, as yet, can only be guessed at. Certainly, we have the example of England and America to guide us, but there is every indication that Australia will outdistance both these countries in the use and appreciation of radio entertainment. Two factors are responsible for this belief. Firstly, our broadcasting regulations have been framed after a full knowledge and experience of the shortcomings of those operating in other countries. This, in itself, indicates that broadcasting will commence here under the happiest and most promising conditions. Those competent to judge have no hesitation in pronouncing our scheme as the most advanced in the world. Naturally, Australians feel proud of this distinction, and there is little doubt that when broadcasting is in actual operation it will exceed the expectations of even its most enthusiastic advocates.

The second factor which prompts a feeling of confidence regarding the popularity of broadcasting in the Commonwealth is the scattered condition of settlement in this country. For countless years the country districts of the various States have agitated for better postal and telegraphic facilities. It is not necessarily a reflection on the various Governments to say that these demands have only been very inadequately met. Financial conditions have frequently compelled the authorities to refuse the establishment, or extension, of the above-mentioned services, even though it was recognised they were necessary. The consequence is that to-day the people in the majority of the country districts are hungry for news and entertainment. One has to live in the country to appreciate the loneliness and depression which residence there so frequently entails. To a person who has had a taste of city life the impression is even more vivid. One of the problems confronting Australia to-day is how to stop the drift from the country to the bright lights of the city. Rural residents are, after all, possessed of the same basic instincts of human nature as their city cousins, and the prospect of a change from their more or less tame environment finds them ready to embrace it with outstretched arms.

There is, therefore, ample reason for believing that the broadcasting of high-class entertainments will create tremendous interest and enthusiasm amongst country people. This will not be confined solely to rural settlers; it will apply equally to residents of country towns, who, in the great majority of cases, are provided with very little in the way of entertainment beyond an occasional sports gathering and the weekly picture show or concert.

The capital cities are looked upon as the home of all that is best and most up-to-date in the way of amusement. It seems certain that all radio programmes will be broadcasted from these centres, and consequently they will carry, quite apart from their own excellence, all the prestige of a city production.

Despite the fact that country folk are from time to time harassed by droughts and other checks to affluence, there is no reason to suppose that the great majority of them will not be able to afford the cost of home receiving sets. The writer remembers the time when phonographs first appeared in the country, and the tremendous hit they made. From one or two fortunate individuals in each district possessing them the craze spread, and in a short time the home that did not boast a phonograph and a goodly stock of records was a dull one, indeed. The phonograph can never hope to compare with the radio receiving set as a medium of entertainment. The latter is the latest, and perhaps the most wonderful creation of man's inventive genius, and it possesses many features which make it unique in even this—a wonderful age.

There need be no doubt in the minds of those who propose to undertake broadcasting that the public will fail to respond to the lead they set, no matter how advanced it may be. From a psychological point of view it appears that the higher the broadcasting companies aim the better will the public respond. This has been proved in countless other avenues, and it only remains for those most concerned to capitalise the experience thus gained to reap a full measure of reward.

Low Power Transmitting Set

Interesting Facts for Experimenters

Mr. S. M. Newman's Excellent Work

AT A RECENT meeting of the Victorian Division of the Wireless Institute of Australia Mr. S. M. Newman delivered a highly-interesting lecture on his low-power transmitter, with which he obtained such splendid results in the Sydney, Adelaide and Hobart tests.

In order to better emphasise his points Mr. Newman exhibited the set mentioned, which, except for the high-tension generator and plate milliameter, is entirely home-made.

In the course of his remarks the speaker produced some interesting figures showing how the plate current was reduced by employing the three-coil instead of the usual two-coil circuit. At the same time, the radiation was increased, and there was a further big advantage in being able to obtain much sharper tuning.

"Before the tests," continued, Mr. Newman, "the plate current was about thirty milliamps on a two-coil circuit with a radiation of 350 milliamps. As the plate voltage was about 500, the plate input was thus fifteen watts. As the tests were to be conducted with an input of eight watts, he immediately installed a three-coil circuit, and after spending a considerable time in adjustments, succeeded in reducing the plate current from 30 to 6.1 milliamps, and increasing the radiation from 350 to 600 milliamps. With this radiation, the plate input was 3.3 watts, but it was found that the keying was not very reliable, so the plate current was increased to 7.8 milliamps, and the plate voltage to 550, thus making the plate input 3.8 to 4.4 watts, with a radiation of 600 milliamps.

The aerial and plate milliammeter were checked against a standard meter before and after the tests.

This is a very good example of what can be done when one tries to get the highest radiation for the lowest input, and shows the importance of tests.

Mr. Newman emphasised the necessity of having an aerial condenser of a very high dielectric, such as mica, to keep down the high-frequency resistance of the aerial system. He stressed the importance of keeping the aerial condenser as large as possible so long as a sufficient amount of inductance is left in the aerial coil, in order that it might act as a coupling to the plate coil.

Since the tests a larger pulley had been made for the motor driving the generator supplying current to the aeroplane generator, with the result that the radiation has been increased to 1.2 amps, and for a continuous wave signal, 1.8. The set was left in operation for at least ten minutes with a radiation of 1.8 amps, and then the filament was suddenly switched off, with the view of finding out if the valve showed any signs of heating, as such a radiation from a receiving valve seems rather abnormal. However, the valve was just as cool as if it had been used for receiving purposes.

The valve was not a specially-selected one. At least five other Marconi-Osram receiving valves had been tried out, each one giving similar results. The lecturer expressed his willingness to submit any Marconi-Osram receiving "R" valve, which the owner cared to bring along to him, to a test, under which he would guarantee to radiate at least 600 milliamps with it. Furthermore, he would replace the valve free of cost if it suffered any damage during the test.

RESULTS ACHIEVED.

The results achieved by Mr. Newman are probably world records, not only for a receiving valve, but for a 5-watt transmitting valve also.

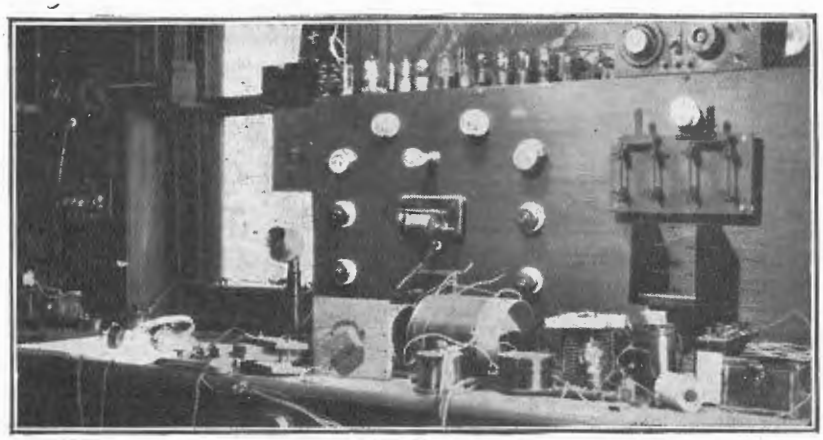
The following are a number of distances over which Mr. Newman's signals have been copied on one valve:

Tamworth, 520 miles over mountainous country.—Copied by Mr. Todd.

Sydney, 460 miles over mountainous country.—Both C. W. and speech copied by Mr. J. G. Reed, Mr. Maclurcan, and Mr. Pike.

Adelaide, 400 miles over land.—C. W. and speech copied by Mr. Kauper, Mr. Snoswell, Mr. Jones and others. Using a detector and one low-frequency amplifier, Mr. Kauper says the C. W. signals are audible up to 40 feet from the receivers.

Hobart, 360 miles over water and land.—C. W. and speech copied by Mr. Watkins and others.



Mr. Newman's Transmitting Apparatus.

DAYLIGHT RANGES.

S.S. *Euwarra*, 380 miles.—C. W. and speech, using one valve.

King Island, 160 miles.— Speech reported strength 6.

Terang, 130 miles.—Daylight conversations carried on with Mr. L. Osburne all through the Easter holidays.

DESCRIPTION OF SET.

The following particulars of Mr. Newman's low-power transmitting set will be read with interest by all experimenters.

The aerial is of the inverted L type, and consists of two 14-gauge copper wires, twelve feet apart, and supported by two fifty-five foot masts 220 feet apart. It points east and west, the down leads coming from the west end.

The earth lead is a 7/16 cable from the operating room to a zinc plate about 80 square feet, which is also soldered on to a three-inch gas-pipe and 1½in. water pipe running past the wireless room. In addition, about 500 feet of copper wire is buried underneath the aerial, and two-foot copper plates are soldered to the ends of each wire.

The counterpoise consists of two 7/20 copper wires, supported about 10 feet above the ground, running directly under the aerial. They are spaced thirty feet apart, and extend about forty feet past each end of the aerial. The two wires are bridged at intervals.

The aerial inductance comprises about thirty turns of No. 14 D.C.C. wire wound on a 5in. former, having taps at every second turn from the fifteenth to the thirtieth—twenty-three turns being in use.

The aerial condenser is made up of about fifteen plates of copper foil, 2in. x 1in., separated by high quality mica, which gives a capacity of about .0015 m.f.d.

A variometer, made from thirty feet of ⅜in. brass ribbon, wound in much the same manner as a spark transmitter oscillation transformer serves as a counterpoise inductance.

For plate winding eighty turns of No. 16 D.C.C. wire, wound on a 6in. former, is used, and a variable condenser of .00005 maximum capacity is connected across its two ends.

Sixty turns of No. 26 D.C.C. wire wound on a 3in. former (thirty turns being in use) makes up the grid-winding.

The Grid Condenser consists of a variable condenser, .00035 maximum capacity.

For Grid High-Frequency Choke 250 turns of No. 26 D.C.C. on a 3in. former does duty.

In the Microphone Transformer the core consists of a bundle of 23 gauge soft iron wire, 1in. in diameter and 3 meters long. Over this is placed an inch fibre tube 1/16in. thick. The primary winding consists of two ounces of No. 26 D.C.C. wire, wound in four layers, and has a D.C. resistance of about 3 ohms.

The secondary consists of about 6,000 turns of No. 40 enamelled wire, having a layer of paraffined tissue paper between each layer, and has a resistance of 2,200 ohms.

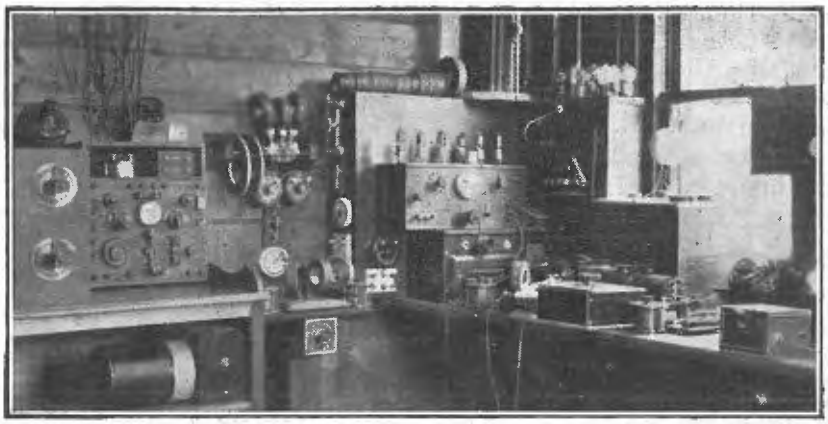
The Grid Leak is made up of two 50,000 ohm non-inductive resistances, in series, making a total of 100-200 ohms for the grid leak resistance. They were made of No. 44 Eureka wire, wound in an ebonite groove 1in. inside diameter, 2in. outside diameter, and ¼in. wide.

For the Smoothing Condenser tinfoil strips, 3in. long and 1in. in thickness are used. This condenser has been added to from time to time, and the number of sheets used is not known, but the capacity would be about ½ m.f.d.

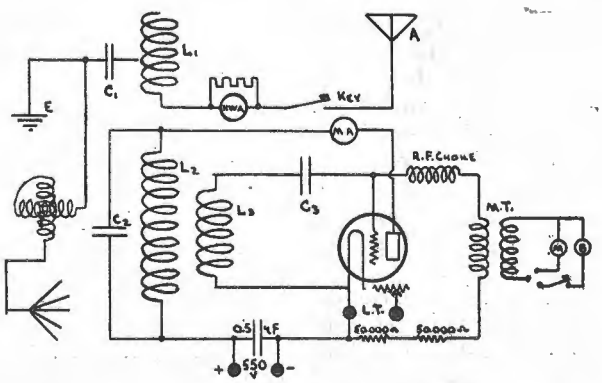
The High Tension Generator consists of a B.T.H. aeroplane wind generator, which gives 600 volts at 3,000 revolutions, and has a low tension winding of 8 volts for the filament current. By using the 8-volt winding as a motor, the generator can be driven electrically from about twenty volts D.C.

The Tapping Key is of the usual type, except that it is entirely enclosed in a brass-lined box, with the knob of the key just protruding through one end. This was made to eliminate any possibility of the pitch of the note varying when sending C.W., as the movement of the hand, when signalling is quite noticeable, even on 400 metres.

The Aerial Ammeter gives a reading from 0-500 milliamps, and with a



Receiving Instruments at Mr. Newman's Station.



Transmitting Circuit used by Mr. Newman, with which he has achieved some phenomenal results.

3.1 ohms shunt 300-1200 m.a., and with a 1.4 ohms shunt, .7 to 2 amps.

The Plate Ammeter reading goes from 0-100 m.a. A Marconi-Osram ordinary receiving R. type valve is regularly used.

For tuning, the aerial and earth circuits are first of all adjusted by the use of a buzzer and wavemeter, to approximately the wave length it is desired to use, provided the plate-tuning inductance with its tuning condenser at minimum, is below the wave length of the aerial circuit. Then, when C2 is gradually increased a point will be found which will give maximum radiation. The counterpoise is then connected to the earth wire and the variometer varied until maximum radiation is obtained. The wave length should not alter when the counterpoise is added. The high-frequency resistance of the aerial-earth counterpoise system was measured by inserting a non-inductive resistance in series with the aerial circuit until the aerial current was reduced to half its value, the resistance then in circuit being equal to the H.F. resistance of the entire aerial-earth counterpoise system at 400 metres.

This value was found to be about 30 ohms ,which seems rather high, but this method is not looked upon as being very reliable.

During the Sydney, Adelaide, and Hobart tests, the plate voltage was 550, and the plate current 7.8 milliamps, thus making a plate input of 3.8 to 4.4 watts. For C.W. working the filament current was 1.0 amps at 3.2 volts, and on telephony 1.2 at 5 volts. It will be observed that the total valve current is very small. With this small input the radiation was about 600 milliamps. Since then 2.2 amps have been obtained in the aerial.

NEW ZEALAND EXPERIMENTER HEARS MR. NEWMAN.

On April 24 Mr. Newman received a letter from Mr. Frank Bell, of Waihemo, New Zealand, intimating that he had heard him communicating with an experimental station in Sydney. The letter explained that the C.W. signals and speech were very clear.

Mr. Newman was using only an ordinary Marconi Receiving "R" type valve for transmission, and deemed it practically an impossible feat for signals to be heard over such a long distance when transmitted on only 6 watts. However, as his messages were being received regularly in Sydney, Adelaide and Hobart, Mr. Newman cabled Mr. Bell, asking him to "listen in" on certain specified dates. The day following the first test he was astonished to receive a cable in the following terms:

> "Telegraphy telephony received very clearly, replying two seventy metres to-night."

That night Mr. Newman transmitted from 8 o'clock to 8.30 on C.W. and telephony. Mr. Bell then replied on his 40 watt continuous wave set on two seventy metres, and the two men were then able to exchange reports. Unfortunately, Mr. Bell's wave length was too low for Mr. Newman's high-frequency transformers, and the latter had to use straight rectification with two low-frequency valves. However, Mr. Bell's signals came in strongly, considering the distance between the two stations, viz., 1,400 miles. Although seven-eighths of the distance was over water, one-eighth had to pass over mountain ranges over 10,000 feet high, which undoubtedly would have an absorbing effect on the signals.

It is not definitely known what distances have been covered, using a receiving valve for transmission in England or America, but as far as is known, it is not more than 100 miles C.W. only so that a distance of 1,400 miles C.W. and speech is easily a world's record, both for a receiving valve and plate input. This does not mean that it can't be done on the other side, but possibly it has never been tried, and if it had been, the signals would probably be overcome by interference from other stations. Experimenters in Australia are undoubtedly at an advantage in that respect.

FIGHT NEWS BY RADIO.

For the first time in history, Argentine was joined with New York by radio when the high-power station Radio Central, at Rocky Point, Long Island, transmitted a complete description of the Firpo-Brennan bout round by round, direct from the ringside at Madison Square Garden, which was received but an instant later in the homes of hundreds of South Americans within hearing distance of the local broadcast station there.

No previous attempt had been made to intentionally furnish South America with a radio service, especially of a character which involves a definite schedule, as in the case of the recent demonstration where minutes were as precious as hours to the anxious listeners located over 6000 miles from the scene. In spite of the great distance separating the two points, only a fraction of a minute was required to have the reports of each round in the hands of the fight fans in Argentine.

The station of the Radio Corporation of America, in Long Island which ordinarily communicates with points in Europe, was connected by land wires to an instrument at the ringside, where an announcer was stationed. Immediately upon getting the returns they were telephoned to the Broad Street operator, who transcribed them into dots and dashes, then flashing them to Argentine by radio on a long wavelength. The operator there reversed the operation by re-transcribing the telegraph characters into a word picture, which was broadcast on a short wave length for the benefit of listeners within range of the local station.

Reports from Argentine state that the demonstration was highly successful and enthusiastically received.

PERSONAL.

Mr. E. T. Fisk, managing director of Amalgamated Wireless (Australasia) Ltd., was entertained at luncheon at the Wentworth Hotel, Sydney, recently, by the council of the New South Wales division of the Wireless Institute of Australia.

* * *

Mr. Malcolm Perry, who has been associated with Amalgamated Wireless Ltd. for some considerable time, recently relinquished his position to join up with the New System Telephones Pty., Ltd.

Australia's Broadcasting Future

Profiting by Other Countries' Experiences

Mr. E. T. Fisk talks to Wireless Institute

A MOST informative and inspiring lecture on Broadcasting in Great Britain and America, and its application to Australia, was delivered by Mr. E. T. Fisk Managing Director of Amalgamated Wireless (A'sia), Ltd., before a well-attended meeting of the N.S.W. Division of the Wireless Institute of Australia on Thursday evening, June 14.

In opening his remarks Mr. Fisk recalled the fact that about thirteen years previously the Wireless Institute had been formed in Sydney. The happenings in the world of wireless since then had, indeed, been great. To-night he heard members discussing the matter of receiving messages over 7,000 miles of ocean from American experimenters, without, he felt sure, realising the full importance of what had recently been accomplished. The work that Australian experimenters have performed should be known to the whole world. It has been carried out on what is, comparatively speaking, small and inexpensive sets, which makes it all the more praiseworthy. He had no hesitation in saying that the reception of signals radiated by American amateurs ranked equal to the feat performed by Marconi, when he got his first signals across the Atlantic. That it will have a big influence on the future of civilisation is beyond doubt.

Referring to the question of broadcasting, Mr. Fisk said it was entirely different from anything which had previously been encountered in Australia, or, in fact, any of the countries where wireless has made such a hit in recent years. Primarily, it is a new phase of entertainment. "Few of us ever realised," said Mr. Fisk, "that the science which has already demonstrated its value in commerce, and to a far greater extent in saving life at sea, was capable of being developed to the most unique form of entertainment the world has yet seen."

"When broadcasting was commenced in America it was so entirely new that it was impossible to foresee the many problems which soon began to crop up. America was not able to view matters then as she is now, and as we also are able to see them. Contrary to the general belief, the first demonstration of broadcasting was given in England in April or May, 1920, when Melba sang from what was really a wireless telephone station. The second demonstration was given to the Empire Press Union delegates when they were crossing the Atlantic, and Australia had the distinction of having the third demonstration, which was given before a number of Parliamentary representatives at the Queen's Hall, in Melbourne, in October, 1920."

Mr. E. T. Fisk, M. Inst. R. E., Managing Director, Amalgamated Wireless (A'sia) Ltd.

"But, as is usually the case with most big undertakings, a beginning with broadcasting on what might be described as a huge scale, took place in America, and to-day, approximately 600 stations there are supplying entertainment to over two million "listeners-in." There was, and probably still is, a certain amount of chaos in America, but it must not be thought that it is all chaos there. The trouble is that they have so many broadcasting stations that it is not always possible to hear the particular sermon one wants to on Sunday morning. Sometimes only the parson's hiccough is heard." (Laughter.)

After America had been going for some time the newspapers in England raised an agitation for the commencement of broadcasting. Wireless there was under the control of the Post Office, and the official heads realised the problem they were up against in drawing up a scheme which would eliminate the bad features of the American system. In the meantime the authorities were inundated with applications to broadcast. After considering the position for about six months the Post Office and the Wireless Manufacturing Companies drew up the scheme now in operation. Eight stations were licensed to broadcast in November, 1922, the whole organisation being under one heading, known as the British Broadcasting Company. Rapid progress was soon made, and the eight stations are now in operation. The London sta-

tion broadcasts thrice daily, but the others mainly confine themselves to evening programmes. Licenses to receive these programmes can be bought over the Post Office counter at a cost of 10/- each. The difficulty now is that one Company cannot supply programmes to suit all tastes. The people's pockets have to be considered, and, consequently, no high-class entertainments can be transmitted, simply because the artists place too high a figure on their services. Theatrical proprietors and concert companies now refuse to allow their performances to be broadcasted free."

WONDERFUL OPERAS.

"I listened," said Mr. Fisk, "to Covent Garden operas being broadcasted, and from a musical point of view the results were better than could have been obtained by numbers of the audience in different parts of the house. Special arrangements were, of course, made to broadcast these operas. One well-known Sydney journalist, who "listened-in" with me to one of these programmes was so impressed that he immediately returned to his office and sent a 200-word cable to his paper in Australia. The applause of the audience could be plainly heard, and between acts, the voices in the stalls. The same concerts were heard all over England and in numbers of Continental towns."

"On another occasion, said Mr. Fisk, the speeches at Burns' centenary dinner were broadcasted, and again excellent results were achieved. The clatter of the cutlery was plainly audible, and one treat which "listeners-in" enjoyed was a speech by G. K. Chesterton, which came through the headphones with remarkable clearness and volume.

"In fact," said Mr. Fisk, "I am quite certain that at my own fireside in another part of London I heard Mr. Chesterton to far greater advantage than many of the diners."

VARIED PROGRAMMES WANTED.

Coming back to the main point of his lecture Mr. Fisk said the varied tastes of the English public was the problem which the Broadcasting Company was now up against. In America with her multiplicity of stations, all tastes were catered for, but instead of each person getting the programme he or she wanted, what was mainly received was a medley of the different programmes. "Australia is in a unique position in the matter of broadcasting," continued Mr. Fisk. "We have an area to cover about twenty-five times as large as Great Britain, and, approximately, as great as America. But unlike these two countries, the former with a population of about fifty-five millions and the latter 120 millions; we have only a little over five millions of people. If we were to broadcast on the British basis it would require over two hundred stations, and the cost of erecting and operating these would be enormous. Turning to the American scheme we are confronted with the same problem. The recent Melbourne Conference got down to the fundamental basis of broadcasting, which is entertainment. Market and weather reports and news items are alright in their way, but, like the cinematograph when used for educational purposes, they are not sufficient to hold public interest and enthusiasm. Broadcasting must have the dissemination of entertainment programmes as its basis, and these must be paid for. Theatres and music halls could not exist if conducted in the open air. The artists naturally require payment for their services. The same applies to any commodity which has been developed to where it can be applied to the use of the world at large. Technical skill has to be applied before it is of practical value, and the experiments being conducted by enthusiasts to-day will only reach the peak of their value when they can be turned to the use of mankind generally."

REGULATING BROADCASTING.

"When we go into wireless matters we leave the world of Newton and enter the world of Einsten. We cannot put walls around broadcasting, but we can govern it by the use of wavelengths."

At this stage Mr. Fisk read the regulations agreed upon by the recent Broadcasting Conference, and touched on the various points in connection therewith.

FREEDOM FOR EXPERIMENTERS.

On resuming his lecture he dealt with the question of how the regulations would affect experimenters.

"At Conference," said Mr. Fisk, "I opposed, in the interests of experimenters themselves, a suggestion that they should be confined to wave-lengths of from 200 to 250 metres. It would be impossible to do any effective work if they were so confined. The experimenter should be allowed the fullest freedom, even if he desires to work on wave-lengths from 10 to 10,000 metres. Conference endorsed this principle. The experimenter is, invariably, wrapped up in his experiments, and is the last man in the world to interfere with the work of others. His knowledge of radio and his interest therein are a guarantee of this. The question was raised at Conference as to the position of the Broadcasting Companies if experimenters were allowed to send and receive over any wave-lengths. "Personally," said Mr. Fisk, "I don't think the amateur will deliberately poach to any appreciable extent. He will probably do a bit of "listening-in" when he becames tired of his experiments, and even then I don't think he should be fined if he smiles at a Harry Lauder joke. There should be no difficulty in getting an undertaking from experimenters that they will not invite all their neighbours to "listen-in" each night, and that, in itself, will prove a protection for the Broadcasting Companies."

At the close of his lecture Mr. Fisk stated, in reply to a question, that he could not say definitely what the Government would do regarding the future issue of experimental licenses. In expressing his own opinion, however, and voicing the spirit of Conference, he could say that so long as a man could demonstrate his intention to work along experimental lines he should be given the fullest freedom.

Mr. Fisk was accorded a hearty vote of thanks at the conclusion of his lecture.

South Australia Ready for Broadcasting

(By Our Special Correspondent.)

South Australia, generally, and Adelaide particularly, have followed the lead of Sydney and Melbourne in embracing radio experimenting with the greatest enthusiasm. For some time an amateur organisation has been in existence, and the membership of late has steadily increased. The movement has now been given a great fillip by the formation of an Association to watch the interests of those seeking the promotion of broadcasting from either the commercial, experimental or entertainment standpoint. This body will be known as the Radio Association of South Australia, and behind it are well-known influential business men who are anxious to see broadcasting exploited to its utmost possibilities. At the first meeting Mr. H. C. Mackenzie was appointed Honorary Secretary. The meeting was held at the offices of Messrs. Newton McLaren Ltd., the well-known electrical engineers, and was presided over by D. E. McLaren. In discussing preliminary matters Mr. Henry A. Kauper said that in countries where broadcasting had obtained such a tremendous grip on the populace, no one would dare to forecast what the amateur wireless set would do in a year's time, as compared with what was being accomplished to-day. He ventured to predict, however, that within another twenty years the broadcasting of sounds would be followed by the broadcasting of scenes, and people would be able to sit at home and witness the Melbourne Cup being run.

Mr. L. C. Jones, who represented Adelaide at the Broadcasting Conference in Melbourne dealt at length with the proposed regulations. At the close of the discussion which followed Mr. Jones was thanked for the efficient manner in which he had represented his State at the Conference.

Other interested Adelaideans present were Mr. Miller Randle, one of the city's leading dentists, and Mr. Harry A. Kauper, well known in aviation circles here. Mr. Randle is enthusiastic over the movement, and is particularly anxious that immediately the regulations are gazetted they should be followed up as quickly as possible, in order that the public might share in the advantages of broadcasting in South Australia. For a number of years Mr. Kauper has been experimenting with entirely satisfactory results, and his Sunday morning concerts have been a feature of the early days of wireless in South Australia. Some day, no doubt, he will be looked upon as a pioneer of the movement in this State.

At the managerial meeting of the Association Mr. Kauper said it would be wise for the Association to keep closely in touch with developments in the other States, with a view to the formation of a company in Adelaide to undertake broadcasting on a commercial basis. Once efficient broadcasting was introduced there would be a tremendous demand for receiving sets.

There is little doubt that the success of the movement is assured in South Australia. At the next meeting of the Radio Association it is expected that Mr. R. B. Hungerford, representative in Sydney of the Western Electric Company of America, and Mr. Collis, a West Australian enthusiast, will be present. It is possible that a wireless concert will be held.

A CONVIVIAL GATHERING.

The Council of the N.S.W. Division of the Wireless Institute of Australia "does things well" when entertaining a visitor. Mr. Collis, of West Australia, is the guest on this occasion.

Tell Us What You Think of "Radio"

A cordial invitation is extended to readers of "Radio" to write and tell the Editor what they think of the magazine. The task of catering for the needs of our large and ever-growing circle of readers is no simple one, and it may be that in our anxiety to do the best for all concerned we are overlooking the claims of some who are entitled to consideration. If so, let us know about it! If any reasonable request comes our way every endeavour will be made to fulfil it. We want helpful, constructive criticism, and we feel sure that out of our thousands of readers there are many who can offer it.

Let us hear from you—Now! Write as you feel—critical or complimentary—state your reasons and offer suggestions.

High-Class Entertainment

Those fortunate enough to possess home receiving sets were treated to a high-class vocal and instrumental entertainment one evening recently, when numerous items were broadcasted from the headquarters of Messrs. W. H. Paling & Co., the well-known musical supply house of Sydney. In collaboration with the New System Telephones Pty. Ltd. elaborate preparations were made to ensure success. Concealed microphones were fitted in the concert hall from which wires led to a room on the sixth floor, where the aerial had been erected.

The first items to be transmitted were played by Mr. Roy Agnew, the well-known composer, who shortly leaves for London. Later, the Philharmonic Society, which was rehearsing for the next performance of "Elijah," sang with fine effect several of the well-known choral numbers. The performance was under the baton of Mr. Joseph Bradley. The following night a full concert, lasting from 8 o'clock to 9.45 p.m., was broadcasted. The success of the night from every point of view was the reappearance in Sydney of Madame Emily Marks, the well-known Australian soprano, who has been singing in England and America for the past ten years. Mr. Oswald Anderson, who was in charge of the proceedings, said that Madame Emily Marks was the first Australian to broadcast in America.

Reports received from different centres indicate that transmission on both evenings was a tremendous success. Those "listening-in" at Mr. Schultz's home at Longueville (a suburb of Sydney) heard the hand-clapping of the audience with almost deafening effect.

The transmissions from Palings are being carried out three times each week—Monday, Wednesday and Friday, commencing at 7.30 p.m. on a wave-length of 250 metres by New System Telephones Pty. Ltd., acting under a temporary patent license from Amalgamated Wireless (A'sia.) Ltd.

Very soon it will be possible to hear high-class concerts every night in the week. The public scramble to buy receiving sets will then resemble the rush to the goldfields in the old days.

Radio Set that Works Without Aerial or Earth

One of the most startling developments that may revolutionise radio is this radio set that will cover any distance and will work without any aerial or ground. It embodies entirely new fundamental principles. It was demonstrated recently before a capacity audience at Columbia University by Professor Louis A. Hazeltine, of Stevens' Institute of Technology, who invented it. This Neutrodyne receiver is incapable of oscillating, is non-radiating, and utilises two stages of audio frequency, five tubes being used, but its design and fundamental principles are entirely new and of a revolutionary character. This is by far the greatest advance made in radio, and opens up an entirely new field for development. This set can be operated entirely by dry batteries.

Radio Lessens Insurance Risks

How Life and Property are Saved

The Ocean Yields up its Terrors

THE tremendous value of wireless telegraphy as a factor in lessening the risks incurred by Marine Insurance Companies cannot fail to have impressed itself upon those most concerned. As a natural consequence these Insurance Companies should feel very kindly towards wireless and those responsible for its rapid expansion. It is only necessary to consider briefly the many uses to which it is now put in connection with the shipping industry to realise the extent to which it re-acts upon marine insurance of all kinds.

The security obtained by the use of Wireless for all who travel in ships, for the ships themselves, and their valuable cargoes is of distinct advantage to Insurance Companies. In the case of the *Titanic* the bill met by the Insurance Companies was very great, but if it had not been for the assistance rendered in response to the wireless distress call, the claims would have been considerably greater.

For more than twenty years now the number of ships fitted with radio outfits has been increasing rapidly year by year. This fact means that the present-day Wireless communication service is of relatively greater value to each ship concerned than previously. This state of affairs must improve as time goes on, and the benefits to the Insurance firms will thus be further increased. If information could be secured regarding the number of ships that have been rescued from dangerous positions through the agency of wireless it would unquestionably disclose that a tremendous saving has been effected.

In any case, there is at hand a sufficiently impressive list to demonstrate the outstanding value of wireless when danger threatens ocean-going vessels.

The wreck of the *Republic,* as the result of a collision with the *Florida,* was the first disaster of any magnitude in which assistance was summoned by wireless. As will be remembered, this initial effort was so successful that all the passengers and crew were saved. In the *Titanic* disaster some 700 lives were saved, and in the following year, when the *Volturno* was burnt in mid-Atlantic, no fewer than ten vessels hastened to the rescue in response to wireless calls. Incidentally, 571 lives were saved.

In June, 1917, the *Waitotara* caught fire in mid-ocean, and became a total wreck, but as a result of calls sent out by wireless, other vessels hastened to the scene and rescued the crew. Three years later the *Havre,* bound from New Zealand to Newcastle, ran short of fuel 200 miles off Sydney, and drifted helplessly about Here, again, the value of wireless was demonstrated, and through it arrangements were made for two tugs —also carrying radio equipment fitted by Amalgamated Wireless (Aust.), Ltd., to go to the assistance of the helpless vessel, which was then safely towed to Newcastle.

On January 22 last year the *Helen B. Sterling* got into difficulties during very rough weather on the trip from Newcastle across the Tasman Sea, and sent out a radio call for help. A number of ships immediately responded, but H.M.A.S. *Melbourne* was able to reach the scene first. The whole of the crew was rescued just in time, and under circumstances not likely to be soon forgotten.

The *Mindini* was recently lost on the Queensland coast, and only a few weeks ago the *Iron Prince* was wrecked near Cape Howe, but in both cases immediate wireless communication was established with the shore and other ships. As a result speedy rescue was afforded in both cases.

Other means adopted during the last few years to increase the safety of those who "go down to the sea in ships," include the installation of Wireless Direction Finders and the fitting of specially-designed Wireless sets in life-boats. The direction finder enables a ship to fix her position within one degree of accuracy, and as the wireless system is not interfered with by fogs or cloudy weather it is inevitable that this means of ascertaining position must eventually be in universal demand.

On the first voyage of the *Stavender Fjord* from Christiania, after she had been fitted with a Wireless Direction Finder, distress signals were received from the *Otta,* which was drifting helplessly with her rudder stock broken. From the position sent out by the *Otta,* and accepted without question, it appeared she was 275 miles away, and the *Stavenger Fjord* steered towards the position given. On arriving there, however, no trace of her could be found, and observations with the direction finder indicated that she was still sixty miles away. A few hours later she was picked up in that position.

During heavy storms in the North Atlantic the Norwegian steamer *Mod* was so badly damaged that she became practically a wreck, and for thirty-six hours the crew were huddled on the deck without food. The captain sent out an S.O.S. message, giving what he believed to be his position, but which proved erroneous. At least six vessels diverted their courses in an endeavour to render help, but no trace of the *Mod* could be found. For some time the British vessel *Melmore Head* was too far away to be of any assistance, but the captain kept in touch with what was happening, and when he found the distressed vessel's signals getting stronger directed the wireless operator to ascertain her position by means of the direction-finding apparatus. According to the reading obtained the *Mod* was seventy-eight miles away from the position she herself had sent out, and in an entirely different direction.

The captain of the *Melmore Head* placed his reliance on the direction finder, and found it to be correct. He reached the foundering vessel just in time to save twenty-three members of the crew before she sank.

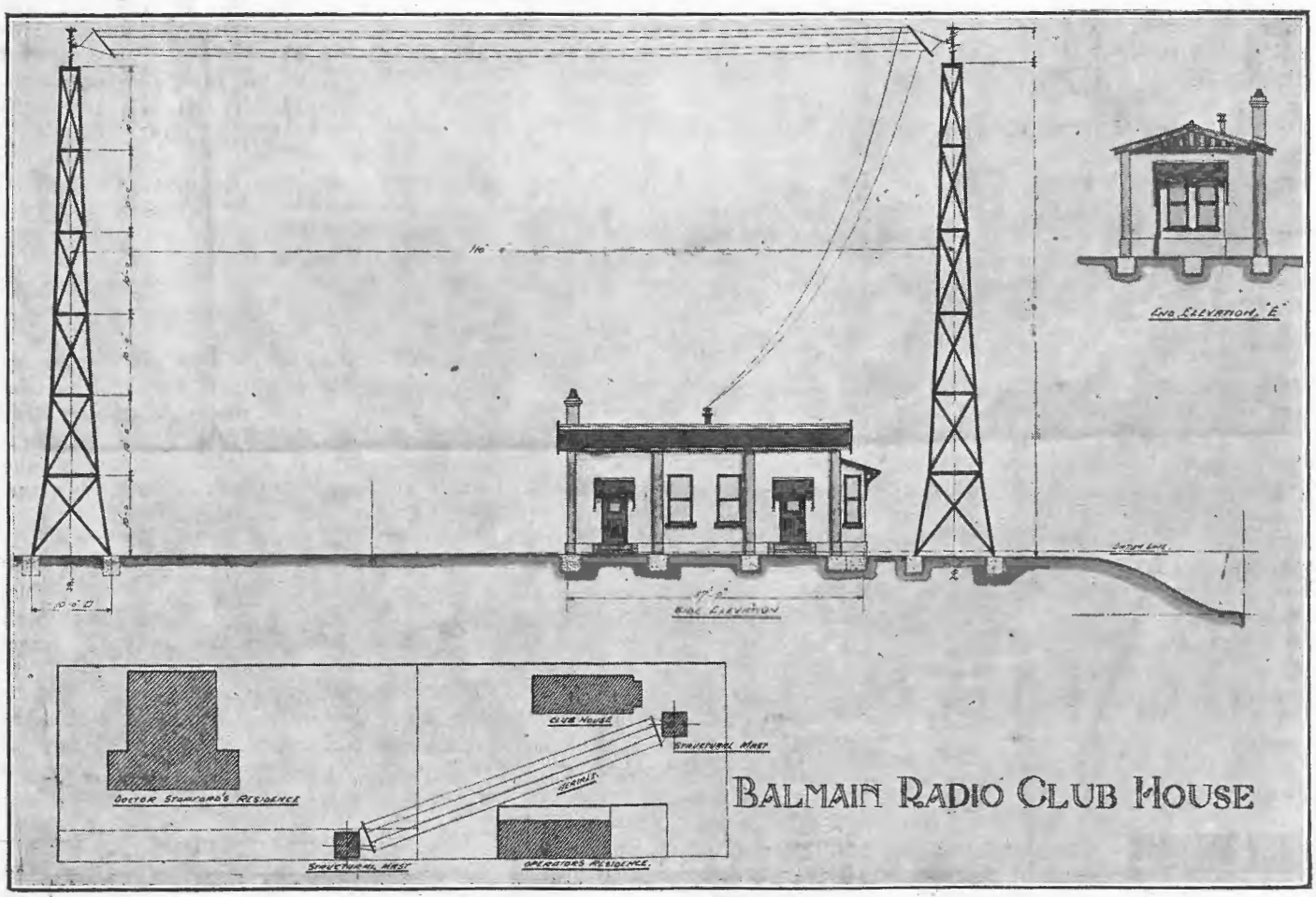
The master of the *Rosalind* reports that on his way to help the distressed steamer *Thyra,* which was drifting rapidly before a strong breeze, he reached the position given, but could find no trace of her. He then tested the direction finding apparatus, called up the *Thyra,* got a bearing, ran straight on it, and proved the utility of the apparatus. On the day following this incident, in a blizzard, the captain of the *Rosalind* directed the *Eastern Course* to his ship by means of the direction-finding apparatus.

There are many other recorded instances of vessels being steered through fog in dangerous waters by means of a direction finder. At Inchkeith, in the Firth of Forth, an experimental wireless light-house, which sends out signals for every point of the compass, and so enables vessels fitted with an appropriate receiving aerial to steer their way up the Forth in the thickest weather, has been erected by Marconi's Wireless Telegraph Company.

Ocean travellers now find that there is available, at all times, a modern wireless telegraph station which places them instantly in communication with any part of the world. This highly-efficient service is available at a most reasonable charge. The Insurance Broker or Underwriter can keep in immediate touch with changing conditions affecting matters in which he is interested, and as he becomes aware of market fluctuations he can frequently conduct to his advantage a good deal of business without moving from his cabin on board the ocean liner. Such facilities are of particular value in those cases where big insurance propositions are being carried out in other countries and representatives are travelling by sea in connection therewith.

Cargo insurance is another matter in which the wireless communication service proves of value. There are many instances in which the course of a vessel has been diverted owing to dock disputes, and much perishable cargo has thus been saved from destruction. Insurance Companies consequently have been spared from having to meet claims which they would otherwise have incurred.

Balmain Radio Club Sets a Good Lead



Members of the Balmain Radio Club are deservedly proud of their Club House. The above illustration shows the general lay-out of the Aerial, Club House, etc.

Patents Section

By GEORGE APPERLEY
RADIO ENGINEER

The following are abridgments of complete specifications of Wireless Patents notified in the Official Journal of Patents, as accepted at the Commonwealth Patents Office, Melbourne, during the month of April, 1922:

No. 6789/22.—Inventor: C. S. Franklin, England, describes a method of simultaneous transmission

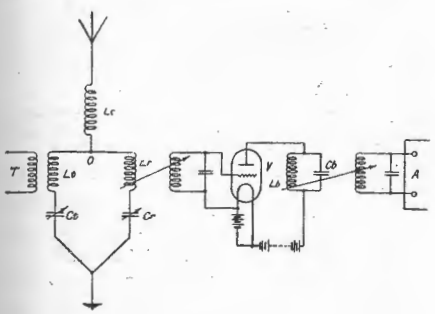


Fig. 1.

and reception, employing a single aerial system. The aerial system has a common part—LC, Fig. 1, and two branches—Lt Ct and Lr Cr—connecting this common part to earth; the time period of the first branch being adjusted to be equal, or approximately equal to that of the part Lc. The second branch—Lr Cr—is tuned to a different frequency, and connected to the combination of the common part and the first branch at or near to a node of potential point O. The introduction of the second branch will, therefore, not affect the tuning of the circuit Lc Lt Ct. To this combination is coupled a circuit T, in which oscillations can be generated for transmitting purposes, the transmission currents flowing in Lr Cr thus being small. Received waves, having a length corresponding to the period of the combination Lc Lr Cr will, therefore flow, and set up beats in this circuit, the frequency of the beats depending upon the frequency of the transmitted and received waves. Coupled to Lr is a circuit, in which the beat currents can be rectified by the valve V and passed to the circuit Lb Cb, tuned to the beat frequency, which may be widely different from that of the transmitted wave. Oscillations set up in the last-named circuit from the local transmitter will, therefore, be very feeble, and will not affect the reception of signals from the distant station.

An amplifier—A—associated with Lb Cb may then be employed to amplify these beats, the frequency of which enables the amplifier to function efficiently without interference from the transmitter.

10875/23.—Inventor: Mr. W. Dornig, Germany.—Provision for the efficient cooling of an electric plate condenser is made by allowing the cooling medium to pass through channels formed by distance pieces. The metal plates 1, Fig. 2, separated by

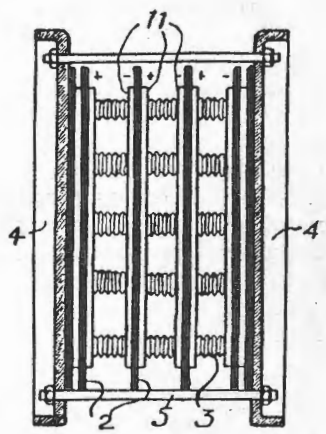


Fig. 2.

an insulating plate 2, are spaced by the pieces 3, the whole being clamped between the plates 4 by the bolts 5. The condenser is placed in a container and air oil, or other suitable cooling medium caused to circulate between the plates.

The Experimenters' Corner

AN INTERCHANGEABLE DETECTOR.

THE crystal detector is coming into its own again with the employment of the various forms of Reflex amplification, and for the undistorted reception of radiophone music. The accompanying drawing shows a cheap and efficient form of detector which can be made from the material found in all experimenters' junk boxes.

For the base use either a piece of hard rubber, fibre or paraffined wood. If the latter is used, colour it black with a solution of nigrosine dye in methylated spirits and shellac. Now get a piece of sheet brass one eighth of an inch thick and about four inches

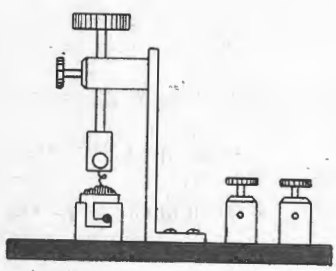


Fig. A.

long. Bend it into the shape shown in Fig. A, after the holes for the supporting screws and the top terminal have been drilled. The vertical rod consists of a piece of one-eighth inch brass with a small hard rubber knob screwed to the top, and a miniature wire connector, either soldered or screwed to the bottom end. This connector makes it possible to quickly change the type of "cat-whisker" or contact wire. For the crystal cup obtain several burnt-out lamps from motor headlights; break away the glass and dig out the plaster filling from the metal base, leaving the insulating compound at the bottom. The crystals are mounted in these cups, using an alloy of low melting point, or an amalgam of tinfoil and mercury to hold them in place.

On the base, immediately under the cat-whisker mount a miniature electric light socket, and connect it to one of the terminals, the other being connected to the vertical standard. Make several of these crystal cups, and mount in them various minerals. They take but a second to change.

A CRYSTAL VALVE COMBINATION.

Owing to the high cost of operation of a valve receiver for the junior experimenter, many employ a good stable crystal detector, not only for emergencies, but for any local signals that can be received on it. The general practice is to tune in the signal on the valve first, and if it is loud enough to give satisfactory results with the crystal, the set is switched over to the latter. Complicated switching is done away with if the circuit given in Fig B is employed. A two-bar slide switch is used for this change of connections. When the switch is turned to the crystal position the filament of the valve must be off.

A HONEYCOMB COIL RACK.

Most modern experimental radio stations employ honeycomb coils for the reception of signals, but few experimenters take any great care of their coils when not in use. The general practice is to allow the coils to lay about on the operating table until required. Common-sense will tell you that such usage causes considerable wear on the insulation of the wire in the coils. A rack for honeycomb coils which keeps them in a safe position when not in use is illustrated in Fig. C. Obtain a strip of close-grained wood or fibre of the dimensions shown, and drill a row of holes spaced 1½in. These holes should be a tight fit for the projecting pins on the honeycomb coil mounting. If this rack is mounted vertical, and the numbers of each coil marked against the corresponding hole there will be no loss of time in selecting them when wanted.

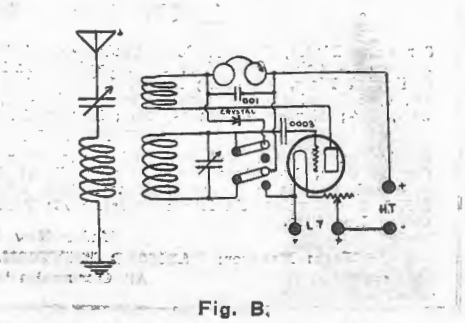


Fig. B.

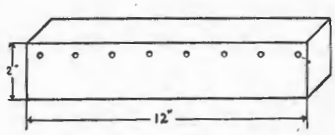


Fig. C.

SIMPLE POLARITY INDICATORS.

Frequently it is necessary that the polarity of a direct current source be definitely known, as, for example, when connecting up an accumulator for charging purposes. This can be determined with certainty by any of the following methods.

Take an ordinary potato, or even a slice of one will do (especially at their present high cost), and at opposite ends insert two pieces of German silver wire, to which the battery leads are connected. As soon as the current flows through this combination a green spot will be seen to form around the positive wire.

The second method is to dissolve in a little water a small crystal of sodium sulphate (Glauber's Salt), and

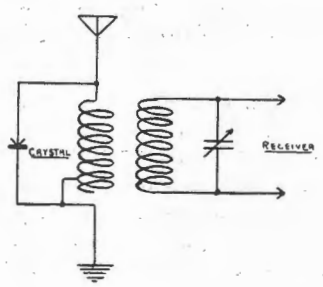
then add a drop or two of phenolphthaleine solution. This solution is used in all chemical laboratories as an indicator for alkaline solutions, and can be obtained from any dispensing chemist. When two wires are inserted in this solution, and a current passed through it, a pink colouration will form around the negative wire. By stirring up the solution this will disappear, and it is then ready for further tests. If a quantity of this solution is placed in a glass tube and two German silver wires inserted through rubber corks at each end, a handy portable polarity indicator is formed. It is well to seal up the corks and the part where the wire enters with sealing wax to prevent leakage.

If neither of these simple indicators are available, the two wires can be placed in a glass of water, into which a pinch of salt has been added. Bubbles of hydrogen will form around the negative wire, while there will be only a slight, if any, trace of gas at the other pole.

A SIMPLE STATIC ELIMINATOR.

Experimenters who are troubled with strong interference from static or near-by commercial stations should try the following idea on their receivers. In addition to reducing interference from strong unwanted stations, it acts as a limiter also, and prevents to a large extent the destruction of the sensitive point on lightly-adjusted crystal detectors.

A carborundum detector is shunted across the aerial and earth terminals of the loose coupler primary. First of all adjust the secondary circuit and its detector to maximum sensitivity, and then switch in the shunted crystal and adjust the latter until a certain point is reached, where the reduction in signal strength is more than compensated for by the decrease in static. There will always be a reduction in signal strength when the carborundum crystal is adjusted properly. The reason for the action of the carborundum crystal is that its resistance does not follow a straight line law, but decreases rapidly after the applied potential reaches a certain value. For weak signals the resistance of the crystal shunt will be high, and the greater percentage of the received energy will pass through the coupler primary, but as soon as the signal strength reaches a certain critical value depending upon the adjustment, the resistance falls and the excess energy is by-passed to earth. Make a note of this little suggestion and try it out next summer when QRN is QSA.



Circuit, showing use of Crystal in reducing strength of static.

WHAT BROADCASTING MEANS.

"The progress of wireless broadcasting in England, America, and a few other countries is really astonishing," says a traveller recently returned from abroad. "This thing is not to be thought of as a toy, but as one of the most strikingly interesting, and, I may add, educational, forces the world has yet seen. With regard to the recent meeting in the interests of establishing a broadcasting company, it seems to me only fair that the general public should do all they can in furthering this movement. Many people do not appear to realise that there is such a thing as "talking through wireless." It needs to be impressed upon them, and enthusiasm should be developed for this scheme."

Victorian Notes

(By Our Special Correspondent.)

Just now numerous Victorian experimenters are converting their aerials to the squirrel-cage or battleship type. Quite a boom has set in, the lead being set by some of the State's foremost experimenters.

The familiar aerial of 3 E.F., at Elwood, loomed up, and it was apparent that an alteration had been carried out. Very soon quite an army of experimenters followed suit.

Congratulations to Mr. H. W. Maddick (3 E. F.) upon his appointment to the Wireless Controller's Staff.

It is not often that one gets the chance to "listen-in" on a wireless man hunt. This affair had to do with a cheerful individual, who, by some means had become possessed of a kink and an unlicensed transmitting set. He was sending S.O.S. with a frenzy that indicated beyond doubt the need for helping him to sanity per medium of a well-directed physical effort. Mr. Maddick and Mr. C. R. Whitelaw (3 B.H.), Mooroolbark, were the two men on his track. An excellent demonstration of two-way communication was provided by 3 E.F. and 3 B.H. in the interchange of reports. Change-overs were remarkably snappy.

The Present Day Wireless Officer

By W. J. MARTIN

(Senior Operator R.M.S. "Niagara")

Most people have a very hazy idea of a Wireless Officer's life in the Merchant Service, and there are many who believe it to be an idle one, but it is not, and to these misguided folk the following information is directed.

I must confess in the good old days we had an easy time. The duties were indeed light, listening-in for five minutes every half hour during the day (very seldom hearing anything except a few stray atmospherics), and a continuous watch of about two hours at night. Now, however, it is quite different!

The present-day marine wireless man needs to be versatile, because the essential qualifications for a position even in a junior capacity on a trans-Pacific mail steamer extend far beyond telegraphy. Besides qualifying as an expert operator, he must be a first-class touch typist, with a fair idea of book-keeping and general knowledge of electricity, a good mechanic, have a smattering of journalism, and last, but not least, he must be a diplomat.

Perhaps the reader wonders why these qualifications are necessary, so I will briefly outline the daily routine.

Thousands of telegrams are dispatched and received at this station during a round voyage, and there is a tremendous saving of time by taking received traffic direct on the typewriter, when signals are sufficiently strong. It is a great mistake to imagine once radiograms are received or transmitted they are filed away and finished with. Every message has to be abstracted, and the correct amount allotted to the various administrations. Besides compiling the Wireless Company's returns, special abstracts are made for the Shipping Company. Cash receipts are written in triplicate for every transmitted message; and a messenger receipt written for every received message; to say nothing of the official log book with its complete record of every signal. Then there is the handling of cash running into hundreds of pounds—no light task—especially during the busy part of the voyage. Faults cropping up in the gear have to be located and rectified without loss of time; otherwise traffic accumulates, resulting in more or less temporary disorganisation.

In addition to the above-mentioned duties, a daily paper, "The Wireless News," is published, containing the news of the world received by wireless each night, and events of shipboard interest, such as deck sports, fancy dress balls, etc.

Under no circumstances must anything be divulged appertaining to radiograms, and for this reason great care is exercised. One strives to satisfy the curious without really telling them anything.

Time signals are received daily throughout the voyage, and the ship's chronometers checked to within one hundreth part of a second. Approaching the American coast in foggy weather wireless bearings are received which greatly aid navigation.

The installation on the *Niagara** has done some remarkable work, and has the reputation, even in American waters, of being one of the finest in the Pacific, and we are very proud of it.

Under favourable conditions messages have been sent and received up to 5,000 miles, and one night direct communication was established with Canada, United States, Hawaii, Samoa, Fiji, New Zealand, and Australia.

Those who think a wireless officer's life is an idle one should travel on the *Niagara* for a voyage—they will soon be disillusioned!

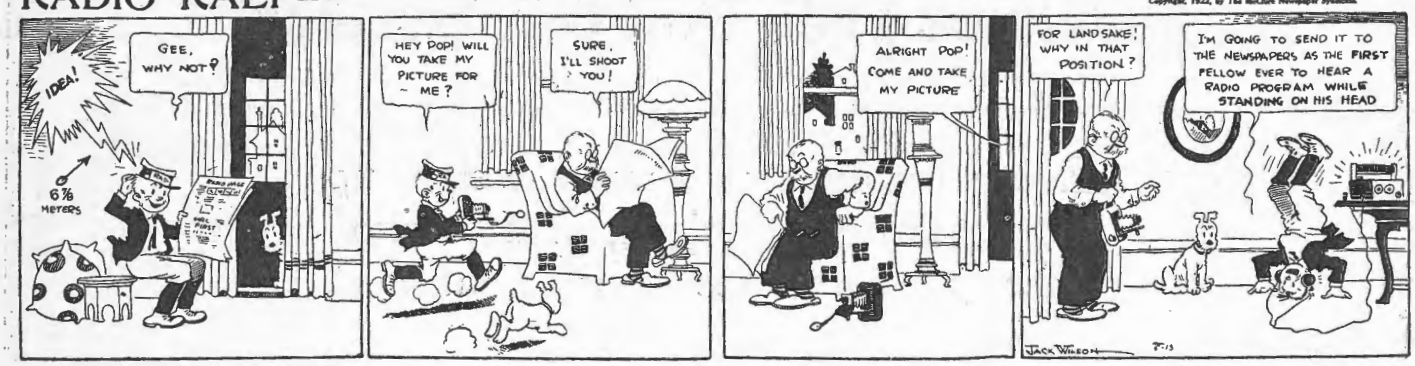
*Particulars of the *Niagara's* wireless installation and work was published in "Radio" No. 1.

Radiofun

At considerable expense we have made exclusive arrangements for the publication of "Radio Ralf's" adventures, which is one of our regular features. Hereunder is one of Ralf's adventures, and in subsequent issues of "Radio" his many thrilling experiences will be recorded, which we believe our readers will enjoy.—Ed.

RADIO RALF---

By Jack Wilson



Radio Activities in New Zealand

(*By Our Special Representative.*)

The recent trans-Pacific tests aroused considerable interest in New Zealand, and some excellent reception feats have been recorded by local experimenters. One complete message received by Mr. R. White, of the New Zealand firm of Lewis R. Eady and Son was as follows:

> "Spackman, Auckland Radio 6 XAD Mott, Avalon, Catalina Island, Cal." Test Cable results G. C. Bell, 2 C.M.K."

The sender of the message also called up Mr. Maclurcan, of Sydney, N.S.W., whose call is 2 CM.

Mr. A. Spackman, of Auckland, also achieved excellent results using one valve, and Mr. W. Andrews, of Remuera, an ex-Dominion Postmaster, states that he received the call at about 10.45 p.m. on Sunday, May 27. He heard the message: "Test Australia 6 CGW." There appeared to be three distinct operators working, of which one was clear and readable, and the others indistinct and spasmodic. Atmospherics were bad at the time the various experimenters report having heard the American signals, which makes the performance all the more meritorious.

Officers of the New Zealand P. & T. Dept. are to undergo an annual course of training in wireless, extending over fourteen days on board H.M.S. *Chatham,* or some other naval unit.

The matter has been taken up enthusiastically, and the first six telegraphists already enrolled. The period of enrolment is five years.

The Wellington Broadcasting Station, on top of the Ford Building in Courtenay Place, Wellington, is in full swing. The concerts have been heard all over New Zealand, from Auckland to Invercargill. Those privileged to hear them pronounced the entertainments as first-class. H. J. Tutschka's Orchestra is giving a series of concerts, and the Port Nicholson Silver Band, under Mr. Joseph Drew is assisting. Fuller's Vaudeville have also contributed to the success of the concerts.

Hamilton (Waikato) appears to be the home of wireless in the North Island. Quite a feature was made of "broadcasting" at the recent show, and the items were heard in all parts of both Islands. Sunday evening services, as far south as Dunedin, were also plainly heard and appreciated by "listeners-in" at Hamilton.

The Auckland Wireless Broadcasting Station at Scot's Hall, which has been temporarily "out of action," is again going strongly much to the delight of everybody.

"One is never out of the world when one has a wireless set," writes a Waikati amateur. One evening recently a party of enthusiasts went for an outing, taking with them a receiving set. They tuned up, and got a number of messages from the *Niagara* when that vessel was 400 miles out from Auckland. Passengers were bidding farewell to their friends in New Zealand and Australia, and the messages were clearly decipherable. Awanui and Pennant Hills (Sydney) were also clearly readable.

Hints for the Experimenters

By "KWAT"

CONNECTIONS.

Make sure of your connections; then solder all joints. Joints left unsoldered quickly corrode or oxidise, and valve circuits appear to be especially prone to this trouble. Many a set refuses to work properly, and when taken apart everything appears O.K. After reassembling the set works correctly once more, quite probably because the joints have inadvertently had a little brush up.

DID YOU KNOW THIS ABOUT FILES?

(a) To stop a new file from becoming clogged with filings rub chalk over the teeth before commencing the job.

(b) When working brass use a new file.

(c) When working copper use a worn one.

(d) When a file loses its bite on brass, reserve it for cast-iron working.

(e) And when its usefulness is at an end for cast-iron, use it for working wrought iron and steel.

EMERGENCY OIL STONES.

An emergency oil stone may be made by placing emery powder and oil on a sheet of zinc. This is very efficient for tools working soft woods. A heavy zinc stamping comes in very handy for this purpose; failing that a sheet of zinc backed over a block of wood answers the purpose splendidly.

CHARGING "A" BATTERIES.

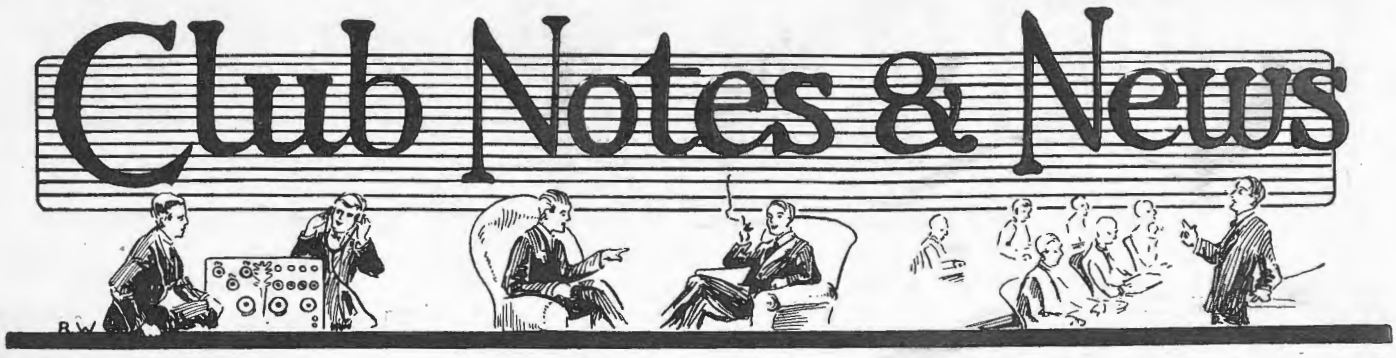
The charging of the "A" Battery is a problem that faces wireless experimenters very frequently. The life of a charge can, however be prolonged considerably by studying the tuning of the receiver. This is especially advantageous when desiring to prolong a "listening-in" period when the battery is almost run out; and there is nothing more annoying than when "listening-in" to something good; to find the "A" Battery setting up gurgling noises and blotting out signals

Maximum results are received from valves when used on the point of oscillation. This point is usually found by lighting the valve, adjusting the vario-reactance until oscillations commence, and then opening the variometer until the critical point is obtained. Now, if it is found that this coupling is very loose, *i.e.*, if the plane of the coils is almost at right angles, reduce the filament current until the oscillations die out, then tighten the variometer until oscillations again commence; this process may be repeated until there is a minimum filament current with a maximum coupling.

By doing this it will be found that the life of the battery charge will be lengthened by several hours. Also a low filament current will be found to prolong the life of the valve.

The writer has found while working commercial wireless stations that the usefulness of a battery, apparently run down, has, by adjusting the tuning been prolonged upwards of an hour.

When using old batteries low filament current is especially useful, as frequently an old, almost useless, battery, will give a noiseless discharge when discharging slowly; but with a heavy discharge it is almost useless on account of incessant gurgling.



WIRELESS INSTITUTE OF AUSTRALIA

NEW SOUTH WALES DIVISION.

THERE was an excellent attendance of members at the meeting of the above Division on Thursday, June 14.

In the absence of the President and Vice-President, Mr. H. E. Stowe took the chair.

After disposing of a number of items of business the chairman extended a cordial welcome to Mr. Ralls (a visitor from New Zealand). In returning thanks, Mr. Ralls dealt with the wireless position in New Zealand. Matters over there, he said, were in a very healthy condition, and excellent results were being obtained by the different broadcasting stations operating throughout the Dominion. In Auckland there are over 700 receiving sets, and in the Auckland province the number exceeds one thousand. Mr. Ralls paid a tribute to the efficiency of New Zealand experimenters. Quite a number of them received American signals in the recent trans-Pacific tests.

Mr. Ralls was loudly applauded at the conclusion of his remarks.

On the motion of the chairman Mr. J. H. A. Pike, the well-known New South Wales experimenter, was elected an honorary member of the Institute.

Prior to the commencement of Mr. Fisk's lecture, reported elsewhere in this issue, the chairman called on Mr. Malcolm Perry to furnish a report of the progress made in the trans-Pacific tests. Mr. Perry detailed the difficulties encountered by the committee, and mentioned that at a later date another test was to be held.

At the the conclusion of the meeting Mr. Wilson, President of the Kurin-gai Radio Club suggested that in order to improve the attendance at club meetings they should all be held on one night, and the various stations asked to refrain from transmitting on that particular night. Mr. Fisk said he thought the idea an excellent one, and if desired his company would cooperate.

WAVERLEY AMATEUR RADIO CLUB.

At a recent meeting of the above Club Messrs. Thomson and Lavington were elected delegates to interview Mr. Hector, relative to a visit to his laboratory. The resignation of Mr. G. Tatham, who has been compelled to sever his connection with the Club, owing to pressure of business, was accepted with regret. The evening's business was concluded with a lecture on "Detectors," by Mr. G. Thomson.

At a later meeting the Club decided to organise a concert to augment the funds and a committee was appointed to arrange the details. The correspondence included a list of new licenses from Melbourne. Discussions on matters of general interest by Messrs. McKellar and Howell concluded the business.

CAMPSIE AND DISTRICT RADIO CLUB.

An instructive lecture on "Condensers" was delivered by Mr. Mawson at a recent meeting of the above Club. A proposal is on foot to inaugurate a Club question box for the information of members.

The Club held a social gathering on the evening of May 30, and the attendance included visitors from kindred Clubs at Marrickville and Croydon. A long and enjoyable programme was served up, and at its conclusion light refreshments were partaken of.

In order to advertise the Club it is intended to hold these functions on the last meeting night of each month.

All enquiries as to membership and the Club's activities should be addressed to the honorary secretary: W. Hughes "Loch Vennachar," Evaline Street, Campsie.

NAREMBURN TECHNICAL SCHOOL RADIO CLUB.

The Naremburn Technical School Radio Club held its weekly meeting on June 6. There was a good attendance, and great enthusiasm was shown by members. The club is growing rapidly, and its prospects are good. The chief item of business was a lecture on the "Theory and Phenomena of Wireless," by Mr. J. Barrett.

Any information regarding the Club will be gladly supplied by the Secretary care of the School.

MANLY RADIO CLUB.

Mr. E. T. Fisk, managing director of Amalgamated Wireless (Australasia), Ltd., has promised to deliver a lecture on Broadcasting, under the auspices of the Club, in Manly on Monday, July 9.

Mr. Fisk is well known in Manly, and already keen interest is being evinced in his lecture. The fact that he was the author of the regulations approved by the recent Melbourne Conference coupled with his ability as a lecturer will ensure a good attendance of the general public.

The Club expects to be in a position to give demonstrations of radio music for the benefit of its members and supporters at an early date.

ILLAWARRA RADIO CLUB.

Excellent progress has been made by the above Club during the past few months. A series of highly interesting and instructive lectures has engaged the attention of members, and future prospects look exceedingly bright. It is now proposed that a general business meeting, of which a special lecture will be a feature, shall be held every alternate Tuesday as at present, and that the club room be available to members every other Tuesday for free and open discussion; questions, testing of sets, and apparatus, buzzer practice, work on club's set, etc. This will give members an opportunity of meeting once a week, and it is thought will be a great advantage. The new order will come into operation early in the Club's new year (July), and further details will be announced later.

Any information concerning the Club may be obtained from the Secretary, Mr. W. D. Graham, 44 Cameron Street, Rockdale, who would be pleased to hear from anyone desiring to become a member.

Two Hundred Flat

The radio inspector came to town the other day,
And wave-lengths took a tumble in the most amazing way.
I visited the station of a radio "op." I know,
Who begged that I should wait a bit and hear his tale of woe.
Said he: "No doubt you wonder why I look so pale and weak.
It is due to strangulation of the wave-length, so to speak.
With just two amperes in the cage the way she worked was fine,
But that was when my wave-length was about two twenty-nine.
She still kicks out the amperes, but there's nothing much to that.
I can't work anybody now; I'm on two hundred flat.

I used to work a bunch of nines, and dalite stuff with eights.
That little old C.W. set's been heard in forty States.
I have a good location; my antenna is a peach;
It isn't that it doesn't work, I know it's got the reach,
But I'm smothered in harmonics, the broadcasts furnish that.
My sigs. ain't what they used to be—I'm on two hundred flat.

I used to handle traffic with a kick that knocked 'em dead.
I'd clear the hook each evening before I went to bed.
They all would tell me 'QSA' when I was working them,
But now I only hear that same old "Sorri, QRM."
It's bad enough to make the Old Man spit upon his cat;
I cannot handle traffic now—I'm on two hundred flat.

I haven't seen a card in weeks, I haven't worked a soul,
I'm feeling like a nervous wreck, my traffic's in a hole.
There's only one solution which can ever save the day—
They ought to pass the Wave-Length Bill, and do it right away.
For I'll bet K. B. Warner a frock coat against his hat
That HE couldn't handle traffic on—two hundred metres flat.

—Wm. S. Creighton, in "QST."

Technical Terms Used in Wireless

Ether.—A medium of elasticity supposed to pervade all space and matter, and assumed by the electro-magnetic theory in order to explain the translation of energy at finite speed by electro-magnetic waves.

Frequency.—A term used in connection with any form of rhythmical motion or rhythmical change denoting the number of complete movements or changes in a given time, usually a second. *See Alternating Current.*

Grid Leak.—A high, non-inductive resistance used for the purpose of providing an electrical path across the grid condenser or between the grid and the filament of the valve, to allow excessive electrical charges to leak off. Under operating conditions this furnishes a stable control.

Harmonics.—Generally understood to be of higher frequencies, which are odd or even multiples of any given frequencies. At times experimenters will hear the harmonics of high-power long-wave stations while their receiving circuits are adjusted for the reception of much shorter waves.

Henry.—The unit of Inductance. The sub-unit is the Micro-Henry, which is one millionth part of a Henry.

Hertzian Waves. — Electro-magnetic waves named after their discoverer, Professor Heinrich Hertz, in 1887.

Impedance.—Total opposition to current flow in a circuit in which the current is varying by ohmic resistance and reactance. Impedance is numerically equal to the square root of the sum of the squares of the ohmic resistance and the total reactance of the circuit.

Inductance.—That property of a material system by virtue of which it is capable of storing energy magnetically. Inductance, like capacity, plays a very prominent part in radio circuits. The effect of inductance is to tend to prevent any change in the value of current flowing through the circuit in question. The unit of inductance is the Henry, and the sub-units are Millihenry and Microhenry, which are one thousandth and one millionth of a Henry respectively.

Induction.—The transference of energy from one circuit to another by means of electro-magnetic phenomena.

Insulator.—The name given to substances having the property of resisting to a very high degree the passage of electricity through them. Broadly, an insulator may be regarded as a non-conductor of electricity.

Kilowatt.—One thousand watts.

Loop Antenna.—An antenna system consisting of one or more conductors wound on a frame, and generally used for indoor reception. Looped antennæ possess very marked directional properties with respect to reception and transmission of radio signals, and are also used in direction finding work.

Loud Speaker.—Any receiving device designed to reproduce signals or speech loud enough to be heard without the use of ordinary head telephone receivers.

Megohm.—One millions ohms.

Microfarad.—Sub-unit of the Farad, which is the practical unit of capacity. It is equal to one millionth part of a Farad.

Microphone.—An instrument used in both wire and radio telephony to vary the current in a circuit in accordance with sound vibrations set up by speech and the like.

Milliampere.—One thousandth part of an Ampere.

Ohm.—The unit of electrical resistance, being that resistance which allows current of one ampere to flow through a circuit when an electro-motive force of one volt is supplied.

Ohms Law.—Fundamental law of electricity which states that the current in amperes flowing through the circuit is equal to the electro-motive force in volts, divided by the resistance in ohms of the circuit.

(To be Continued.)

W. B. (Albury) asks for the method of making three basket coils for use as primary, secondary and reactance, to tune from 920 to 1,500 metres; also three to tune to 440 metres.

Answer: Three coils of 100 turns for the longer wave, and three of 50 turns for the short wave. Provide taps on the primaries of both tuners.

C. H. (Hamilton) asks: (1) What waves will the following coils tune to: 1 coil, 4½in. long x 5in. diameter, wound with No. 22 gauge enamelled wire. 1 coil, 6in. long x 4½in. diam., wound with No. 24 enamelled wire. (2) Would an aerial of the following dimensions be O.K.? 25 feet high one end, 35 feet the other, 51 feet long, twin wires 4 feet apart. (3) Is a single wire aerial 70 feet in length too long for an earth lead, and is a water tap a good connection?

Answer: (1) Without a knowledge of the capacity to be used we cannot state the wave-length capable of being tuned in.

(2) Yes.

(3) Yes.

J. K. R. (Barcaldine) submits a diagram of his receiver, and asks: (1) Would concerts from Sydney and Brisbane be received on it?

(2) For a one valve hook-up, using primary, secondary and tickler.

Answer: (1) Under good conditions, yes.

(2) See diagrams in former issues of "Radio."

L. D. (Lindfield) asks: How to construct a wireless telephone transmitter having a range of 50 yards.

Answer: By placing a microphone shunted by a small condenser in the ground lead of an oscillating receiver, radiophone transmission is possible for the distance you mention. To do this you must be licensed as a transmitting station; otherwise you will be breaking the Radio Regulations.

S. R. (Ballarat) asks: (1) Would it be possible to receive Melbourne telephony at Ballarat, using one valve and a crystal? (2) What would be the capacity of the tuning coil and its approximate wave-length using a suitable aerial? (3) What aerial system would you recommend?

Answer: (1) Amplification will be needed for successful reception from Melbourne. Use the reflex circuit described in No. 5 issue of "Radio."

(2) and (3): Radiophone reception with a single wire aerial 40 feet high and 100 feet long would require a 50 turn coil on a 3in. tube tuned with a series—parallel 0.001 m.f. condenser.

R. M. B. (Parramatta) asks: (1) If he may erect an aerial before having received a license. Application has been sent in. (2) What broadcasting stations should he hear on a loose coupler set with twin wire aerial 35 feet high and 60 feet long, and 4,000 ohm Murdock phones? (3) Would Victoria and New Zealand be audible?

Answer: (1) No.

(2) You should hear Amalgamated Wireless 2MB, who transmits music at 7.30 p.m. every Tuesday. Wave-length 410 metres.

(3) Spark signals from VLA (Awanui N.Z.), and VIM should be audible.

Indoctus (Melbourne) submits diagram of a crystal receiver, and asks (1) Would such a set be capable of receiving telephony over a radius of ten miles? (2) Would it make any difference if instead of 2¾in., the secondary former had a diameter of 2½ inch?

Answer: (1) This would depend upon the power used by the transmitting station, but if good telephones are used telephony should be audible.

(2) No, provided the same amount of wire is used.

Audion (North Motton) asks: (1) How to construct a loose coupler capable of being tuned to 400, 600, and 940-1200 metres. (2) Advantages of Radio to audio-frequency amplification. (3) How to calculate the frequency of a circuit with condenser in series.

Answer: (1) A coupler with a primary of 100 turns, 22 D.C.C., 4in. diameter, and a secondary of 150 turns 30 D.S.C., on a 3in. tube would tune in 600 and 1,200 metre stations when shunted with variable condensers of about 0.0005 microfarads. A dead-end switch capable of reducing the secondary to 75 turns should be fitted for 400 metre work.

(2) Radio amplification is used for the intensification of weak signals, while audio is best suited for signals of normal amplitude.

(3) An article dealing with "Radio Calculations and Measurements" will appear shortly in "Radio."

The formula, when the capacity of the series condenser is not too low is approximately:

$$f = \frac{300 \times 10^6}{1885 \sqrt{L \times \frac{1}{\frac{1}{C} + \frac{1}{C^2}}}}$$

Where f = frequency, C = capacity of aerial. E = capacity of series condenser in microfarads. L = inductance in microhenries.

Movements of Marine Operators

Mr. C. R. Waite signed off s.s. *Australmount* at Sydney on May 10.

Mr. A. B. Monks signed off s.s. *Australrange* at Sydney on May 10.

Mr. J. Baird (Assistant) transferred from s.s. *Kangaroo* to s.s. *Gascoyne* at Fremantle on May 5.

Mr. F. M. Basden (Assistant) transferred from s.s. *Gascoyne* to s.s. *Kangaroo* at Fremantle on May 5.

Mr. A. Stuart was relieved by Mr. T. W. Bearup as senior operator of s.s. *Boonah* at Sydney on May 11.

Mr. A. R. Smith signed on s.s. *Cooma* at Sydney on May 11.

Mr. N. W. Leeder relieved Mr. H. A. Flick as senior operator of s.s. *Gascoyne* at Fremantle on May 1.

Mr. M. L. Robertson has returned from Home Port leave, and joined s.s. *Gorgon* at Fremantle on May 2.

Mr. F. Stevens signed on s.s. *Levuka* at Sydney on May 7.

Mr. K. McSwan, who was relieved by Mr. F. Ouvrier on s.s. *Poolta* at Sydney on May 8th, is now on Home Port Leave.

Mr. E. M. Searson proceeded on six months leave without pay as from May 1.

Mr. J. W. McKay signed off s.s. *Macedon* at Newcastle on May 11.

Mr. M. H. Stuart signed off s.s. *War Spray* at Newcastle on May 5.

Mr. J. R. Gilligan transferred from s.s. *Moira* to s.s. *Mallina* at Brisbane on May 5.

Mr. E. H. Pollard transferred from s.s. *Arawatta* to s.s. *Aramac* at Brisbane on May 3.

Mr. G. Pow, who was relieved on s.s. *Wodonga* by Mr. A. Stuart, at Sydney, on May 21, has now relieved Mr. H. E. Young as senior operator of s.s. *Esperance Bay.*

Mr. E. H. Pollard, who was relieved on s.s. *Aramac* by Mr. F. L. Scott at Brisbane on May 17, joined s.s. *Moira* at Brisbane next day.

Mr. C. Williamson signed off s.s. *Australglen* at Sydney on May 22, and proceeded on Home Port leave.

Mr. J. A. Guy signed on s.s. *Camira,* at Sydney, on May 23.

Mr. T. H. McWilliams signed off s.s. *Waihora* at Port Chambers, on May 17, and proceeded on Home Port leave.

Mr. W. C. Brown signed off s.s. *Wahine* at Wellington on May 15, and proceeded on Home Port leave.

Mr. G. Illingworth terminated service on May 15.

Mr. W. S. Ringrose joined s.s. *Echunga* at Sydney on May 17.

Messrs. E. J. Giles, A. J. Costa, and K. W. Downey, first, second and third operators, respectively, signed off s.s. *Taiyuan,* at Sydney, on May 24, and proceeded on Home Port leave.

Mr. T. Alexander signed off s.s. *Dumosa,* at Melbourne, on May 21.

Mr. N. W. Marshall, who, through a misunderstanding, was reported in these columns as having resigned, relieved Mr. R. W. Barnes on s.s. *Waikouaiti,* at Sydney, on May 28.

Mr. E. T. Prentice, who was relieved by Mr. R. W. Barnes on s.s. *Junee,* at Sydney, on May 28, has proceeded on Home Port leave.

Mr. A. Cuthill returned from leave, and relieved Mr. R. E. Haddock on s.s. *Morinda,* at Sydney, on May 28.

Mr. G. M. Power transferred from s.s. *Maunganui* to s.s. *Koromiko,* at Wellington, on May 22.

Mr. J. L. Skinner signed on s.s. *Komura,* at Melbourne, on May 25:

Mr. A. H. Beard returned from leave, and relieved Mr. H. J. Boyne on s.s. *Karoola,* at Sydney, on May 31.

Messrs. J. Elmore, K. W. Downey and H. A. Flick (first, second, and third operators, respectively) signed on s.s. *Parattah,* at Sydney.

Mr. L. A. Paul signed off s.s. *Aeon,* at Melbourne, on May 29, and returned to Sydney.