ISSUED EVERY SECOND WEDNESDAY

SIXPENCE

RADIO

IN AUSTRALIA & NEW ZEALAND

Incorporating "Sea Land and Air"

VOL. I. JUNE 13, 1923 No. 6

—"Wide World" Photo.

Miss Edith Clifford, vaudeville artist, who undertakes daily weight-reducing exercises to radio music.

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RADIO
IN AUSTRALIA & NEW ZEALAND
Incorporating Wireless Journal and Age

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What the Conference Accomplished

IT IS yet too early to say whether the regulations to govern broadcasting in Australia, which were agreed upon by the recent Melbourne Conference, will achieve in practical operation the promise they now hold. Much depends upon how they are administered, and the extent to which those coming under them shape their activities. The Conference delegates set a good example to the rest of Australia by the whole-hearted manner in which they tackled the problem of framing regulations for the Minister's guidance. The difficulties confronting them were undeniably great, and few expected such a speedy and unanimous termination to the proceedings. It now remains for the result of their deliberations to be tested in actual practice. When that is done we believe that the scheme will reveal the fact that the regulations are the best possible suited to the peculiar needs and conditions of Australia, the army of experimenters, and the general public.

Prior to the opening of the Conference the opinion was expressed in some quarters that special representation would be required to safeguard the interests of genuine experimenters. It was feared that unless this representation was forthcoming their interests would be subordinated to the purely amusement side of broadcasting by confining them to wave lengths practically useless for experimental work.

Happily, this fear proved to be groundless. Without exception, the Conference delegates demonstrated their anxiety to do the best possible in the interests of all concerned, and a perusal of the regulations, as submitted for the Minister's approval, discloses that those who come under the heading of "experimenters" will in no wise have their activities curtailed. This is as it should be. In Australia, as well as in other countries, the experimenter deserves much credit for the progress made by wireless in recent years. It was not always as interesting and entertaining to dabble in radio, as it is at the present day. One does not require a long memory to recall the time when the man who put up an aerial and attempted to pick up signals was regarded in the light of a "crank." Much has happened in the last few years, and it would be a poor return for all the good work they have accomplished if the men who helped to "blaze the trail" were to be sacrificed on the altar of public amusement. No apprehension need be felt, however, that the regulations will operate to the slightest extent against the best interests of experimenters. The public will have its entertainment, the amateur his experiments, and the commercial possibilities of radio will be exploited to the fullest extent. That is the ideal which Australia must aim at, and there is no reason why it should not be attained. The Broadcasting Conference laid a good foundation.

When It Pays to "Go Slow"

THOSE who have been clamouring for the commencement of broadcasting in Australia are likely to have their desire gratified at an early date. The danger of a monopoly, which many people professed to fear, has proved quite illusory. When England lagged behind America in making use of the tremendous entertainment and educational possibilities of radio broadcasting there was the usual outcry from those who wish to imitate the "bull at the gate" act every time a new idea or invention comes to light. Fortunately, the authorities refused to be stampeded, and subsequent happenings have more than justified their apparent conservatism. England to-day boasts a broadcasting service, unquestionably not perfect, but far in advance of that which operated at the outset of the radio boom in America. True, the latter has since put her house in order, but only after she was taught a severe lesson. Chaos reigned supreme there for many months, and that the tangle was eventually straightened out is a tribute to the popularity of radio and its influence for good in the community. A discovery of lesser value would have gone under in the first few months, but radio emerged triumphant, and has since won its way into the homes of the people as a permanent institution. Australia now has an opportunity of enjoying all that is best in radio entertainment, and there is little doubt that the chance will be embraced with both arms. The broadcasting regulations will probably be gazetted at an early date, and all who desire to carry out the transmission of entertainment programmes will be free to proceed. It will, of course, be some little time before everything is working smoothly, and the highest point of perfection attained. That, however, need occasion no dismay. The future is ours to make or mar, and those who undertake to supply the public with programmes to its taste can be assured of an eager and appreciative audience. The stage is set, and Australia is eagerly waiting for the curtain to be lifted on the first act.

Australia's Future Wireless System

Other Countries Point the Way

A Vision that will become a Reality

THE average Australian, unless he be a radio enthusiast, has a very imperfect conception of what an up-to-date radio system is like, and how it works. In fact, few people realise that such a high standard of excellence has been attained in the application of radio telegraphy to the commercial needs of the different countries, as is the case in America, France and England to-day.

In these three countries, and particularly the two first-named, there has been a very great advance in commercial wireless telegraphy during the past two years. There have been established in each of London, Paris, and New York, large central collecting and despatching offices for wireless messages to and from all parts of the world. In the heart of the city messages are being passed over the counter, and thence sent by automatic carriers into the middle of the telegraph office. Other messages are being received through telephones by expert telephonists, from all over the city and country to go by wireless. In another section are automatic printing machines connected direct with offices of big trading firms and banks, which do a large amount of telegraphing; other business houses are connected by the ordinary telegraphic service. By all these channels messages flow into the central traffic office.

In the office there are tables where operators type out the messages on an ordinary typewriter keyboard. That automatically perforates a tape with the Morse code, and the tape runs through a machine at anything up to 120 words a minute. The machine, in turn, is connected to an overland wireless transmitting station situated from 20 to 50 miles distant. At the transmitter station there is only a silent apparatus, with engineers who keep the gear running. The impulses coming over the land line at high speed operate the transmitter, sending the messages by wireless to a distant station. They come into the receiving station, anything between 20 and 50 miles away from a city—which station again contains no operators, but simply attendants who keep the apparatus in order—and with absolutely no sound whatever, are transferred on the landline to the addressee, or are received and telephoned into the city, where they are passed on by the land system for distribution at home, or by wireless to some other country.

At the present time these high-speed circuits are working in Great Britain, the United States, Canada, Switzerland, France, Spain, and Germany. Services in other countries are being arranged now. In France they are conducting services to America, as well as European countries, and the new French station (St. Assise) is designed to work with four distant countries simultaneously. In addition to that they have got an intro-European station right in the heart of the city, where, after the incoming wireless signals have punched holes in the tape according to the Morse characters, the tape is run at high speed through a machine which converts the Morse characters into printed letters. These messages, as they are cut off and pasted on to slips, are passed along an automatic band-conveyor to what is called the unpacking room. In that room there are clerks with card indexes containing at least 40,000 code addresses, and as these messages come in with code-indicator addresses they are marked for proper distribution, either by telephone or otherwise.

Switzerland has a service with England, and is arranging extension to other countries. Germany has two services working with America, and an intra-European station for communicating within and without Germany, capable of working thirteen different stations simultaneously.

One modern wireless service to-day is carrying more than 20,000,000 paid words per annum, and the chairman of one of the big cable companies in an address last year referred to the great proportion of traffic between Europe and America which is now going by wireless.

Experimental Transmission Tests

In order to enable the hundreds of experimenters who possess receiving sets to conduct tests, arrangements have been made by Mr. E. T. Fisk, Managing Director of Amalgamated Wireless (Aust.), Ltd., for one of the company's experimental stations in Sydney to transmit a programme on a wave length of 400 metres.

For the present transmission will be carried out on Tuesday evening only of each week, between 7.30 p.m. and 8.15 p.m., and will consist of 1.C.W., C.W. and telephone speech signals. The tests will be continued indefinitely, and the number of nights per week may later on be increased.

Continuous Wave Transmission

THE advent of cheap low-power valve transmitters has revolutionised experimental radio transmission. Spark transmission, owing to its inefficiency and excessive interference, is rapidly passing out of use amongst experimenters.

Continuous wave transmission offers many advantages which should be made use of in all modern radio stations. It makes available telephonic and telegraphic communication over distances which a few years back were considered only possible when using high-powered commercial apparatus.

The operation of this type of transmitter requires a little more skill than for a damped wave set, and the numerous adjustments and connections which are possible afford ample scope for the most enthusiastic experimenter.

To construct a low-power C.W. set the experimenter can commence operation with any type of hard valve. Any amplifying valve, such as the V24, QX, Q, or UV201, can be used if relatively low voltages are applied to the plate. For serious work UV202 Radiotron is recommended. This valve is capable of delivering five watts of high frequency energy to the aerial, and with reasonably low antenna resistance a radiation of 0.7

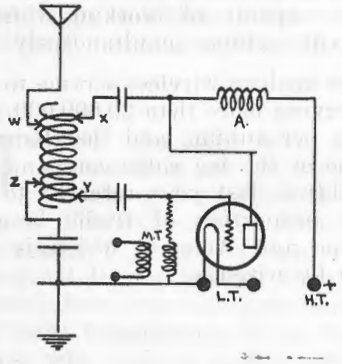


Figure 1.

to 1.0 ampere is easily secured at 400 metres. Herewith are given several diagrams for transmitters, both telegraph and telephone. *If the following points are observed successful operation from the start will be assured:*

Fig. 1 shows the connections for a capacity reaction circuit, which is a very stable oscillator on the short wave lengths used by experimental stations. Contact W is used to adjust the amount of inductance in the aerial circuit, and, incidentally, the

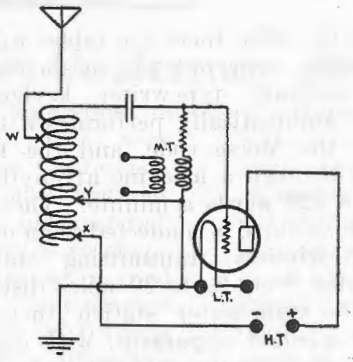


Figure 2.

wave length. The plate tap X must be so adjusted that the impedance of the inductance included is equal to the internal impedance of the valve at the operating frequency. This condition is made evident by maximum radiation being obtained for minimum plate current. To control the grid reaction, Contact Y is moved either above or below the point where the earth lead Z is connected. The exact position of this clip depends upon the characteristics of the valve, and whether telephonic or telegraphic transmission is desired. A position above the earth contact decreases the reaction, while that below increases same. For radiophone work, best modulation is obtained when just sufficient reaction is used to prevent the oscillations from breaking when the microphone is spoken into. The radio frequency choke A is a most important part of the circuit. It must be adjusted to resonance with the outgoing wave, when it effectively prevents any high frequency energy leaking back to the earth through the H. T. power supply circuit.

Another simple circuit outlined in Fig. 2 employs a close-coupled magnetic reaction through portion of the tuning inductance. The tuning of the plate and aerial circuit is the same as before, reaction being adjusted by moving contact "X" along the inductance.

The third diagram for a two coil magnetic reaction transmitter is the most simple and easily adjusted set of all. A separate coil is used in the grid circuit, which is coupled in vario coupler fashion to the main inductance. It is but a moment's work to turn this coil into the position best suited for undistorted modulation. This coil should have an inductance at least equal to that of the aerial coil.

In all the foregoing circuits close coupling to the aerial is employed, which, under certain conditions of adjustment (and, unfortunately, frequently experienced) radiates a wave capable of exciting receiving aerials to harmonic vibration. This is liable to seriously interfere with commercial and government work on other wave lengths than that authorised, and to avoid trouble for those operating close to one of the above-mentioned stations, an inductively-coupled circuit will court favour with the Government Authorities when applying for the necessary station license. The radiation, as indicated by the hot wire ammeter, will appear

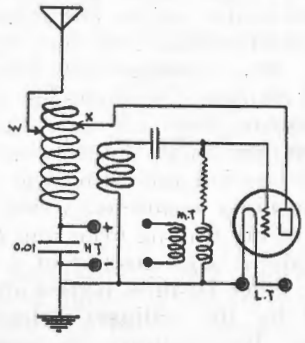


Figure 3.

slightly lower than with the direct-coupled set, but this should not be thought a disadvantage. The reduction is due to the elimination of the harmonics, which in no way contribute to the signal strength of the fundamental wave. Across the tuned plate oscillatory circuit, a micrometer spark gap must be connected to protect the condenser from high voltage surges. Do not couple the aerial circuit any tighter than will give maximum radiation.

For telegraphic purposes only, a circuit requiring minimum outlay for valves is that in which the valves are called upon to act as combined rectifiers and oscillators. Fig. 5 will make all connections clear, as well as giving data regarding condensers, etc., to be employed. Audio and radio frequency chokes in the plate supply leads are necessary to reduce the A.C.

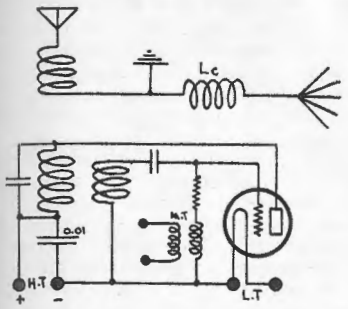


Fig. 4.

hum and prevent "back-firing" of the high frequency aerial currents. Capacity or magnetic reaction may be used.

Very often it is a difficult matter to obtain a good earth—by which is meant one in which the dielectric and ohmic losses are at a minimum. Between the elevated wires and the earth exists an electrostatic field varying at very high frequency, and any imperfection in the intervening dielectric, such as buildings, undergrowth and dry topsoil introduces losses which lower the efficiency of the station considerably. To provide a field between the two components of the antenna system as nearly perfect as possible, a counterpoise should be used. This must be, as far as possible a duplicate of the elevated member, and to gather in the stray electro-static field at each end of the antenna it should extend about ten feet both ways. This counterpoise can be used alone, or in conjunction with the regular earth—which should be buried directly under the antenna. The aerial having a lower capacity to the counterpoise than to the earth, the former will have to be brought into resonance with the aerial earth system by the insertion of an inductance (Lc) in Fig. 4, the value of which depends largely upon local conditions.

Telegraph signalling is accomplished by either (a) Buzzer Modulation, (b) Interrupting the H.T. Supply, or (c) Compensation Wave Operation. If inserted in the H.T. Supply Lead the key must be thoroughly insulated to guard against shocks. The third method which causes practically no variation in the supply current, and consequent flickering of the oscillator and rectifier filaments employs a very small inductance of a few microhenries in the ground lead which is shunted by the telegraph key. It is only necessary to change the wave length one metre at the wave length used for experimental work to cause a variation of over 1,000 cycles in the heterodyne note at the receiving end. This is quite sufficient for telegraphic work, and is much more than is used in high-power commercial work. The connections for method of signalling are shown in Fig. 5. Always keep the contacts of the telegraph key clean, to avoid any resistance losses.

When first testing a circuit it is advisable to cut down the H.T. voltage to about one third normal by dimming the rectifier filaments. This greatly reduces the possibility of damaging the apparatus if some part of it is connected wrongly.

After the transmitter has been made to oscillate there remains the problem of tuning it to the correct wave length. The majority of wave meters used by experimenters are far from accurate, especially those of the heterodyne variety, which vary as much as twenty per cent. This means that an adjustment supposed to be 400 metres may be anywhere between 320 and 480, depending upon the filament brilliancy and valve used. The wave length can be determined with a fair degree of accuracy, as follows:

From past experience most experimenters know the position on their respective tuners for resonance with 600 metres, or, rather, the mean position, as ship and land stations vary a few metres to either side to avoid excessive interference. Listen in and determine this position if it is not already known.

Obtain a variable condenser of fairly high capacity (0.001 microfarads will do), and couple it to an inductance of 35 turns of No. 22 d.c.c. wire wound on a cardboard tube four inches diameter. With the receiving set adjusted on the mean position for 600 metres, increase the reaction coupling until it just oscillates, and with the 0.001 m.f. condenser shunted across the previously-mentioned inductance, bring the latter close to the receiving coils, and tune (the inductance-capacity combinaion *not* the receiving set) until a click is heard in the telephones. The coupling must be weak enough to give only one click. The inductance and capacity now form a wave meter tuned to 600 metres, and if brought near any other receiver will give the same click when the latter is tuned to 600 metres. The inductance should be adjusted by putting on or taking off turns of wire until resonance takes place with about 160 degrees on a 180 degree condenser, or 90 on a scale divided into 100 division. All circular plate variables vary in capacity directly proportional to the divisions on the scale; therefore, if the condenser is set at a reading of exactly half the original, half the capacity will be in circuit. Wave length being proportional to the square root of the product of the inductance and capacity, the wave length will now be $600/\sqrt{2}$, or very nearly 425 metres. This provides an accurate adjustment for a wave length right in the centre of the experimental wave band.

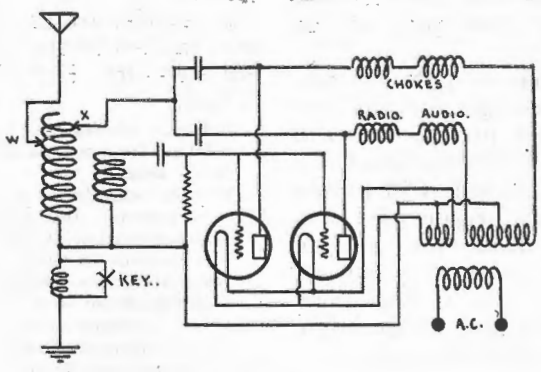


Fig. 5.

Broadcasting Conference

Important Resolutions Agreed to

The foundation laid by the Broadcasting Conference which sat in Melbourne recently should ensure maximum efficiency for broadcasting in Australia. With a genuine desire to secure for the Commonwealth the utmost that is possible in the way of high-class entertainment and educational facilities the conference tackled the admittedly-difficult problem of regulating broadcasting with an earnestness which will undoubtedly ensure success.

Broadcasting is an entertainment business for the general public, who, desiring a high-class service, must necessarily contribute to the maintenance of such a service that will bring right into their homes the voices of world-famous artists, orchestras, etc. In the first issue of "Radio" (pp. 16) this matter was dealt with thoroughly.

The conference in Melbourne kept the essential points of the business in view, and recommended proposals which will serve the public with an efficient and reliable service—unequalled in any other part of the world.

In America there is quite an open field for broadcasting, and the one good feature which prevails seems to be the competition between broadcasting stations. Owing to lack of proper control, America's broadcasting services resulted in chaos. No provision was made for the upkeep of broadcasting stations which had to depend on revenue from the sale of apparatus to pay for the upkeep of the stations.

Mr. E. T. Fisk, managing director of Amalgamated Wireless Limited, who, in the words of the chairman (Mr. G. A. Taylor) has "just returned from the aerial seat of war," propounded a most complete scheme, which through its directness and simplicity, offered a solution to Broadcasting in Australia. It appears to eliminate the bad features of both the English and American schemes, and yet retain the desirable features of both, in as much as Mr. Fisk's proposals offered inducement to firms broadcasting having continuous revenue and assuring the public of a high-grade service. Moreover, we in Australia, are offered competition, both in broadcasting services and in the sale of receiving apparatus.

The public will certainly appreciate the comprehensive facilities which will be available for their entertainment, and the trade of securing the necessary protection to ensure success.

It appears to be a pleasant dawn for Australia's entrance into the Broadcasting field, which in this country is, as yet, untouched, and it seems that both England and America might well examine Australia's Broadcasting Regulations when they are issued.

The scheme proposed by Mr. Fisk was so complete and ideal towards Australian conditions that those present at the Conference accepted it with open arms. After slight amendments the proposals were forwarded to the Postmaster-General, who stated that regulations would be drafted from the proposals recommended by the Conference.

Hereunder are Mr. Fisk's proposals, as submitted by the Conference to the Minister—the Hon. W. G. Gibson, M.H.R.

(a) A number of wave lengths to be allotted for broadcasting purposes. Such wave lengths to be selected in respect of their suitability for stations of various powers, and their suitability for standardisation of receiving apparatus, and subject to their not being required for public wireless telegraph or wireless telephone services.

(b) Licenses or concessions for broadcasting stations to be granted for all available wave lengths within a given area.

(c) Each broadcasting station to be licensed for transmission on one wave length only, but transfers may be approved by statutory authority.

(d) Licenses to be issued under the Wireless Act to the public for receivers of design approved by statutory authority, and capable of receiving signals of two or more services and incapable of variation without intentional tampering.

(e) Licenses on nominal fee to sell or hire receiving apparatus to be issued to bona fide manufacturers and electrical or other traders.

(f) All licenses to be renewed annually, excepting in the case of broadcasting stations and trading concerns which are to be for five years.

(g) Concessionaries and licensed dealers to be authorised to issue licenses to all their customers who have paid their subscription to the concessionaire.

(h) Receiving licenses and renewals thereof to be withheld from all persons who do not pay the annual subscription to the broadcasting stations.

(i) The Government to take effective measures to protect the industry.

(j) Dealers and traders only to supply receiving equipment or parts thereof to holders of licenses.

(k) Since there will be ample room for competitive broadcasting services it is unnecessary to place any limitations on the nature of the services provided. Each concessionaire may decide for himself the class of service that will bring him the greatest number of subscribers. That, after the publication of these regulations, time be allowed in which to receive applications for broadcasting licenses, such applications to be treated on their merits.

(l) Retailers to keep a record of all equipment sold, together with the name, address, and license number of purchaser, and to notify the concessionaires of any particular wave length accordingly.

(m) Any person, company, or manufacturer dealing in or using wireless equipment without a license from the Government shall be subject to an adequate penalty.

(n) The administration of regulations governing broadcasting to be in the hands of a board having thereon representatives of the Government, of broadcasting stations, of manufacturers, of traders, and the Press.

MOTIONS APPROVED BY COMMITTEE.

The following motions were unanimously approved by the Committee:

That this Conference affirms the principle of preference to Australian, British and foreign manufactured apparatus in that order on such terms as will encourage use of Australian and British manufactured apparatus, and that this be the recommendation from the Conference to the Minister:

That this Committee realises the necessity for protecting the principle of property in news, and we forward herewith a memorandum drawn up and submitted to us by representatives of the Press.

That this Committee recognises the right of fully-qualified persons indulging in bona fide experimental work to be without any hindrance, except as prescribed in Statutory Declaration, No. 169, of 1922, such right to be kept in mind in the allotment of wave lengths, subject to the experimenter giving an undertaking that he will not poach on broadcasting services.

Queensland Insurance Company Radio Club

Members of the Queensland Insurance Co. Radio Club, the first Club in Australia to be Subsidised by a Business House.

The Queensland Insurance Radio Club is probably the first one in Australia to be formed under the patronage of a commercial house. It is a direct offspring of the Recreation Club, which is heavily subsidised by the Company.

It is beyond question that the time is close at hand when other business houses will find it to their advantage to encourage the study of radio amongst their employees. No hobby can be more interesting or entertaining and few productive of more good.

The Queensland Insurance Radio Club was fortunate in possessing at the outset a number of members experienced in scientific and mechanical work. One member has been dabbling in the study of wireless since the early days of its discovery.

The detectors and coherers in those days were poor compared with the present time. This experimenter used a coherer composed of a ferrotype plate revolved by clockwork, whereby the disc, kept smeared with oil, was in delicate adjustment with a bead of mercury, and with an eighth inch spark coil and 18 inch square cage aerials morse was transmitted and received over a quarter of a mile. Other members comprise the flight lieutenant of an aerial corps with the British Army in France, a submarine officer of the British Admiralty, a senior telegraphist of the Postmaster-General's Department a wireless operator with the A.I.F., an officer on the Suez-Aden Section of the Eastern Company's Cable, besides a civil engineer and others with varying experience.

The Club has just received its license from the Controller for the operation of an interesting radio frequency circuit and will be linking up with the Radio Association of New South Wales and taking up active work shortly. In the meantime a library is being collected and apparatus constructed. It is recognised that Club members must be conversant with the Morse Code if the real interest and pleasure of wireless is to be derived. As shown on page 142, Morse is being taught in the right way. The Code is not being learnt direct from the buzzer but the tune of the true wireless note is impressed on those just learning by good Morse being sent through an ingenious device into head 'phones provided for each. Practice of this kind is indulged in during the luncheon hour so that members should soon become proficient.

A fine aerial has been erected on top of the Company's six-storied building in Pitt Street, and the Club hopes to be installed in new quarters therein very shortly. A syllabus of its operations will then be put into effect.

Mr. Alexander McVernon is the Patron of the Club, and is the centre figure in the second row. On his right is Mr. S. A. Grace (President) and on the left is the Club Secretary (Mr. J. Dillane). The other officers are Mr. Dodd (Assistant Secretary), Mr. Taylor (Treasurer) and Mr. Parker (Morse Instructor).

The group comprises only some of the Club members.

Experimental Work at Manly, N.S.W.

Mr. F. C. Swinburne's Up-to Date Station

Long Distance Reception

MR. F. C. Swinburne, president of the Manly and District Radio Club, is one of the most enthusiastic experimenters in Australia. Wireless has been his hobby for a number of years, and he has spared no trouble and expense in building an experimental receiving station which has given excellent results in long distance work. Mr. Swinburne accompanied the astronomical party to Stanthorpe last year on the occasion of the solar eclipse, and carried out the reception work in connection with the time signals which were wirelessed from Sydney. His interest and enthusiasm in radio experimenting were largely responsible for the formation of the Manly Radio Club, and amateurs in the Manly district recognise that in him they have a friend who is always ready to advise and assist them.

Description of Set.

The following brief description of Mr. Swinburne's set is furnished for the information of readers of *Radio*.

The set illustrated was designed primarily for use on long wave signals and the circuit chosen has more than come up to expectations. It is extremely selective and easily controlled.

While this circuit would function fairly well without the use of the variable condensers in the plate circuit, it has been found that their inclusion not only makes the set much more stable when oscillating and reduces howling, but will, when properly used, add from 10 to 20 per cent. to signal strength. With the range of coils at present in use this set will function over a wavelength range of 600 to 20,000 metres, and when smaller coils are constructed great things are expected on the 400 metre concerts. A rather uncommon feature of this set is the potentiometer and alternative condenser control on the first valve. After considerable experimenting with both types of control it seems that the potentiometer is slightly superior to the grid-condenser for the following reasons: With proper adjustments it may be made to limit the loudness of incoming signals or atmospherics, thus making the reading of signals much easier; for example: The signal strength of VIS may be reduced until VLD is quite as loud. Further, the potentiometer does away with a great deal of valve noises and howls when making changes of wavelength.

In receiving telephony also the potentiometer has much to commend it to more general use. Another factor that has without doubt done much towards increasing the efficiency of this set is the uniformity and stability of the V24 valves used.

American type sockets are connected in circuit behind the panel to facilitate the testing of other types of valves and amongst those tried were V.T's., A.P's. (both types) and Cunninghams, but nothing was found equal to the valves in present use.

As an example of reliability when this set was in use at Stanthorpe it

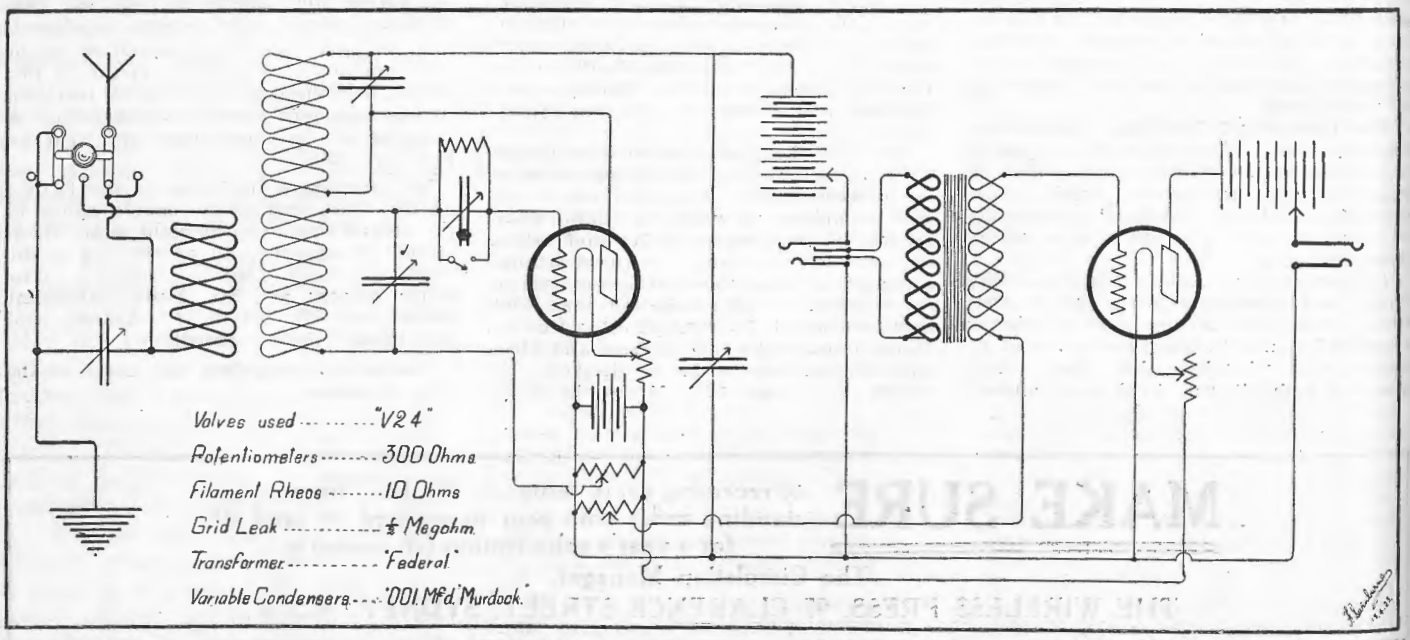


Diagram of Receiving Circuit used by Mr. Swinburne.

was worked practically night and day for four days, and apart from wave-change adjustments no alteration in battery adjustments was necessary except when the filament battery ran out and had to be changed. The plate batteries are 30-40 volts on detector and 40-60 volts on amplifier.

Panel ¼'' Bakelite, wiring 1-18 bare busbar type, all connections soldered, Rheostats Remler 10w, Plate battery switches Remler, Coil mount De forest. Phones 2,000w Brown's adjustable.

Small portable set uses Stern's circuit. Apparatus employed. A.P. Detector, Remler Rheo, .001 and .0005 Murdoch Condensers, QSA coils.

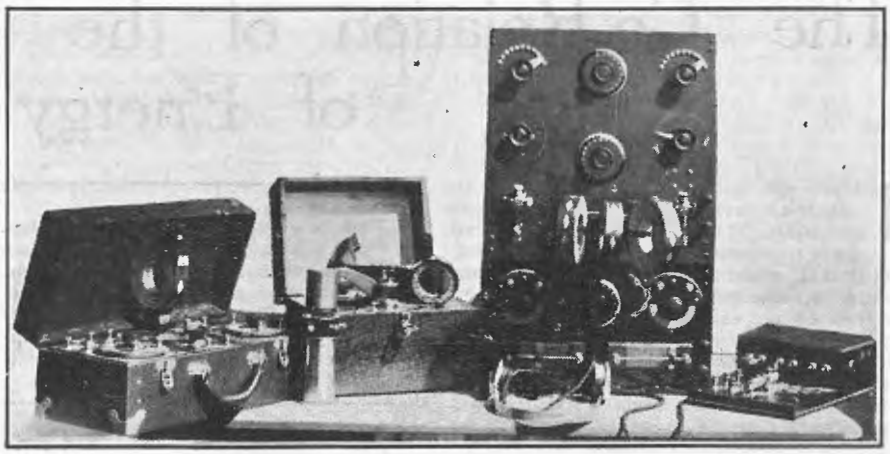
Auxiliary Apparatus.

The auxiliary apparatus consists of a De Forest Wavemeter 150-3,500 m; Standard inductance 34-2,000 mhys and standard fixed condenser, 1 valve control panel, two buzzers are used for calibration purposes, a Telefunken and a Marconi. This set is also used for buzzer practice.

Long wave stations intercepted include Darien NBA (time signals) Lyons YN, Nauen POZ, Bordeaux LY, Rome IDO, Eilvese OUI (irregularly) Nantes UA (very occasional) New Brunswick WII, Annapolis NSS (time), New York WQK, Tuckerton WGG (occasionally), San Francisco NPG (press 15 feet from phones), Cavite NPO (very loud), Gaum NPN; other longwave stations KGI, NPL, NPU, PKX, PCG, JAA, JJC. Shortwave stations PKE, PKA, VLD (regular), FQN, VPD, VLB, and most Australian stations. At present there is under construction a super regenerative set and a start will soon be made on a transmitting set.

The sets are being continually dismantled and altered in order to try out various "stunts." The aerial at present in use consists of a single (7-20) wire, 65 feet long and 45 feet high. The masts are 45 feet high, the lower 30 feet consisting of a triangular frame each leg of which contains 2½ cwt. of 1½'' by $\frac{3}{10}$ galvanised angle iron. The space between posts at base is 5 feet. The upper 15 feet of the mast consists of 2 in. galvanised iron pipe, and by the withdrawal of 6 bolts it is possible to slide it up and down, thus facilitating the work of painting, etc.

The aerial has unquestionably contributed so much to the excellent results achieved as to more than compensate for the trouble and expense involved in erecting it.



This Photo shows Mr. Swinburne's Experimental Wireless Apparatus, consisting of Wavemeter, Buzzer, Portable Receiver, and Long Wave Panel Type Receiver.

Waves from West Australia

(By Our Special Representative.)

A curious and interesting occurrence took place a few nights ago, when a microphone, being used for experimental work, accounted for more than its share. On the evening referred to, Mr. W. E. Coxon, of Bulwer Street, was testing his transmitter, details of which were given in our last issue, and the window of his den happened to be open.

The following morning a couple of enthusiasts, who had "listened in" the previous night, wanted to know what new-fangled musical instruments he had used to send out such haunting strains. At the same time they explained that it sounded like an orchestra in a padded cell, or melody from the ethereal realms.

As Mr. Coxon had not transmitted any music on that occasion, he began to wonder what the joke was, but upon being assured that it was no joke he started to scratch his head. After a few minutes' hard thinking, he suddenly remembered that on the night in question a band was playing in Hyde Park—over a quarter of a mile away. The sensitive microphone had picked up the music and distributed it.

The Wireless Institute of West Australia finishes its current year very shortly, and with an enthusiastic policy of more attractive demonstrations, interesting and instructive lectures, and field days, it is hoped that the ensuing year will be the most successful since its inception. The report on every item is O.K., and all praise is due to the President and Council for the splendid way in which matters have been conducted.

The Co-Relation of the Various Forms of Energy

The following excerpts are taken from a highly interesting lecture on the above subject delivered by Mr. Alec Hector at the last meeting of the New South Wales Division of the Wireless Institute of Australasia.

I MAY say to you that I am purely an amateur physicist, purely an amateur scientist. That is, I earn my bread as a business man, not as a scientist, so that I wish in a measure to disarm criticism, because I am not going to talk to you as an expert, but as an amateur of science. I love science. I have loved it ever since I can remember. Now we are all lovers of wireless. I started this idea as a matter of self-protection. In my business I have to have what might be called a bowing acquaintance with a large number of the sciences, and as things accumulated and accumulated and accumulated, I felt I had to find some way of memorizing things, some way of condensing things, so that instead of them becoming a burden to carry there would be some order. I felt that through all the sciences there was an innate unity of things, and that there was a master key that would open all the doors if I could find it, and I went on, and on, and on, and frankly I believe I have got hold of that key. I first started to arrange things in a mnemonic order, purely as an arrangement to fit in the memory. I started a wheel, putting all the different facets of science in one great wheel, and that was the time that some of my scientific friends said I was an impossible visionary. There was one section—the physical section—which I arranged in this way: Magnetism, electricity, sound, heat, light, cathode rays, X-rays.

That was purely a mnemonic arrangement. But as I dug deeper and deeper into the different manifestations of energy, I found that these were not only analogous, but they were homologous, that the difference between magnetism, electricity, sound, heat, light, cathode rays and X-rays was only a matter of degree, and that all obey the same laws. For instance, if we take a horse shoe magnet and place within a portion of that magnet a piece of soft iron, we set up induced magnetism. Faraday's great discovery of the law of induction really produced the dynamo. That induced magnetism which is set up by revolutions of a piece of soft iron between portions of the magnet and it can be conveyed a long way with a big wire, but we no longer call it a wire conducting induced magnetism—it is called an electricity wire conveying the electric light. So that you might say electricity is but induced magnetism in a long wire. If you break that conducting wire, it will give resistance. That resistance, like every other thing resisted, is apt to make a noise. It makes sound. In short, it says: "I want to get on, I want to get on." The more resistance, the more it makes a noise. Now that resistance can be so varied that you can get rhythm and make that sound musical or make it hideous, as we do in a motor car to make the other fellow get out of our way.

Break it at another place further along, and you induce another kind of resistance. That resistance is so strong and the current gets so angry that it becomes hot all over, and you get heat. Now that heat can be made rhythmic, and you can so develop this heat that you can warm your hands at the radiator or stew your chops on the stove, according to the size of the horseshoe magnet and the speed of the armature, and that is heat.

Now, then break the current at another place, and you can induce another kind of resistance, and enclose that in a vacuum glass tube and you have got light. A little step further on and you can induce another resistance, and you can get that current to pass through a vacuum, and you get cathode rays. Sir William Crookes devoted his lifetime, or nearly his lifetime, to studying what he called radiant matter.

Now, then pass on from cathode rays to another kind of vacuum, and interpose a piece of platinum or other suitable metal, get the current hot on the platinum, and you get X-rays, and X-rays will pass through your hands and photograph the bones of your hands or inside, or whatever happens to be there. There you have magnetism, electricity, sound, heat, light, cathode rays and X-rays.

Now, that is a convenient mnemonic for memorising the different manifestations of energy. That is well known. Many of you, possibly all of you, know it, but the arrangement, I think, is mine.

What then is magnetism? If you turn up your text books you will find it is invariably said: "We do not know what magnetism is." If you will allow me, I will venture to give my explanation of what magnetism is. It may be wrong, it may be right. This is my hypothesis. What is the difference between a magnetic body and a radio active body? My contention is this: that in the portion of matter of which all matter is composed, you get a certain amount of atomic disassociation. That is, inter-atomic explosions and electrons given off in magnetism or in magnetic ore. You have this same thing in electronic explosions or inter-atomic disassociation going on very rapidly. In short, the difference between a magnetic ore and a radio active body is a matter of degree and not of kind. In radium or radio active bodies you get an emanation given off. Suppose we put a piece of radium inside a leaden coffin and put outside of it a powerful electro magnet, the emanation that is streaming out from the top of the leaden coffin is swung round to the left and swung to the right, and some goes out which is not affected by the electro magnet.

Now then just as the mists encircling the hills gradually condense and form tiny little driplets, so do the electrons conglomerate and form tiny little particles, uniting together and forming atoms, and the atoms conglomerate and form molecules, and the molecules combine and form ponderable matter and electrons—ponderable or weighable if we had a machine fine enough to weigh it. When I gave a lecture—strangely enough at the request of my same friend, Mr. Brown—in 1915 at the Ultimo Chemical Society, I gave forth that same idea. Naturally the idea of light being weighable or ponderable was such an uncanny idea that you can quite pardon some of my scientific friends for saying that I was a pure visionary. In fact, some of my friends went so far as to suggest that I should go and see a mental specialist, but being a canny Scotchman I kept my guineas in my pocket, and I am still at large. Well, since then Einsten has become a household name, and the ponderability of light is now a debatable question in the language of science, and the same critical friends that recommended the mental specialist now say that Hector is but promulgating some of the commonplaces of science.

Now we all know the wave theory. That is, that electrons, electricity, sound, heat and light all obey the undulatory theory or wave theory, which was propounded by Huegens, Fresnel and Young, and put the great Newton's idea of the corpuscular theory right aside. But now we are coming back to consider that after all there are some things that can be explained by the corpuscular theory that cannot be explained by the undulatory theory, and some are beginning to think that Newton was right after all. I remember long years ago reading some of Henry Drummond's books, and he said there are so many scientists who are eager to get some new little matter, some new fact, endless scientists, indeed, seeking for new facts; and he went on to say: "Why don't you get some scientists to lie back and think and co-ordinate? There are many workers and but few co-ordinators." And I thought, well, perforce, I will have to be a co-ordinator. I have been lying back and thinking for the last twenty years, and I still remember a statement made in one of the great Tyndall's books. He says: "Facts seem to gather round you if you begin to brood." If there is any message of value that I hope to have for you, it is not that I am going to give you new facts; but I would like to enforce that idea of the

value of lying back and brooding. And it is surprising how the facts will come like chickens out of their eggs—chirp, chirp, chirp—round, and it is nice to see the chickens of your own hatching.

Now, then, I began to brood on the corpuscular theory ,and brood on the undulatory theory, and then I followed on with the vortex motion theory of Descartes, and I said if you take the two and unite it as a vortex, then all your theories are explained and easy to understand. The difficulties of accepting the corpuscular theory and undulatory theory are combined. My contention is that the great Newton saw the bullet going straight and the wave theory man saw the effect of the wave, but if you unite the two, you get the effect of both, and the undulatory theory then becomes reconciled to the corpuscular theory by means of the vortex, which is a better conception of weight.

Now then, we noticed that sound, heat and light were but different manifestations of the same thing, and it occurred to me that it might be possible to construct an instrument that would synchronise waves of light with waves of sound, and when you get an instrument producing harmonies of sound, you would have harmonies of colour at the same time. I tried it, and the result was very satisfactory and surprising. If we realise that sound is but a manifestation of the movement of electricity (and I believe that it is so), and, therefore, if electricity is only heat and light, manifestations of the same things ought to obey the same laws, and they do. Magnetism ,electricity, sound, heat, light, cathode rays and X-rays all obey the same laws of dispersion and absorption, obey the same laws of resonance and of refraction and defraction. "No," says the scientist, "sound does not." We will leave that for a moment.

If sound is but electrically induced fundamentally, then a very good way of studying wireless is to study the waves or the vortices of sound. The difference between wireless transmission of impulses from myself to you and from you to me is only a difference in degree. We have within ourselves a transmitter which we call the vocal chord and larynx and so on. That is an ideal transmitter for a limited distance, and we have an ideal receiver. The antennae is but the outside of the ear. That shows that the donkey was not such an ass after all—he had a good big ear. We will take the transmitter for granted for the moment, and confine our attention to the receiver. As you all know, the ear is something of that shape with a channel leading in here. It leads to the drum of the ear. Now behind that canal are three bones, and these three bones are set in movement by the vibrations of the ear drum, and then they convey that message on to another drum, which is at the end of a wonderful spiral chamber. Then inside this shell-like structure you have a wonderful instrument, which is known as the organ of Corte, that is, it is a series of very fine hairs, all in different sizes, so that when a wave in the fluid here is sent rippling along up through the spiral chamber a little hair squeaks out its own particular reply. In short it is an ideal tuner; it gets into perfect resonance at once. A person with a poor ear will have a very poor reception, like the old lady who knew two tunes—the one that was the Old Hundred and the one that was not it. At present wireless is like the old lady. The tuning operators leave much scope for you gentlemen to improve it by inventing and following along nature, because there is a perfect receiving apparatus for the reception of varying qualities of wave lengths and getting in tune and sending a message to the sensory. In short, all your experiments of sound can apply to your experiments of wireless, just as Tyndall long years ago said everything that is an experiment in sound has its analogue in light, and everything that is an experiment in light has its analogue in sound. My contention is that they are not only analogues but homologues; it is only a difference of degree and not of kind; that we have left the old shibboleths of the absolute, and we are now into the reign of relativity, and we think of things relatively rather than absolutely. Now a great deal of difficulty has arisen in grasping the principle of relativity. Many scientists have said to me: "Well, I cannot get hold of the idea of the 4th Dimension. What is the 4th Dimension?" Well, Einsten's idea of the 4th Dimension is so simple that its very simplicity evades our perception.

Now as we are considering the relativity of forces, you will pardon me if I dip a little into the question of relativity and then go on. In constructing a building there is always a right and a left, and you get an up and a down and a back and a front; but time is the element of the 4th Dimension that is entering in all the time. That is, this is determined by "time," and that is determined by "time." In short, there is a sooner or a later. We may be going to erect a very fine up-to-date new building. Then your building will have a right and a left, up and down, back and front, but if we know the council it is more likely to be later than sooner. Now you see that some thing has been known to us all the time. Einsten did not discover it; he only made use of it. We have been making use of it all the time.

As a matter of fact, I have already made an experiment since I entered this room. I was a little bit nervous when I first stood before all you learned gentlemen. And I said to myself: "I am going to get in resonance with you, and you will give me your health and I will get rid of my headache." Gentlemen, my headache has gone. That is purely a question of tuning. As a matter of fact, the difference between the tuning of an instrument and the tuning of an individual is only a matter of degree.

You know the well-known experiment of putting a tuning fork on, say, middle C, and striking another one, say, A, and and set it vibrating near C . There is no response from C. Try G, still no response. Try B still no response. Get a true C and you get an answer. What applies to tuning forks, applies to individuals, and it applies to spiritual things in the highest degree.

Now take another line of the law of induction. My idea in teaching science is to always show the dry as dust thing first, and then the physiological or live application, and then the highest, if you want to. In this very room I gave an illustration that I am going to give you in a moment of the relativity of the law of inductance, and one of my learned friends thought that I was dragging science through the mire of trivialities and went out of the room. If you have a piece of iron coal and a piece of iron attached to a powerful electro magnet, this is rendered hot, and you can set up induced magnetism between this piece of iron and that piece of iron. There is your negative and there is your positive. You bring this closer and closer and closer and you will by and bye get sparks across, and get heat generated so great that you can unite this and you have a welding of the two together. That is an application of the law of thermo-dynamics or heat forces. But if you want to have a perfect union it is better to have a cathode agent present. Then you get a perfect welding of the two. Now, how are we going to raise that dry as dust fact, and make it interesting to persons who are not interested in science at all, but who like to know the latest phase and so on. Imagine that you have here a condition which we will call the negative, and here a condition which we will call the positive. In this case we will call the negative a very beautiful lady, and the positive a very dynamic dandified young man. Now, as soon as Mr. Positive sees Miss Negative he is inspired at once, and he says: "She is the one." He does not even know her name, but by hook or by crook he gets an introduction, and by and bye becomes more and more intensified, and every morn he brings her violets. Miss Negative is quite cold and indifferent. He must not make himself too cheap, and being a wise scientist he realises that making a break in wireless, etc., is a means of intensifying it, and for a few mornings, or perhaps a few weeks, he does not appear and does not bring the violets. And then he comes again with a still more beautiful bunch than ever before. She is delighted, because she has been watching for him and the light sparkles from her eye, and by and bye he brings a further metal arrangement (a ring), and he eventually gets a cathode agent, whom we will call the minister, and these are no longer twain but one. Now, that was the law of induction. He induced her to change her name.

Now, gentlemen, I do not want to weary you with this diagram, but these were a series of diagrams that I did for my own delectation on searching for that master key of unity, and I found that all the different physical workers of the world were working towards one great unity, and I jotted them down and used it, say, as the half of a nautilus shell. That gives the physical aspect of it; then I jotted down all the different names indicating the different workers in chemistry, etc. Each name there represents hours and hours of study, and after all I found that I had only got to the point that I started from, of one thing living on the other. I merely show you this because, frankly, I have no long letters after my name.

I am purely an amateur scientist. I had to plod through this and plod through that to find after all that everything was resolving itself into one great and wonderful unity, and after some 35 or nearly 40 years I constructed this symbol of symbolic representation of the great Nebular hypothesis, where the sun and the different planets take shape out of the fiery mists, and there form definite rhymthic harmonies of their own. Now then, go back 3,000 years ago. We had atomism explained by Lucretius. Epicurus, Democritus and Leuappus. The atomic conception of matter was conceived three thousand years ago more or less. Then Pythagoras and Kepler got the idea of what they called the harmony of the spheres, and were laughed at by some of the dry as dust wiseacres. Then Kant and Swedenborg and Leplace developed the Nebular hypothesis, which is but a growth of the great idea of the atomic structure of matter. Then radio activity was discovered by Becquerel, Curie and Rutherford and others; the atomic theory by Dalton, a man colour blind; the periodic law by Mendeleef. That wonderful periodic law might have been the heritage of the English, but for some of the dry as dust men in those days, who some 50 or 60 years ago laughed at the idea, and by and bye a Russian came along with a further development of the same thing, and it became Mendeleef's periodic law instead of Newland's, who conceived the idea first. Franklin conceived electricity as a fluid. Clark Maxwell conceived heat as a fluid. Then came the conservation of mass, the conservation of energy by Joule and Meyer. Then further on you have the wave theory of Huegens, Fresnel and Young, the vortex theory of Kelvin and Descartes, right down until we come to the present day, and we have the general principle of relativity and the ponderability of light, and we are up to date as far as Einsten brings us.

In wireless we can communicate with London at the present time. If you had said that 30 years ago, you would have been told that you were a visionary. Now it is an accomplished fact, but we cannot get any messages unless we get in tune. There is a great harmony of the universe, and if we get in tune with it, we become in tune with the infinite. And what messages may we get? Little devil's messages if you like, but we can throw our loaf down to some one. What I think is that there is a harmony of light, a harmony of sound, a harmony of heat, a harmony of form, and a harmony of the whole universe, and if we get in tune with that, we receive the message of that harmony.

At the conclusion of his lecture Mr. Hector, in replying to a query regarding harmonics, made the following explanation:

If you strike Middle "C" on the piano "C" on the organ and "C" on the violin and "C" on some other instrument, they will all be "C's" and they will all have their own special quality, and that is just as I mentioned, each one has their own particular harmonic. If Mr. Black rings up Mr. White and someone else answers: "Yes, I am Mr. White," you would say: "Oh, no, you are not Mr. White, you are so and so; I know the voice.' ' He knows the harmonics of the voices. Now then, here is a theory that I would like to give for the first time in public. I was greatly concerned once in finding out in the spectrum band why you have a colour, say, for platinum (violet) and other colours along the band. I said to a very distinguished professor: "Can you tell me any reason why we don't have one single colour for one single element?" That puzzled me for a long time, and then I fell back on the sound symbol. I said: "My word, I have got it." Just as you strike a note on the piano and put your foot on the sustaining pedal, strike Middle "C" and you get the different wires in sympathy with that note vibrating; in the same way when you strike your violet colour of platinum, the other colours run up and we have the harmonics of colour. There was to me the explanation of the various colour bands in the different elements. As far as harmonics are concerned, it may be little waves on the top of bigger waves, and little waves on top of the little waves.

Tasmanian Activities

(By Our Special Representative.)

Tasmania has long felt the need of a Radio Club, and at a recent meeting in Hobart it was decided to form one. The initial success has far exceeded the expectations of those behind the move. The meeting decided that the Club should be known as the Tasmanian Division of the Wireless Institute of Australia. Mr. Robt. Nettlefold was elected Patron. Amongst the members are a number of well-known enthusiastic experimenters.

Some very fine work has been done both in transmitting on low power and the reception of amateur signals from the mainland. The most outstanding feature of this work is that of Station 7AA, in charge of Mr. T. Watkins. Some time ago arrangements were made with the Victorian Division for a series of tests, Mr. Watkins being detailed by the Tasmanian body as its representative. Code signals were used throughout these tests, and out of the seven transmitting stations in and around Melbourne, the log kept by 7AA showed that the whole seven were received. Considering the low power used (approximately 6 watts) by these experimenters, it is a remarkable achievement. The seven stations were all copied, and their telephony heard distinctly, although only one valve was used.

Since these tests Mr. Watkins has been successful in linking Tasmania with the mainland by means of his 5 watt transmitting set. This test took place at the latter end of April, and word was afterwards received from Melbourne that the signals were heard. Fuller details are being awaited with keen interest by experimenters in and around Hobart.

The work of erecting a transmitting and receiving station at the Institute's Club rooms, Trafalgar Place, Hobart, is now in full swing. At an early date it is hoped to be able to communicate direct with the various other bodies on the mainland. To enable the Institute to carry on this work it will be essential to have the co-operation of as many amateurs as possible in our own State. Judging by the many applications for membership that have been received, the Council feels assured of success.

A movement is afoot in the northern part of the Island to form a branch of the division at Launceston.

Complaints have been made regarding the delay in issuing receiving licenses. It is hoped that this will be obviated in the near future.

AERIALS AND AIR TRAFFIC.

The delegate at the Broadcasting Conference, who unconsciously brought the element of comedy into the precincts of a tense atmosphere by requesting that homing pigeons be protected against the threatened multiplicity of aerials, stoutly braved the hilarity that he created. The four hours of accumulated suppressed feeling was released upon him in the form of cheers and laughter, and with a force and spontaneity of a Leyden Jar

The delegate asked for corks to be strung on aerial wires, but it was pointed out that single wire aerials were not so numerous in Australia as in England—the country from which the delegate drew his information.

Miss Lee White Entertains "Listeners-In"

At Mr. R. C. Marsden's Experimental Station (2JM) at Edgecliffe, Sydney, one Sunday evening recently Miss Lee White and Mr. Clay Smith, together with Hector St. Clair provided an entertainment for hundreds of "listeners in" throughout New South Wales. Miss Lee White sang several well-known songs from her musical revue, "Back Again," and Frank Charlton also rendered several vocal items. To secure a permanent record of the event Paramount Pictures cinematographed the whole performance.

Mr. Marsden subsequently received reports to the effect that the concert was heard in Armidale, Tamworth, Mudgee, Inverell, Mandurama, Goulburn, Newcastle, and even in far-away Toowoomba (Q'land) it was picked up on a single valve. It will be good news to all who enjoyed the first concert, and to others who did not have their sets ready that Miss Lee White and Mr. Smith will give a repeat concert at a later date, of which due notice will be given.

A Quaint Pose by Miss Lee White and Mr. Clay Smith of "BACK AGAIN," taken while singing songs from the popular revue into the transmitter of Mr. Marsden's Station (2JM). The above picture, is enlarged from a motion picture negative of the Paramount Gazette, which filmed the event with the aid of hand flares.

Transmitting Licenses in South Australia

5AC	V. R. Cook, 57 John's Road, Prospect.	5AH	F. L. Williamson, Dequetteville Terrace, Kent Town.	5BG	H. A. Kanper, Guiney Road, Dulwich.
5AD	A. R. Snoswell, Harris Street, Exeter.	5AV	Wireless Institute, S.A. Division (C. E. Ames), 20 Grange Road, Hindmarsh.	5BI	School of Mines (W. W. Honner), North Terrace, Adelaide.
5AE	J. M. Honner, Alpha Road, Prospect.	5AW	Adelaide University, North Terrace, Adelaide.	5BN	H. L. Austin, 8 Parade, Norwood.
5AG	W. J. Bland, Buller Terrace, Alberton.	5BD	F. E. Earle, 321 Fifth Avenue, St. Peters.	5BQ	L. C. Jones, Carlisle Road, Westbourne Park.

The Construction of a Magnetic Rectifier

THERE are several methods of charging a storage battery, but for efficiency as regards current consumption, and regularity of operation, there is nothing to beat a well-built vibrating magnetic rectifier. Many experimenters have considered

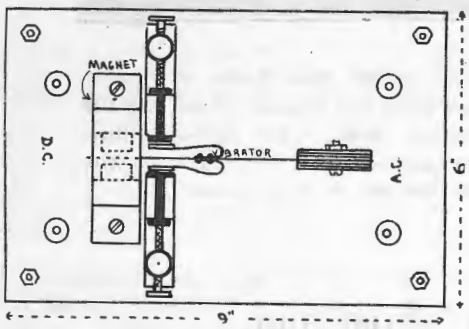


Fig. 1.

this type of rectifier, but owing to the lack of data regarding its construction few have ever attempted to build it. The following information should, therefore, prove very valuable to all experimenters.

First of all, the step-down transformer will be described. The core should be made of transformer iron, if possible, but if this is not obtainable ordinary stove pipe iron of No. 26 or 28 gauge can be used. The core has a cross section of 1½in. x 1½in., and is built up into a square 6in. x 6in. from laminations 4½in. long x 1½in. wide. Assemble two legs of the transformer with laminations projecting 1½in. alternately to the right and left. This will allow the connecting limbs to be interleaved later on, and the whole made a solid job. It is a good plan to varnish the laminations before assembly, to keep eddy current losses to a minimum. On the limb which holds the primary winding there must be a projecting lug 1¼in. long to hold the vibrating reed; therefore, to do this seven of the laminations in the centre must be made 5¾in. long. The centre one is cut down ¾in to make a seating for the vibrator. Tape these two legs tightly, and after the coils have been wound and put in place the connecting legs can be treated likewise. The laminations are held tightly in place by means of the four pieces of 1½in. angle iron, which serve to hold it to the top panel and baseboard respectively.

The coils can be wound directly on the legs of the transformer, if desired, but the quickest and most workmanlike job is to former wind them, and treat with wax or insulating varnish before assembly. A suitable former for winding them is shown in Fig. 4. This is a tapered block of wood with two end pieces. Pass a ¼in. bolt through the hole in the centre, around which the former must be free to turn. Before commencing the winding place four wires of about No. 26 gauge across the form near the corners. These will serve to bind the wires together for removal from the form for impregnation in the insulating medium. After this treatment the coils are taped neatly with either a cotton or a good grade of insulating tape. The primary winding consists of 1,200 turns of No. 24

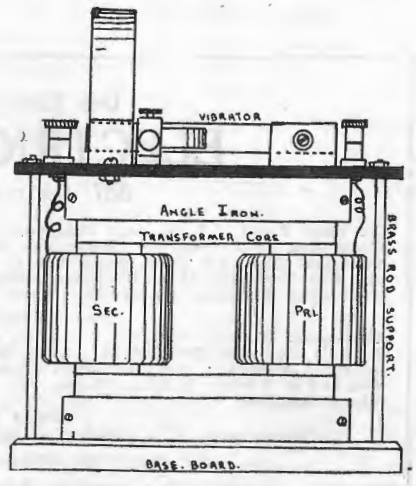


Fig. 2.

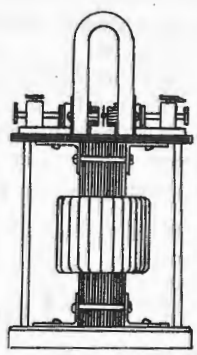


Fig. 3.

d.c.c. wire for 240 volt working, with a proportionate number of turns for other voltages. The secondary for a six volt battery must contain 100 turns of No. 16 d.c.c. wire with a tap at the 50th turn. For a twelve volt battery 150 turns must be put on with a centre tap at 75 turns.

The next item must be constructed with care, or trouble is likely to be experienced. Fig. 5 gives the dimensions for the vibrator, which must be cut out of a piece of transformer or stove pipe iron to the exact dimensions shown. The springs which hold the copper contacts are riveted to the main spring after the former have been soldered and riveted into place. It is not necessary that these springs should be made of magnetic material, but it is essential that they be made of some springy material, such as brass, steel, or german silver, to enable them to withstand the repeated shocks when striking the stationary

electrodes which will be described later. Use only soft annealed steel for the main spring, because the magnetic reluctance of hardened material (such as clock spring) is too high for successful operation.

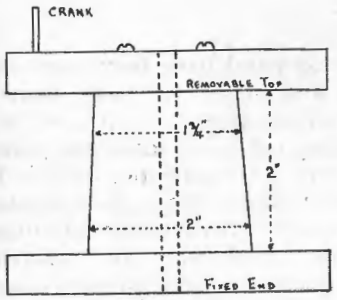


Fig. 4.

For the stationary contacts file up two pieces of carbon from an old generator brush or arc light carbon, 1in. by ¼in. by ½in. A holder for these carbons can be cut out from a sheet of 1/32in. spring brass to the dimensions given in Fig. 6. This is bent into shape to accommodate the brush, and screwed into place on the panel where shown in Fig. 1. A wooden or fibre block 7/16in. high underneath

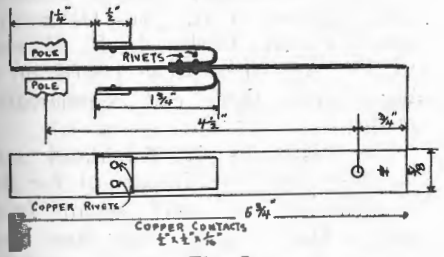


Fig. 5.

the brush holder supports it level with the centre of the copper contacts. The charging rate is regulated by means of these brushes, and they require careful adjustment for best results. The brush holders should grip them firmly, and make good contact or heating will result. Smooth them up occasionally with a piece of fine sand-paper, as they become pitted with use.

This rectifier utilises a permanent magnet to control the vibrator, and a suitable type can be secured from any experimental supply house. Those used on telephone magnetos are to be preferred, and, if possible, secure one

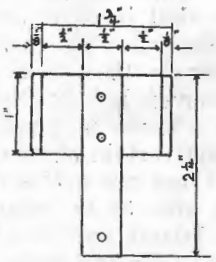


Fig. 6.

with holes drilled in the pole pieces, as this will facilitate the mounting of the soft iron extension pieces (Fig. 7). If such a magnet is unobtainable construct clamps to hold both the magnet and the pole pieces, as it is almost impossible to drill a hole through the magnet owing to its extreme hardness. If the magnet is so strong that it causes the vibrator to strike against the pole pieces, the gap must be widened. Take care that the main spring of the vibrator lies exactly between the pole pieces of the magnet, or otherwise the bias so formed will give rise to erratic action.

The rectifier will warm up during operation, and to prevent distortion taking place a material must be used for the panel which is not affected by heat. A piece of Bakelite, 9in. x 6in. x ¼in. should be used for this, and to make sure that all the holes will be drilled in the proper positions, draw

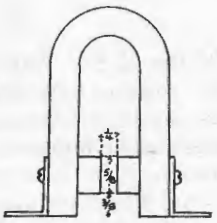


Fig. 7.

up a template beforehand on some stout drawing paper, and mark them from it by means of a centre punch. The base is of wood 9in. x 6in. x 1in., with four brass rods with sleeves connecting it to the panel. This makes a very strong finish. The whole may be mounted in a box with the panel at the top, for the sake of appearance, although it is better to leave the transformer exposed for cooling purposes. The diagram of connections is given in Fig. 8.

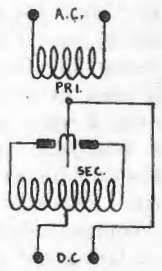


Fig. 8.

Go to it now, Mr. Experimenter, and make yourself independent of the battery service station.

New Zealand Wireless Development

Marked Interest Displayed

(By Our Special Representative.)

FROM the North Cape to the Bluff the keenest interest is being displayed in matters pertaining to wireless development, and every day brings to light interesting revelations. Since the regulations for amateur, experimental and broadcasting stations have been gazetted there has been a marked increase in the number of licenses issued, whilst the formation of radio clubs throughout the Dominion has given added interest to the hobby—if such it can be termed. In the Auckland province alone there are upwards of eight hundred public and private seekers, and the same encouraging state of affairs prevails as one journeys south. Many of the boys start off with a small crystal set costing from 30/- to £5; and they may be seen nightly at the Broadcasting Stations enquiring if there is anything doing. Most amateurs are using one valve sets, and claims to being on intimate terms with the United States, the Pacific Isles, England, France and Germany are common everyday occurrences.

The storms and heavy floods in the South Island recently resulted in telegraphic communication with the North Island being cut off for a time. Even the West Coast route was out of action. Wellington Radio to the Bluff handled all urgent messages during the flood with most satisfactory results.

The chief Government station in the Dominion is at Awanui, which is a high power station, fully equipped. The Auckland Radio, which is on top of the Post Office at present, experiences a good deal of interference, due to local induction in the building.

Wellington Radio, on the Karori Hills, has recently changed the aerial system to umbrella aerial. The radiation from the station since the change does not appear to have shown any marked improvement. The main difference noticed is that the tuning is, if anything, broader.

Going south, at Awarua, only a "listening in" service is maintained, except on special occasions. Awarua is handy, so as to be able to reach Samoa when Awanui is out of action working on a long wave.

The remaining station coming under the Dominion is the Chatham Islands. This station is invaluable, insomuch that it picks up New Zealand traffic from 'Frisco boats a few days prior to the "time messages" being received by the New Zealand Stations. There is great utility in this in that certain areas on the New Zealand Coast are half screened, and traffic is able to be relayed out to Chatham Island, and then back to the Mainland. For this relay no charge is made by the New Zealand Government.

The question of a light or a radio direction finding station on the Three Kings is a matter equally as important to Australia as to New Zealand. The Dominion Government has recently had a number of experiments made, and with them it would appear to be a question of finance. The cost of a radio beacon system for wireless direction is put down at £7,000, and that of a lighthouse at £30,000. The Government steamer *Tutanekei* was last month sent to the Three Kings with the experts, both Wireless and Marine, and the party carried out tests there. There are many advocates for the radio installation, but shipmasters are believed to favour a light. The easy solution of the matter would be to establish both a light and a wireless direction finding station on the Three Kings, which, together could be economically maintained."

There was a flutter of excitement on board the *Niagara* on her last voyage from Sydney to Auckland, when "The Wireless News" was published aboard for the first time. The paper, which was sold at threepence per copy each morning, was pronounced a great success, and has come to stay.

Amongst other little stunts, many amateurs have been trying their hands on the Armstrong Super-Regenerative receiver, and are said to have achieved good results. Four in New Zealand have been very successful, and claim to have heard the American amateurs on circuits containing not more than two valves.

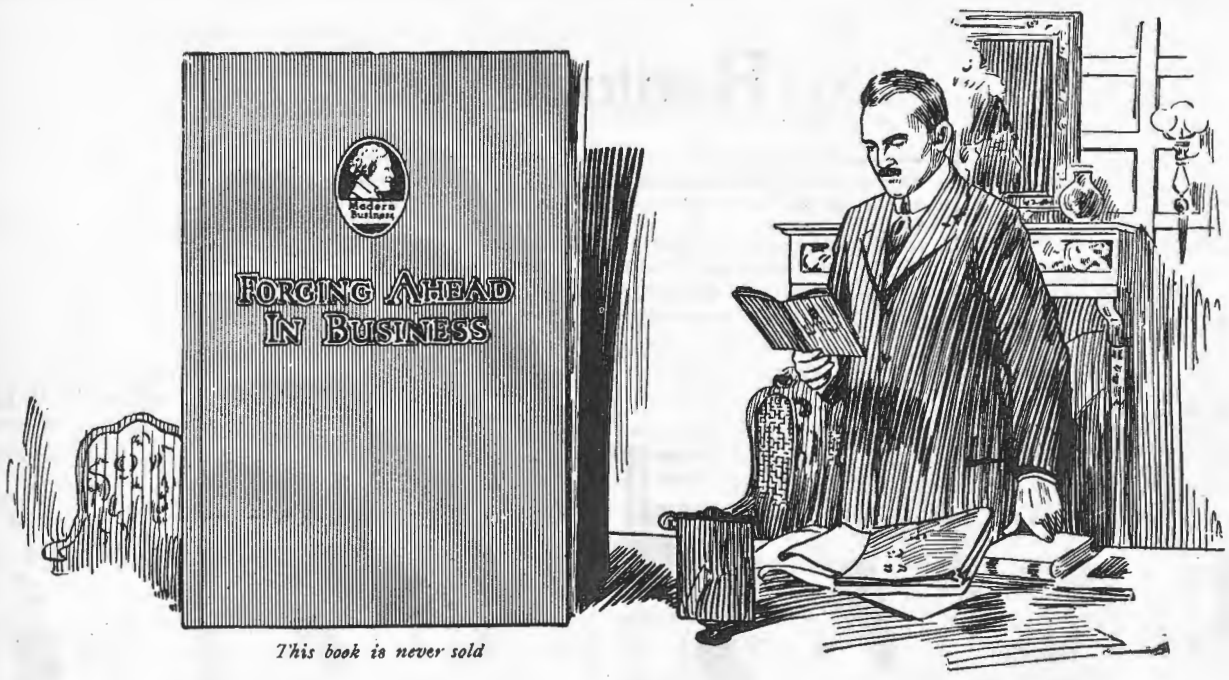
During the currency of the Trans-Pacific Radio Tests, New Zealanders naturally turned their attention towards America. An amateur in Auckland, using a single valve, has copied the following stations: Anapolis, United States N.S.S.; Arlington N.A.A., Marion W.S.O., Pearl Harbour (Hawaii) N.P.M., Cavite (Pacific Islands) N.P.O., Santiago (California) N.P.L., 'Frisco N.P.G., Savilli (Long Island) N.D.D., and others. Similar experiences are reported in Great Britain, France and Italy, including the following: Canarvon in Wales, M.U.U., Leafield in England, G.B.L., Rome, I.D.O., Eiffel Tower, F.L., Saint Assises, U.F.T., Bordeaux, L.Y., Nances, U.A., Lyons, Y.M. In Germany: Nauen, P.O.L., Berlin, L. P., Eilvese O.U.I. All these were heard on a single valve three coil regenerative circuit.

The amateurs of Auckland and elsewhere are very impatient for the broadcasting to start again from Scott's Hall. The delay has been caused through one of the modulating valves breaking, and replacements had to be obtained from America.

Quite a number of New Zealand amateurs, using three valves, have received American amateur signals. This was accomplished prior to the trans-Pacafic tests.

In these days of rapid transit it is hard to believe that islands within a hundred miles or so of Tahiti, with its regular mail steamers, are shut off from the world for several months every year. Thanks to the installation of wireless plants, this difficulty will, in a great measure, be overcome as a message received in Wellington recently testifies.

Concerts and other social functions broadcasted at Wellington during the week have been received with marked clearness throughout the Dominion



This book is never sold

This book may not be intended for you

But more than 200,000 men found in it what they have been seeking

HERE is a slim little volume of only 120 pages. It is not the work of a famous writer. It is not illustrated by a celebrated artist. It is not even bound in leather; its covers are of paper.

Yet few books published in the English language have had a wider reading. And those who have held it in their hands and turned its pages would not part with what it has disclosed to them for many, many times its simple value.

In itself it is only a key—but it is the key that has unlocked the door of the future for those 155,000 business men. Alone it cannot add one penny to your income nor advance your business progress a single step. But it is a guide-post that points the way for you to follow—if you will as others have.

That depends upon you. All the help that others can give you will be of little use unless you are strong enough to make a first effort and earnest enough to sustain that effort.

This page is your test of initiative. It will partly determine whether this book is intended for you.

If the very title of it—"Forging Ahead in Business" stirs no response in your mind, then turn the page and think no more about it. This book is not for you.

But if it does awaken a response, then think of this; plenty of men have the power to start a thing, but few possess the courage and the stamina to carry through their undertakings.

So the second question for you to answer is: "If I send for this book, if I find out more about the Alexander Hamilton Institute Course and Service, if I am convinced in my own mind that it is what I have lacked—then is my character strong enough to help me to do what those 155,000 men have done?"

It means a little money. It means more than a little time. You must ask yourself whether you will sacrifice both. If the answer is a positive "No," then again it must be said that this book is not for you. No system yet devised can impart information by the miracle of telepathy.

But if you are frankly asking yourself what you are doing to-day to make yourself better to-morrow than you were yesterday, and if you believe that every minute is not filled with something more important than this, then start this coup n on its way at once.

Ask yourself this: "Why should any one pay me more next year than this year? Just for living? Just for avoiding costly blunders? Now that I am devoting most of my waking hours to business, what am I doing to become more expert at business?" The answers to those questions will tell you whether to turn the page or mail the coupon.

Alexander Hamilton Institute
42 Hunter Street - Sydney, N.S.W.

Send me "Forging Ahead in Business" which I may keep without obligation.

Name .....
Print here
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.....

Business Position .....

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

Miss Filament: "That horrid Mr. Hy. Tension threatened my life just now."

Constable Fuse: "Well, stand by me—I'll protect you with my life."

* * *

"Mrs. Audiotron told me her filaments were twins."

"That's nothing Mrs. Coupler told me her honeycombs were triplets."

* * *

First Fly (on grid of valve): "Say, mate, come up on the slippery dip."

Second Fly (on accumulator): "Yes, and slip into the fire! Not on your life, these swimming baths will do me!"

* * *

Mr. Dynamo: "I am feeling so 'run down'."

Mr. Coupler: "You should see Dr. Storage. It looks like magnetic poisoning."

Mr. Dynamo: "I don't think I can afford to see him. What is his charge?"

Mr. Coupler: "Oh, about half an amp for ten hours."

Traffic Cop "Grid" (disgustedly): "They expect me to control this reckless traffic on Filament Avenue; and me suffering from curvature of the spine and electronic spiralysis."

* * *

Miss Anode: "Oh, dear, how stifling and hot it is in this glass-house when the fire is burning. Not a breath of fresh air, and those Milliampere girls and that Electron crowd hanging about when they're not wanted!"

* * *

"There's something in that," said the beginner, when he shorted the accumulator.

* * *

"A very pointed argument," said the grid when he crawled from under the shattered glass.

* * *

"A little bit goes a long way," said the Milliamp when he jumped from the aerial.

* * *

"In the limelight," said the electrons when they danced around the filament.

"A very fast life," said the frequency, "especially on 100 metres."

* * *

"Stiffness set in," said the Low Tension current when it tried to jump the filament switch.

* * *

"So near and yet so far," said the High Tension current when it tried to jump the shunt condenser.

* * *

"Hard hit," said the 'phones when they got across the H. T. Battery.

* * *

"Buzz," said the B. Battery when it got amongst the Honeycombs.

* * *

"Nothing to speak of," said the Plate when it looked at the Vacuum.

* * *

"Hard pressed," said the wire when the terminal clamped it down.

* * *

"Very stuck up," said the earth-wire when it surveyed the aerial.

—Contributed by—
R. H. E. CHANNON.

Queensland Notes

(By Our Special Correspondent.)

FIRST CONCERT IN BRISBANE.

With Brisbane as an audience, Radio Station 4 C.M., Preston House, Brisbane, which is owned by Dr. Val M'Dowall, made a most important step in broadcasting circles in Brisbane recently.

Since this was the first concert of its kind in Queensland strong efforts were made to ensure success, and the numerous congratulatory reports which tinkled over the telephone spoke eloquently of the excellence of the results.

The music broadcasted catered for all tastes, including light and operatic selections. The artists, who gladly gave their services, were all first class, and to them was due a large measure of the evening's success.

The reports which poured into the station all corroborated the brilliant success of the broadcast, and Mr. T. M. D. Elliot, who operated the set, was showered with deserving congratulations.

Throughout the evening modulation was perfect, whilst atmospherics were practically negligible. The transmitting set was operated with a power of 9 watts, and on a wave length of 800 metres.

RADIO CLUB AT GYMPIE.

Due to the efforts of Mr. A. E. Dillon, a radio club was formed at Gympie on May 18.

Mr. Dillon has been connected with wireless matters in Brisbane for many years, and realising the possibilities ahead, founded the Queensland Institute of Radio Engineers—the first body of its kind in Australia. He fills the dual position of secretary and treasurer.

A satisfactory attendance was present at the inaugural meeting at Gympie, and after listening to an address by Mr. Dillon it was decided to form a Club on the motion of Mr. Dunston, M.L.A., seconded by Mr. R. Rankin.

The following officers were then elected: President, Mr. A. L. Stumm; Vice-President, Mr. R. Rankin; Hon. Secretary and Treasurer, Mr. H. Kennedy, M.I.W.A.; Committee, Messrs. F. W. Bestman, M.I.E.Q.; W Geldard, M.I.E.A., H. Mingay, F. Hamer, H. Williams, H. Cool, and W. Harris.

AMERICAN SIGNALS HEARD.

Whilst "listening in" on an improvised set in Gympie on May 9 Mr. A. E. Dillon (Secretary Queensland Institute of Radio Engineers) picked up signals on a wave length of about 200 metres. These signals were transmitted by the continuous wave system, and Mr. Dillon believes they emanated from an American amateur station.

The signals were, of course, exceedingly weak, no amplification being used whatsoever, and as atmospherics were rather pronounced, it was impossible to copy transmission unbrokenly. Occasional words, especially the words "California" and "Ohio"—the latter being distinctly copied three times about 11.30 p.m.—justify the belief as to their origin.

Practically all the Australasian land and ship stations have been copied by Mr. Dillon, and the following long-wave stations were also of readable strength—San Francisco, San Diego (California), Annapolis (Maryland), New York Central, Balboa (Panama), Guam (Society Is.), Pearl Harbour (Hawaii), Cavite (Philipine Is.), Funibashi (Japan), Koepang (Java), Bordeaux (France) and Nauen (Germany).

VICTORIA HEARS QUEENSLAND.

The Secretary of the Queensland Wireless Institute (Mr. W. Finney) has received a communication from Mr. Ross A. Hull (Vice-President of the Victorian Division of the Wireless Institute of Australia), stating that he has heard music and speech transmitted from the Queensland Institute. Mr. Hull is desirous of establishing communication between the two divisions, and of conducting a series of experiments.

The results of the Queensland State Elections, which were held on May 12, were also broadcasted with great success.

Club Notes & News

WIRELESS INSTITUTE OF AUSTRALIA

NEW SOUTH WALES DIVISION.

THE next meeting of the Wireless Institute of Australia (New South Wales Division) will be held at the Chamber of Commerce Building, corner George and Grosvenor Streets, Sydney, on Thursday, June 14, at 7.45 p.m. Mr. Fisk, M.I.R.E., has kindly consented to give a short lecture to members on his trip abroad, with special reference to Broadcasting. All members should find this a very interesting subject.

Mr. H. Rigby Gregory will give a short lecture on the Tasmanian Hydro Electric Scheme, and will also explain the developments of the New South Wales Hydro Electric Scheme, which is being constructed, and also those contemplated for the future.

Mr. O. F. Mingay, Hon. Treasurer of the Wireless Institute, N.S.W. Division, attended the Broadcasting Conference in Melbourne, and represented the New South Wales Division on the Committee. Mr. Mingay assures all genuine experimenters that their entire interests were carefully safeguarded during the whole proceedings, and they can rest assured that they will be given every opportunity when broadcasting commences. The experimenters were also represented by Mr. Court, of the Victorian Institute, who acted on behalf of the other States; and, further, Mr. Fisk at all times stressed the necessity for encouraging development of wireless per medium of the genuine experimenter.

METROPOLITAN RADIO CLUB.

On May 21 Mr. C. W. Mann, science master at Canterbury High School, gave a lecture to members of the Metropolitan Radio Club on "Waves and Wave Motion."

On May 23 a lecture was given by Mr F. Swinburne, President of the Manly Radio Club, and this was followed by a practical demonstration of reception of telephony. A 3-valve set was used, together with a magnavox power amplifier The volume of sound was enormous, and during the test it was impossible to hear a conversation in the room.

MANLY RADIO CLUB.

When the Manly Radio Club was formed some months ago the officers were elected for a period of three months only, in order to test their suitability for office. That period expired recently, and at the general meeting held on May 28 another election was held. The majority of the former officials were elected, with the addition of a number of new vice-presidents and two committeemen. The full list of officers now is: President: Mr F. C. Swinburne. Vice-Presidents: Ald A. T. Keirle (Mayor of Manly), Messrs P. S. Nott, M. Dixon, J. R. Trennery, H. Wall, W. J. Proud, and A. Drummond Hon. Secretary: Mr. B. Symes. Hon Treasurer: Mr. F. Clark. Committee: Messrs. Perdriau, Channon, and Wilcox

Prior to the election of officers the Chairman announced that Mr. P. S. Nott who is President of the Literary Institute Committee, had donated the two poles for the aerial. The work of erecting them is to be proceeded with at once, and the Club hopes, at an early date, to be in a position to treat its members and supporters to a series of entertainments.

A comprehensive programme of lectures was drawn up, and the Club expects to accomplish much useful work in the next few months.

RADIO RELAY LEAGUE.

Evidence of the progressive spirit animating the experimenters of Australia is revealed in the determination to form a radio relay league. The object is to organise branches of the League in various districts, in order that a complete chain of experimental stations may be formed across the continent.

The ground work of the scheme was laid at a recent meeting in Sydney held under the presidency of Mr. S. Colville. The association will work under the auspices of the Wireless Institute of Australia, and will be konwn as the Australasian Radio Relay League.

The following officers have been appointed: President: Mr. C. D. Maclurcan Vice-Presidents: Messrs. P. Renshaw and B. Cooke, F.R.A.S. Hon. Secretary: Mr Charlesworth. Organising Secretary: Mr S. Colville. Treasurer: Mr. Maclardy. A Committee of ten has also been appointed.

The feeling of experimenters in Victoria was sounded by Mr. Basil Cooks on his recent visit to Melbourne to attend the Broadcasting Conference; and he reports that they are entirely in sympathy with the movement. He also mentioned the matter to Mr. Malone (Controller of Wireless) and that gentleman expressed the opinion that the idea was an excellent one, and he was willing to afford it any assistance in his power. Another meeting will be held shortly to further advance the matter.

DEMONSTRATION AT CANTERBURY HIGH SCHOOL.

A very interesting and instructive demonstration was given at a meeting of the Canterbury Intermediate High School Radio Club (Sydney), held in the lecture room of the School on Thursday evening, May 31, Mr. E. J. Rourke (headmaster) presided, and Mr. C. W. Mann (science master and secretary of the club) gave a very fine demonstration before an audience of 150, composed of High School boys and their parents. The apparatus used was a Qx valve as detector and two V 24 valves, using two stages of audio amplification and a Baby Brown loud speaker. From 8.45 to 9.25 splendid results were obtained from 21X (Burwood Radio Club), and from 9.30 to 10 p.m. 2 J.M. (Mr. Marsden) sent a very fine concert. During the evening short speeches were made by Mr. Rourke and Master Hector MacDonald. who explained the objects for which the Club was formed, and the great progress it had made. Mr. A. W. Watt spoke on "Wireless During the War." Too much praise cannot be given to Mr. Mann for the very capable manner in which he officiated. The interest shown by those present was ample evidence that his efforts to make the evening an interesting one, and to awaken the interest of the parents in their boys' Radio Club were fully appreciated.

RADIO ASSOCIATION OF N.S.W.

Prior to the opening of the Broadcasting Conference in Melbourne recently, the Radio Association of N.S.W. wrote to the Postmaster-General requesting that the interests of the genuine experimenter should be safeguarded. A reply was received from the Secretary to the Department intimating that the request would not be overlooked.

The Association now has in its ranks the majority of the Clubs in N.S.W., and it is hoped that it will not be long before the rest of them join up.

BALMAIN RADIO SOCIETY.

Quite recently a practical demonstration in receiving and transmitting was given by Mr. P. T. Stephen (W.T.I.N.L.) before the technical committee of the above Society.

Mr. Stephen used only 2 watts in transmitting, but the signals were received quite clearly over a wide range.

During the reception tests of damped and undamped systems, practically all of the amateur transmitters in New South Wales were heard, together with many Victorian experimenters.

No trouble was experienced in receiving the Australian Coast and Ship Stations New Zealand, Dutch New Guinea, Japan American Naval Stations in the Pacific as well as the United States High Power Stations working Europe. French and German stations are readable at any time they are transmitting.

All the above signals were received on one Radiotron Valve using Honeycomb coils for wave lengths between 300 and 10,000 metres. A special type of bank and pile was used for extra long waves over the 20,000 mark.

At a later meeting Mr. Stephen continued his tests, but no transmitting was carried out.

Telephony from Mr. Marsden's and Mr Marks' stations was heard throughout the room on one valve the receivers (Baldwin Mica Diaphragm) being placed on a table. Throughout the tests the signals were at all times strong and clear, and the telephony items were very much appreciated by all present.

The Society's transmitting set should soon be heard again working on 400 metres. The call signal is 2ZB, and anyone hearing the tests is invited to send in a report.

All enquiries regarding the Society should be directed to: F. W. Riccord, Hon Sec. **(pro tem)**, 77 Grove Street, Balmain. Telephone: W 1126.

NEWCASTLE AND DISTRICT RADIO CLUB.

A special general meeting of the Newcastle and District Radio Club was held at the Club rooms, 25 Winship Street, Hamilton, on May 23.

The membership of the club has grown to such an extent that it has been found necessary to make some restriction, and the number required for a quorum being present, the business was proceeded with

The resignation of Mr. N. P. Olsen, as Secretary, was accepted, and Mr. L. T Swain elected in his place.

A motion was passed that the constitution of the Club be altered, as follows:

That the Club be reorganised on the following lines: Membership restricted to thirty, subscription be increased to three shillings per month; the entrance fee be increased to ten shillings and sixpence and meetings be held fortnightly.

Mr. N. P. Olsen accepted the office of editor for the Club.

Two new members were admitted, and the President declared the meeting closed

The Club has its transmitting license and is now on the lookout for more suitable premises to instal the set, which is being built by the members.

BRIGHTON AND DISTRICT RADIO CLUB.

The above Club is making rapid progress. The second meeting saw a further advance in the membership. In view of the rapid increase Mr. H. Crago retired from the presidential chair, in favour of Captain R. T. Whalley ,of Sandringham, who has become a member of the Club. Mr. Crago was elected Vice-President.

After various matters of interest had been decided at the third meeting a lecture was delivered by Mr. R. Busch, on "Long Wave Receivers," after which the Club members enjoyed a "listen in" to some of the long wave stations. Signals were clearly heard from NPM, NPO, LY, and NPG.

All communications must still be addressed to the Hon. Secretary, 28 Durrant Street, North Brighton, Melbourne (Vic.).

It was decided that meetings should be held each second Thursday in the Congregational School-room, Hopetoun Avenue. The next meeting will be held on June 14. Arrangements have been completed for regular buzzer practice and a course of lectures. Full information is available from the Secretary (Mr. G. S Dohrmann), 2 Hopetoun Avenue, Canterbury, Vic.

PARRAMATTA RADIO CLUB.

Parramatta has now fallen into line with the majority of the suburbs around Sydney, and boasts a Radio Club.

At the inaugural meeting held recently the following officers were elected: President: Mr. H. J. Rumsey. Vice-Presidents: Messrs. Owen and MacDonald. Secretary: Mr. H. Melville.

How the Young Members of the Queensland Insurance Radio Club are taught their Morse.

CANTERBURY (Vic.) RADIO CLUB.

Towards the end of May a meeting of radio enthusiasts was held at Canterbury (Vic.) for the purpose of forming a club. There was an excellent attendance. A constitution was drawn up, and the following officers were elected:

President: Mr. R. H. Dixon. Vice-Presidents: Messrs. K. Fryer and J Givens. Secretary and Treasurer: Mr. G. S. Dohrmann. Committee: Messrs. J. Anderson and W. Holtz.

The annual subscription for adults was fixed at £1, and juniors 10/-. It was decided to apply for a club license, and erect an aerial at an early date. Donations of the various parts of a crystal set have been made by members, and this will serve as a foundation upon which to begin work.

A room for club purposes has been made available by Mr. Melville.

Radio enthusiasts in Parramatta and district are invited to communicate with the President or Secretary for further particulars.

WAVERLEY AMATEUR RADIO CLUB.

At a recent meeting of the above Club a request was received from a country centre for a copy of the constitution and rules for the guidance of the society which it was proposed to form. Needless to say, the request was complied with. Following on the invitation extended by Mr. Hector it is the intention of members to visit his laboratory at Greenwich at a convenient date.

Mr. G. Thompsons' lecture on "General Tuning" followed the conclusion of the general business, and was much appreciated.

GENERAL NOTES.

Mr. Wallace Best, Rose Bay (2ER) has commenced transmitting. To date his modulation has been exceedingly good.

Mr. R. C. Marsden, who is in charge of the Time Roster governing the operations of amateur transmitters around Sydney complains that those who are allotted certain times show a disposition to go outside the limit. This is unfortunate, as it deprives many who are anxious to carry out tests of a fair opportunity to do so. The least that can be expected of those who have been allotted half an hour a night for every night in the week is that they should have sufficient sportsmanship not to monopolise the ether for an hour or so before or after roster time. To ensure harmonious working it is necessary that the interests of all transmitters should be safeguarded, and this can only be accomplished by a display of unselfishness on the part of all concerned. The number of those possessing transmitting sets is increasing so rapidly that it will be necessary in the very near future to cut down both the period and the number of nights at present allotted in order to allow everyone a fair opportunity.

PERSONALITIES.

Mr. J. W. Robinson, who was recently appointed Hon. Radio Inspector, has made application for membership of the Wireless Institute of Australia. When granted, this will mean that all the N.S.W. Hon. Radio Inspectors are members of the Institute.

W. F. S. (East Richmond, Vic.) asks: (1) How to make a short wave regenerative set to tune to 550 metres, including size, amount of wire, dimensions of rotor and stator of the variocoupler and variometers. If a variable condenser is needed what capacity would it be? (2) Method of calculating the proper inductance for the primary, secondary, and tickler circuit to tune to waves between 1,000 and 25,000 metres? (3) Does the determination of strength of signals received depend upon the amplification of the valve, and what is the amplification factor of a U.V. 200?

Answer: (1) Construct a variocoupler as described in the Experimenter's Corner of last issue, and wind 30 turns of No. 22 D.C.C. on the stator with five taps and 50 turns of No. 26 D.S.C. on one rotor. Used in conjunction with a 0.0005 m.f. condenser this will provide a single circuit regenerative receiver capable of operating between 250 and 750 metres. The rotor is connected in the plate circuit as a reaction coil.

(2) Calculate this from the formula

$$L = \frac{(W.L.)^2}{1885^2 + C.}$$

The tickler can have the same number of turns as the secondary.

(3) The number you heard refers to a signal scale varying from 1 to 10, used by commercial operators, and has no direct connection with the amplification constant of a valve. The factor for a U. V. 200 is, approximately, six.

J. C. (Albert Park, Vic.) asks for a circuit using a crystal as a detector and a valve as an amplifier, and a variometer instead of an iron core transformer.

Answer: (1) The circuit is given herewith. The potentiometer is optional although its use greatly improves certain crystals.

(2) An iron core transformer is essential as audio currents are being dealt with.

See the article on Reflex Amplification in last issue for further information regarding these circuits.

L. M. (Randwick) asks: (1) What amateur transmitters should be heard at Randwick on a loose coupler crystal set with an aerial 35 feet high one end and 20 feet the other, 60 feet long, twin wires six feet apart. (2) What would be the greatest receiving range for the above set. (3) Is it possible to receive anything with this set using a 40 feet single wire aerial 25 feet high. (4) Could a .00075 variable condenser be used in connection with the set?

Answer: (1) You should hear 2JM, 2DS 2LI and 2CM.

(2) This depends upon too many factors to give a reliable answer.

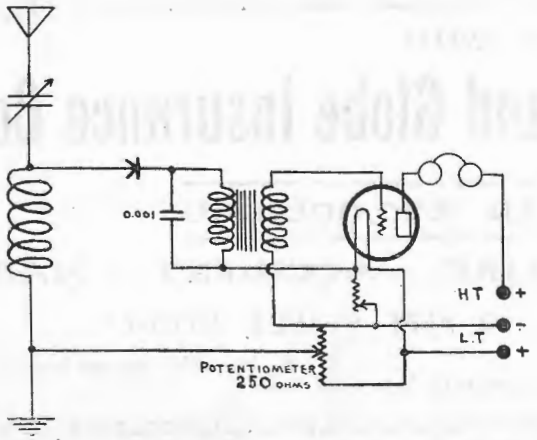
(3) Yes.

(4) Yes—to tune the secondary circuit

C. A. W. (Artarmon) has a variable condenser of .0005 mfd capacity, having 23 plates and $\frac{1}{8}$in. spacers, and asks (1) How many more plates he must add to retain the .0005 capacity if he substitutes $\frac{1}{4}$in. spacers? (2) What are the gauges of the samples of wire enclosed?

Answer: (1) If you double the spacing of the plates twice the number must be used to retain the original capacity.

(2) The gauges of the wires are as follows: 26 D.S.C., 28 Enamel, 30 Enamel, 36 S.C.C., 44 S.S.C.



Circuit, Using Crystal as a Detector and Valve as Amplifier.

X. C. L. (Martin Place) writes as follows: (1) I have an extension from my 'phone terminals on a loose coupler crystal set running a distance of thirty feet into another room. The signals appear to be louder through this additional wire than from the set direct. If long 'phone leads have this effect would it not be possible to amplify signals by making them pass through a coil of wire between the detector and 'phones? (2) Does VIS work with any other stations at any set time, or send any other regular signals besides the weather reports at 8.30 p.m.? (3) What is the advantage in joining the leads from each wire of the aerial just before they enter the building? (4) Would a twin wire inverted "L" aerial, 75 feet long, 60 feet high at free end, and 44 feet high at the other, be classified as fair, good, very good or excellent? (5) What is the advantage of a twin wire aerial?

Answer: (1) The increased signal strength is due to the capacity of the long connecting cord acting as a radio frequency by-pass condenser. Try shunting the 'phones with a 0.001 m.f. condenser when using the short cords.

(2) No.

(3) A slight decrease in ohmic resistance.

(4) This should make a good aerial.

(5) Increases capacity and decreases resistance.

H. G. (Taree) asks: (1) What signals he should receive using one valve set with reactance, A.T.I., Murdoch's 2,000 ohm 'phones and basket coil tuner? (2) What are the regular radiophone transmissions, call signals and times? (3) To what use can he put a quantity of No. 32 S.W.G. enamel-covered wire? (4) Is flexible wire good for use as aerial or earth lead.

Answer: (1) You should be able to receive telegraph signals on 600 metres, and radio telephony on 400 metres.

(2) The regular radiophone transmissions are as follows:

2CM.—Mr. Maclurclan, of Strathfield every Sunday night from 7.30 to 8.30 p.m

2M.B.—Amalgamated Wireless, Sydney every Tuesday from 7.30 to 8.15 p.m.

Both transmit on, approximately, 400 metres.

Other stations transmit at times notified in the Saturday issue of the *Evening News*.

(3) Use this wire for single layer coil construction.

(4) Yes, the stranding reduces the high frequency resistance.

Coastal Radio Service

ITEMS OF INTEREST.

Mr. G. J. Weston, Superintendent of the Coastal Radio Service, gave a very interesting lecture on "Wireless Telegraphy and Telephony" to the No. 1 Troop of Boy Scouts in Melbourne. About 70 Boy Scouts and their respective leaders were present. Music and speech was transmitted from Collins Hause, and was greatly appreciated by all present.

A hearty vote of thanks to the lecturer and Mr. B. Pringle, who assisted with the apparatus, was carried by all present in true Boy Scout style.

During the month of April some extraordinary receiving results were recorded at Sydney Radio. These results were obtained using one Expanse "B" Valve:

April 8.—5.58 a.m. GJPQ read: Ship then 3,300 miles west of VIS.

April 15.——4.32 a.m.: "TR" from VJK 1,300 miles west of VIA.

April 14.—10.36 p.m.: "TR" from GBE, then 2,500 miles from VIS.

April 17.—2.9 a.m.: "TR" from VJQ 350 miles west of VIP.

April 17.—VIM and VIA time sigs read at noon and 12.30 p.m., and communicated with VIA at 12.36 p.m.—good sigs both ways.

April 18.—4.40 a.m.: GBJ (Benalla) calls VND (Durban), and sigs easily readable. Ship then, approximately 4,500 miles from VIS. Bound Durban from VIP, due VND 22nd (4 days out), left VIP 7th. 5.30 a.m. again heard, GBJ calling VND; again at 5.51 a.m.

April 20.——4.55 a.m.: GFBP strength 7 gives position to VIM—2,750 miles.

April 23.—3 a.m.: GQC strength 7 calling YGM (intercepted position: lat. 39.23. S, 75.41. E) 2,000 west of VIP (VIP gives QRZ to this ship).

April 24.—3.50 a.m.: MGM strength 4 heard sending to VIP 1,200 miles west of VIP.

STAFF CHANGES.

Mr. J. F. Christie, relieving radio telegraphist, has been transferred from Geraldton to Perth, on completion of relieving duties at the former station.

Mr. E. J. O'Donnell, relieving radio telegraphist, Perth Radio, is being transferred from Perth to Melbourne Radio.

Mr. C. E. Lemmon, radio telegraphist, Sydney Radio, has resigned his position.

Mr. J. Tolano, radio mechanic, of Thursday Island Radio, has resigned his position.

Messrs. A. G. Kempling and F. W. Stevens, radio telegraphists, have arrived at Melbourne Radio, and proceeded on recreation leave after their three months' sojourn at Willis Islets.

Mr. S. M. Newman, radio engineer, "Collins House," proceeded to England per s.s. *Moldavia* on six months' leave.

Our hearty congratulations and best wishes to Mr. F. W. Stevens, radio telegraphist, Melbourne Radio, who was married at Melbourne on May 17.

Movements of Marine Operators

Mr. C. Drew, who was relieved by Mr. G. Maxwell on s.s. *Ceduna*, at Sydney, on May 15, is now on Home Port leave.

Mr. S. M. Brown was relieved on s.s. *Cantara* by Mr. K. J. Dines, at Sydney, on May 15, and is now on Home Port leave.

Mr. F. N. Davidson was relieved on s.s. *Melbourne* by Mr. T. Laidlaw, at Sydney, on May 17, and is now on Home Port leave.

Mr. F. C. Smith, who signed off s.s. *Macumba* at Brisbane on May 18, has now returned to Sydney, and is on Home Port leave.

Messrs. J. M. Camps, T. F. Dines, and R. C. V. Humphery, first, second and third operators respectively, signed off s.s. *Caludu*, at Sydney, on May 19.

Mr. R. J. Inglis signed off s.s. *Werribee*, at Melbourne, on May 16, and is now on Home Port leave.