

RADIO

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

VOL. I.

AUGUST 22, 1923

No. 11



Wanda Hawley, Paramount Picture Star, is an ardent radio enthusiast.

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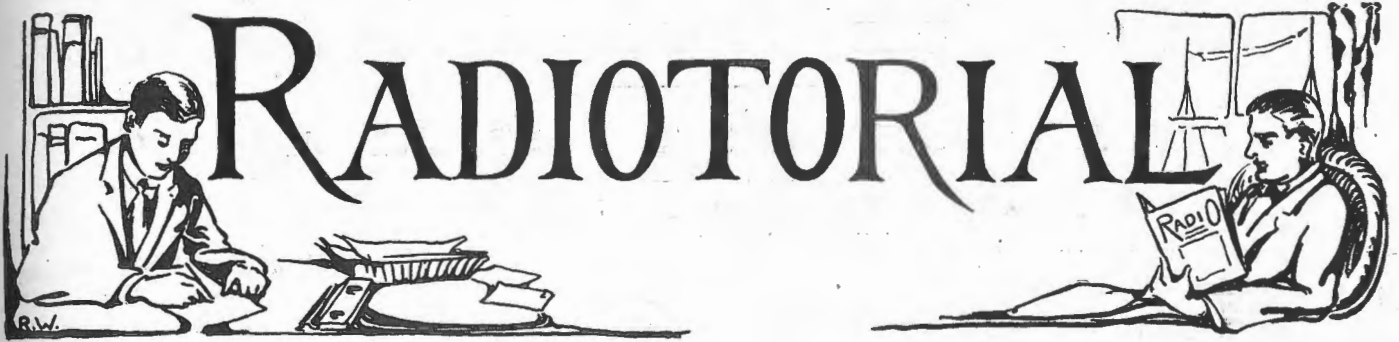
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An Optimistic Outlook

THE Commonwealth Broadcasting Regulations which were gazetted on August 1 have, even at this early stage, been favourably commented upon. It is yet too early for their many admirable points to be fully realised, but when broadcasting is in operation, Australia as a whole will be in a position to judge how well the Melbourne Conference did its work.

Within the next few months high-class entertainment programmes will be available to owners of broadcast receiving sets throughout Australia. That much can safely be said. The gazettal of the regulations has cleared the way, and those who recognise in the transmission of radio entertainment programmes an opportunity to brighten home life have not much longer to wait.

A word of warning may be necessary to radio dealers who will soon be established in practically every centre of the Commonwealth. For their own and their patrons' protection it is advisable that they should exercise proper care in purchasing broadcast receivers and be sure that any apparatus ordered by them is so designed and constructed as to comply with the Australian regulations. Every dealer will find ample protection in a close study and practical operation of these regulations.

Dealers would also do well to discourage isolated and half-hearted attempts to initiate broadcasting. Such attempts may gratify those who desire an immediate beginning, but in the end it will mean dissatisfaction and disappointment to the people who reasonably expect, and, at the proper time, will receive something better.

Broadcasting can only attain its proper place as a community entertainer by careful and systematic efforts to secure the best possible results. Less than a score of years ago no one would have dared to suggest that motoring would ever be as popular, safe and pleasant as it is to-day. A successful effort on the part of manufacturers to improve the quality of their output and Local Government and Traffic authorities to provide better roads and regulations has had a happy result. To-day motoring belongs to the many, and still those who contribute to its success are making further efforts to place it on a higher pedestal. If the same systematic and whole-hearted efforts are employed to place Radio Broadcasting on the road to success it will prove a profitable business to those financially interested and a never-ending source of interest and entertainment to the great mass of the people.

Maintaining Interest in Radio Clubs

EXECUTIVE officers of Radio Clubs frequently complain of the difficulty experienced in holding the interest of members. This difficulty is not necessarily due to any lack of initiative or enthusiasm on the part of the responsible officers. Within the limited opportunities at their disposal they do everything possible to keep their respective societies in a flourishing state. But as "one swallow cannot make a summer," neither can a handful of members carry on the work which rightly belongs to the large body of radio enthusiasts now to be found in almost every district.

When reviewing the proposal to have a common meeting night for all Clubs, this journal suggested that frequent intervals members should be told of the obligation resting upon them to keep their Society alive and useful. Experience proves that there is no better way of keeping interest alive amongst the rank and file

of any body than by making responsibility as wide as possible. When there is work to be done and sacrifices made, it is better to have the burden widely distributed than resting on the shoulders of a few.

Many clubs are now introducing the social element into their activities. There is much to be said for and against this. Many enthusiasts claim that a Radio Club should confine itself solely to wireless work. This is theoretically sound, but practically, it falls short of success. The judicious introduction of a little light entertainment such as a dance to radio music or a concert in which wireless supplies part of the programme will help to increase the Club's popularity without in any way detracting from its more serious side. It is possible to have too much of one thing, no matter how good it may be, and the club which refuses to place aught but wireless on its menu cannot be termed successful if a dwindling attendance marks its career.

New York Broadcast Central

Radio Corporation's New Station

At Aeolian Hall

BROADCAST CENTRAL, the new radio station of the Radio Corporation of America at Aeolian Hall, New York City, which has been the subject of considerable speculation among radio listeners who have heard the station testing with call 2XR, was recently opened.

Located in the heart of the city's musical and theatrical district, where entertainment of the highest order is ever available, this station offers to the American public the most elaborate radio programmes with a degree of faithfulness in reproduction that marks the beginning of a new era in radio broadcasting. The aerial wires, which tower 400 feet above the street on Aeolian Hall at Fifth Avenue and 42nd Street, provide two antennas, and this super-station can transmit two broadcast programmes simultaneously, on different wave-lengths.

The closing of station "WJZ" at Newark, N.J., operated jointly by the Radio Corporation of America and the Westinghouse Electric & Mfg.



Aeolian Hall, New York City, from Fifth Avenue, showing towers and antennae of "WJY" and "WJZ."

Company coincided with the opening of Broadcast Central. The well-known call "WJZ" has been retained for transmission from the Aeolian Hall station on 455 metres, while the call "WJY" is used for the other wave length of 405 metres, both of which wave-lengths have recently been allocated to the new station.

The new station is fitted with a double antenna and two independent transmitters which permit a dual programme to be broadcast, one, that of classical or serious entertainment; the other, popular airs, dance music and lectures.

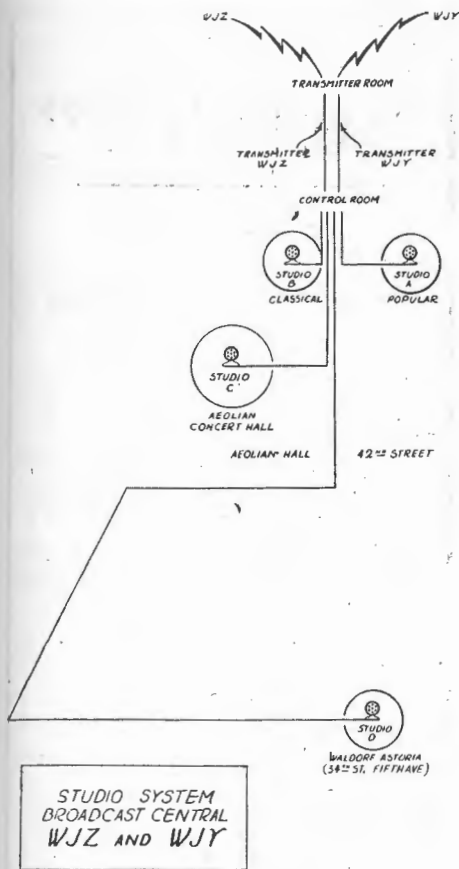
The Radio Corporation of America has made a thorough analysis of the types of programmes best suited to the requirements of the public and this study has revealed the fact that generally, the radio public may be divided into two classes, those who prefer classical or similar entertainment and those desiring dance music and popular airs.

Not only is transmission carried on from the two studios which are a part



The Heart of Broadcast Central.

The photo at the left shows the main transmitting apparatus at Broadcast Central, and the photo at right the control equipment in transmitting room, located on the roof of the Aeolian Hall. The operator has before him a microphone through which he can talk by radio telephony, a key by which he can converse in morse code, and land line telephone equipment, all of which provides communication with any point in the United States. An inter-communication system furnishes internal communication between the studios and transmitting room. By means of a special "check-up" device, the operator can, at a glance, actually observe the degree of perfection in the reproduction of a programme.



One of the Studios at New York Broadcast Central in Aeolian Hall. The diagram on the left shows the arrangement of the various studios.

Location.—Heart of New York’s musical district where the finest of entertainment is ever available. (29 West 42nd St., N.Y. City.)

Towers.—There are two self-supporting steel towers erected on the roof of the building. They are each 115 feet high and their total weight is 15 tons.

Antenna.—Consists of two independent sections supported between towers. Height above street level is 350 feet. The two sections of wires

have individual “lead-ins” to the transmitting house on the roof.

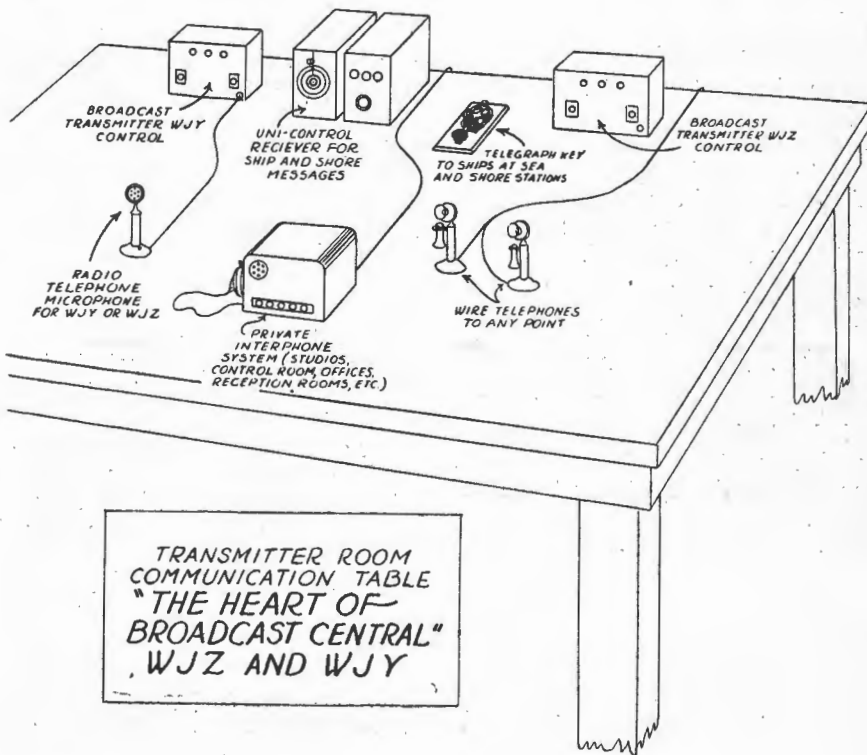
Wave-lengths.—Each section of antenna is energized by an individual transmitting set permitting a double programme to be broadcast on two wave-lengths without mutual interference. This combination of two independent aerials with associated equipment permitting simultaneous broadcasting is an exclusive feature of Broadcast Central.

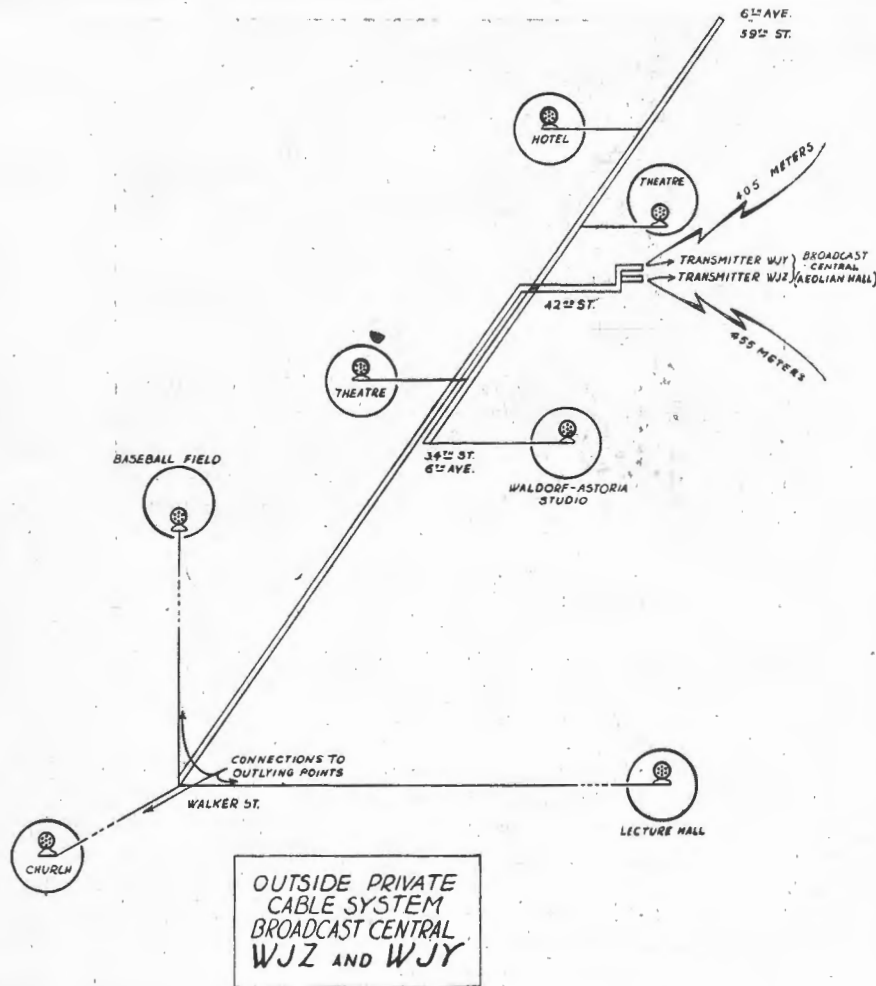
(Continued on page 246.)

of the station, but the main recital hall of Aeolian Hall has been connected to a switchboard in the station, thus providing at frequent intervals another source of the finest music obtainable.

To guard against interruption in programmes, two spare transmitters are installed together with the necessary controlling apparatus which enables the operator to make an instantaneous change from one set to another should any trouble develop.

Broadcast Central is a model station both in electrical design and operating facilities, incorporating the most advanced ideas of RCA engineers. One of the outstanding improvements is the “checking up” of the broadcast programmes for clearness in transmission. This is accomplished by a “moving picture” device connected with the antenna which shows at a glance the perfection in reproduction of music or voice as the radio waves leave the antenna. Any distortion occurring during a rendition may be instantly corrected by the operator who watches the electrical vibrations as they radiate into space.





Studios.—One studio has been provided for each transmitting channel, one for classical music the other for popular airs, lectures, etc. In addition, special wires are installed from the main recital hall of the building direct to transmitting house on the roof. On certain occasions special events or recitals will be broadcast direct from this large hall.

Emergency Equipment.—For each channel there are two complete transmitting sets. These spare sets may be connected into the circuit of each antenna by the simple manipulation by a switch. This provision will prevent any interruption of programmes through the failure of any transmitting set.

Device “Checks Up” Programme Broadcast.—A new device inserted in the antenna circuit of each channel indicates the clarity of transmission. The operator in charge can, at a glance, actually observe the degree of perfection in the reproduction of a

programme. A switchboard near this instrument enables the operator to correct any distortion in transmission that may occur.

Latest Apparatus Used Throughout.—The Radio Corporation of America has spared no time and money in making Broadcast Central the model Broadcast Station of America. The equipment used is the result of several years research and development in the practical operation of broadcast stations.

The Heart of Broadcast Central.—The control equipment located in the transmitting room on the roof is the heart and nerve centre of the system. The operators have before them a microphone through which they can talk by radio telephony, a key by which they can converse in dot-dash telegraphy and telephone equipment which provides communication with any point in the United States. An inter-communication system furnishes for internal communication between studios and transmitting room.

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Wireless Regulations

Where Australia Stands

By J. MALONE, M.I.R.E., M.I.E.E., M.A.I.E.E., Chief Manager of Telegraphs and Wireless

THE Regulations comprising Statutory Rules No. 97 of 1923 govern the licensing of all classes of Wireless Stations under the authority of the Wireless Telegraphy Act. This means, of course, that they govern all Wireless Activities in Australia and Territories, as no station can be legally erected or operated unless it is licensed as set out in these Regulations.

The Regulations are divided into Parts 1 to 8; Parts 1, 2 and 8 contain clauses of a general nature referring to all classes of licenses, while Part 4 deals with Broadcasting only. Persons concerned with Broadcasting, therefore, should not refer only to Part 4 as there are some important clauses in the other parts which, being of general application, will refer to Broadcasting as well.

The classes of licenses of more particular interest to the general public are experimental licenses and broadcasting licenses. The conditions with regard to experimental licenses have not been altered to any great extent. Reg. 9 deals with them; sub-Regulation 9 (5) being of particular importance:—

9 (5). "Conditions with regard to wave-lengths, power, location of station, and other technical features as are necessary for the protection and safe-working of other stations shall be determined by an authorised officer, and shall not be inconsistent with these Regulations."

The object of delegating this power to the Chief Manager is to provide for flexibility of administration; any amendment not inconsistent with the Regulations can be made quickly. The "authorised officer" referred to therein is the Chief Manager of Telegraphs and Wireless, who has set out the conditions in Instructions Re-

garding Applications for Experimental Licenses which are obtainable from the Chief Manager's office, 146 Flinders Lane, Melb., or the Radio Inspectors, Sydney and Fremantle, and the G.P., Brisbane, Adelaide, Perth and Hobart. A reference to those Instructions will show that the wave-length of Transmitting Stations is 100 to 250 metres with no spark transmission over 200 metres. It will also be seen that in special cases a longer wave-length may be granted. This longer wave-length, of course, will depend on the requirements of the Broadcasting and other Commercial and Defence Stations. *Regenerative circuits capable of causing the aerial to oscillate* are not normally allowed; but regeneration is permitted where it is safely controlled; in such cases, the licensee must be capable of receiving morse signals by sound at the rate of 12 words per minute. Applicants for transmitting licenses shall possess operating qualifications and comply with certain conditions as set out in the Instructions which should be studied carefully before forwarding applications or fees.

Applicants for experimental licenses will be required to satisfy the Chief Manager of their qualifications to conduct experiments scientifically and to indicate the nature and object of the experiments which they desire to conduct. In short, the Chief Manager will be required to determine whether the applicant is or is not an experimenter; if not an experimenter, the applicant cannot be given an experimental license, but will, of course, have the opportunity of listening-in to any Broadcasting Station for whose programme he may desire to subscribe by obtaining a Broadcasting (Receiving) license from the Broadcasting Licensee or Licensed Dealers, who will be author-

ised to issue licenses on behalf of the Postmaster-General.

Radio Clubs, Wireless Institutes and such organised bodies of experimenters working under a constitution or rules which meet with the approval of the Chief Manager will be recognised and encouraged by the authorities. It is realised that such internal control and discipline are necessary in the interests of all concerned, and consequently it will be the desire of the authorities to see such Institutes flourish. It will, of course, be necessary to look for certain conditions before recognising officially such clubs so that the Broadcasting business may not be jeopardised; membership of Clubs should be confined to people genuinely interested in the science of radio.

At present a number of amateur Broadcasting demonstrations are given in various States, and these demonstrations apparently are much appreciated by other experimenters and amateurs. It is the intention of the authorities to permit such amateur Broadcasting to continue unless and until it can be shown that interference is being caused with other stations or business.

With regard to Broadcasting as set out in Part 4 of the Regulations, it is explained that these Regulations are based on the proposals of the Conference held in Melbourne on 24/5/23 at the invitation of the P.M.G., comprising all interests concerned in Broadcasting. The Conference selected a committee which drafted proposals for Regulations and this committee subsequently discussed in detail draft Regulations prepared by the authorities. The final amended draft has been put into legal phraseology by the Crown Law authorities. It will be seen, therefore, that the Conference is mainly respon-

sible for the Regulations and will, it is hoped, take its share of responsibility in endeavouring to obtain harmonious and efficient working conditions which will make for the development of successful Broadcasting.

It will be seen that it is not an easy matter to obtain a Broadcasting license. Applicants must satisfy the Postmaster-General of their technical and financial capability to provide an efficient service and to maintain it for a period of five years. Financial guarantee of £1000 will be required to support their bona fides. This guarantee is demanded in order to protect the public, so that it will not be possible unless at considerable financial loss for any Broadcaster to obtain a license and get in the first or second year's revenue and then desert his clients. Every Broadcasting Station will have an exclusive wave-length, and the power of the transmitter (measured in the High Frequency Charter Circuit) will be between 500 and 5000 watts; coupled circuits will be demanded and radiation must be maintained reasonably constant with a permissible variation of the authorised wave-lengths of 1 per cent. above or below. No restriction will be placed on the class of programme broadcasted or the times of broadcasting. Therefore it will be possible for a licensee to broadcast advertisements. It will be necessary for him, however, to broadcast such items of public interest which the Minister may determine, comprising weather reports, market reports, etc., such special items shall not exceed the maximum of 20 minutes during each 12 hours.

The Regulations dealing with sealed receivers is one which has already called for considerable comment and criticism. This condition of sealing the receiver so that it will respond to the wave-length of the station to which the licensee is subscribing is probably the most important regulation of all, as the basis of the Regulations is provision for a competitive entertainment business. Therefore, each broadcaster will obtain as many clients as he can and in order to hold these clients it will be necessary for him to provide a good programme, and ultimately only the broadcasters who provide first-class programmes will remain in the field. It will be

possible for any holder of a Broadcasting (Receiving) license to so arrange that his receiver will pick up more stations than one; in this case he will be required to pay an additional license fee of 10/- and also the additional subscriptions to the Broadcasters whose programmes he picks up.

It will be possible for any person to make or assemble his own receiver, the only condition imposed by the Regulations being that the receiver when assembled in a box shall be capable of being sealed so that it will respond only to the selected wave-length, and the reaction will be so fixed as not to be capable of causing the aerial to oscillate. The maker of such a receiver is required to take the box containing the tuning elements to a Radio Inspector, who will test it to ascertain its conformity with the Regulation dealing with reaction and wave-length; if satisfactory, he will issue a certificate accordingly and a fee of 2/6 will be charged for each such test.

Special Regulations concern Radio Dealers who will all be required to be licensed and to display a sign "Licensed Radio Dealer." These dealers will not be able to sell or hire any apparatus to any person unless the latter is in possession of either an experimental license or a Broadcasting (Receiving) license. In the latter case, the various Broadcasting stations will arrange so that the dealers will have available approved receivers capable of picking up their respective stations. Also for the dealer to collect the Broadcasting subscription fee and the Government License fee—the latter being handed over to the Post Office Authorities, together with a duplicate copy of the Form which will comprise both the license and a receipt for the license fee and the subscription fee; thus the public will not be required, as in England, to go to the Post Office for a license fee and then to the dealer or Broadcaster to make arrangements for his subscription. He will be enabled to make arrangements and pay both fees to the dealer.

Manufacturers of receivers must arrange with the Radio Inspectors for a specimen type of their receivers to be tested for approval. If it complies with the conditions relative to reac-

tion and variation of wave-length, it will be given a type number and a stamped impression containing particulars of such type number and the wave-length to which it will respond. This stamped impression must be placed on all similar receivers made to that type. All such receivers must bear the approved Government seal. No conditions are laid down as to the method of sealing; this set must be capable of having the tuning elements sealed—the method of so doing being a matter for adjustment between the manufacturers and authorities.

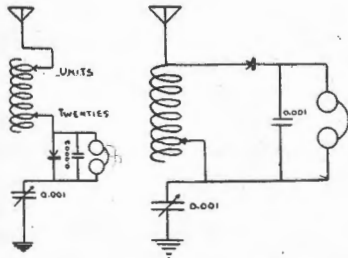
The Department is anxious, as it has always been, to encourage the development of wireless in every legitimate way and hopes for the co-operation of all enthusiasts to maintain harmony in their various spheres. The new Regulations dealing with Broadcasting are a distinct departure from practice in other parts of the world, and it behoves all concerned to give the Regulations a fair trial before indulging in criticism. While it is recognised that the various interests have ideals almost irreconcilable, a constant co-operation and co-ordination of activities is not only advisable, but necessary if we are to find wireless developing happily and efficiently. The experimenter must be encouraged; he is mainly responsible for the introduction of Broadcasting and he will still be able, in his proper place, to do useful work for Australian radio. The dealer, who will have to listen to public criticism, has a special duty to himself and the public in educating the prospective "listeners-in"; the Broadcaster will naturally see to it that he "delivers the goods" and does not interfere with other people's goods or the satisfaction of his own and other Broadcasters' clients. While the manufacturer will be in a happy position of security, he has a big responsibility in recommending designing and manufacturing such equipment as will lead to efficient service to all. With these various interests working harmoniously and unselfishly for the common end, flourishing and efficient wireless services—the authorities whose only interest is the care for all, will have peaceful nights even if they live laborious days.

The Radio Crystal Set

How to Make It

By C. W. MANN

IN many respects a crystal set has advantages over a valve set. Spark reception and telephony over short distances is remarkably clear, and tuning is very easily accomplished. The great disadvantage of a crystal set is, of course, the fact that the range is limited, especially in the case of telephony. The amateur should remember that a good aerial, a good earth and good 'phones are necessary in order to enjoy success in wireless reception. This statement does not, of course, underrate the value of sound construction in a set, but rather emphasises the need for consistent good work in order to obtain good results.



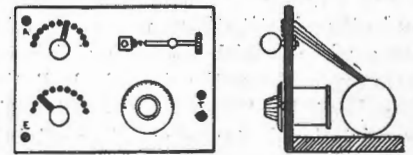
Figs. 1 and 2.

For simplicity of tuning, the single coil circuit stands alone and the results which can be obtained will justify its use for telephony and telegraphy work. The dimensions of the single coil given are to cover a wave length of from 300 metres to 900 metres. Nothing is to be gained by using coils giving a greater wave length when used with a condenser, for all commercial work will be heard on 600 metres while telephony is on the 400-450 metres band. To get this wave length, a coil measuring four inches in diameter and having a length of five or six inches, wound with 150 turns of No. 24 enamel wire will be necessary. If possible, an ebonite former should be used, failing this, a cardboard former which has been dried in the oven and given a couple of coats of shellac can be used.

A variable condenser having an approximate value of .001 microfarad should be placed in series with the coil. For tuning purposes, it will be necessary to vary the inductance of the coil. This can be done by tapping or by using a sliding contact. The tapping method is generally to be preferred to the slider, as a consistent contact is difficult to obtain between the wire and the slider. However, if the latter method is adopted, the slider once placed in position, contact is obtained by scraping clean the wire immediately beneath the slider as it moves along. If tapings are adopted, the coil can be tapped in at least two practical ways. Tapings can be taken off so that equal inductance between tapings is secured, or equal number of turns of wire can be tapped. The latter method, will perhaps recommend itself to the beginner on account of its simplicity. Every wire cannot be tapped, of course, but the tuning of most stations will necessitate fine tuning. This can be obtained by tapping in "twenties and units." A glance at the diagram will make this quite clear. The condenser in series with the coil will then enable tuning between turns, i.e., a portion of a turn; this will give fine tuning. The writer strongly recommends this method for the circuits employed. Only a few of the tapings are shown, but there are ten controlled by switch A, and seven tapings by switch B. In the actual construction, the tapping is made by twisting the wire into a pigtail at the right time, scraping clean and soldering a lead from the pigtail to the corresponding stud. The lead should be of flexible wire with the braid, but not the rubber insulation, removed. The pigtails should be staggered, that is, taken off at different radial positions on the coil which can be completed by varnishing and mounting on a baseboard secured with small brass screws.

A variable condenser should now be constructed from parts obtainable from any dealer. The ideal type for the amateur is the fixed and movable plate type. There are many ideas for the construction of a crystal cup, and the writer thinks this can be left to the maker. The catwhisker, however, should be very fine; a single strand of flex, about two inches in length, soldered to a piece of No. 22 bare copper wire coiled into a spiral makes a splendid catwhisker. Much experimental work can be done on crystal testing, but the beginner will soon settle down to galena for good, consistent results.

The parts are now ready to assemble. The coil, .001 m.f. variable condenser, crystal cup, two switch



Figs. 3 and 4.

arms, seventeen studs, four terminals and 'phones. A small 'phone condenser, .0003 m.f., should be placed across the 'phones. The baseboard should be raised above the table by means of four insulators screwed under the four corners and the set wired up with No. 14 or 16 bare copper wire. A panel should be screwed in front of the baseboard to hold switches and variable condenser. Of the two circuits shown, No. 1 is by far the better, however, the hook-up can be changed frequently with little trouble. Tracing the circuit will be a simple matter once the assembling is done.

To test the crystal, connect the aerial and earth wires and listen in. A buzzer is very useful for testing crystals. Place the buzzer adjacent to the set, but do not connect up the set and

(Continued on page 253.)

Broadcasting News

From Overseas

RADIO AND HEALTH TALKS.

Twenty-three broadcasting stations are co-operating with the United States Public Health Service by the regular dissemination of health bulletins for the public welfare.

It is now estimated that there are more than 2,000,000 radio receiving sets within range of these stations.

Probably the first station to pioneer this valuable service in California was "KUO," the radiophone station of "The Examiner."

For the past year "KUO" has acted as the official broadcasting station for the California State Board of Health and has broadcast each Wednesday valuable data of interest to all.

This service of "The Examiner" station has proved of exceptional interest to many of the state hospitals and other institutions, many of which are equipped with radio receiving apparatus. Here the health bulletins broadcast by "KUO" are often listened to by doctors and other officials.

CAMPING MORE POPULAR WITH BROADCAST SET.

Radio has worked wonders for the tourist and camper in America. In previous summers all that a motorist could do when the supper dishes were put away was to play cards or read under the flicker of a candle light or retire to an early bed.

Now, however, since the ether has been harnessed, all the news of the day, sporting events, stock quotations and bed-time stories are possible at the campfire with the simple turning of a dial.

Campfire dances far out on the Sierra Nevada Mountain range can be enjoyed via radio, the music for which is played in one of San Francisco's hotel ballrooms.

It is truly a wonderful age in which we are living. Verily, the lot of the camper has been made easy.

DAILY PROGRAMME IN 'FRISCO.

The following list shows daily broadcasting programme in San Francisco as published by "The Examiner."

It will be observed that our Californian friends are able to hear local broadcast from 9 a.m. to 10 p.m. daily and inland and distant stations up to 11 p.m.

9 to 10 a.m.—"The Examiner."

10 to 11.30 a.m.—Oakland "Tribune."

11 to 11.30 a.m.—"The Examiner."

12 to 1 p.m.—Warner Bros.

1 to 2 p.m.—Richmond Radio.

2 to 3 p.m.—Mercantile Trust.

3.30 to 4.30 p.m.—Oakland "Tribune."

4.30 to 5.15 p.m.—Hale Brothers.

5 to 5.30 p.m.—"The Examiner."

5.30 to 7.30 p.m.—"Berkeley Gazette."

6.45 to 7 p.m.—Hotel Oakland.

7 to 7.30 p.m.—Mercantile Trust.

7.30 to 8 p.m.—DX listening-in period.

8 to 9 p.m.—Presidio.

8.30 to 10 p.m.—Fairmont Hotel.

Inland Stations.

1 to 2 p.m.—Herrold, San Jose.

3 to 4 p.m.—K & U, Sacramento.

4 to 5 p.m.—Stockton.

5 to 6 p.m.—Gould, Stockton.

6 to 6.45 p.m.—K & U, Sacramento.

6.30 to 7 p.m.—Modesto "Herald."

6.30 to 7.30 p.m.—Sacramento.

10 to 10.45 p.m.—K & U, Sacramento.

DISTANT STATIONS.

6.45 to 7.30 p.m.—Earle C. Anthony, Los Angeles.

8 to 9 p.m.—Herrold Lab., San Jose.

9 to 10 p.m.—Los Angeles "Examiner."

10 to 11 p.m.—Earle C. Anthony, Inc., Radio Central Station—KFI, Los Angeles.

7 to 9 p.m., Wednesday; 3 p.m., Sunday, Pacific time.—Great Falls, Montana—KYDS.

Mon., Wed., Fri., 8 to 9 p.m.; Sun., 7 to 7.30 p.m.—"The Oregonian," Portland, Ore.—KGW.

6 to 7 p.m. daily, except Sunday—"Telegram" Publishing Company, Salt Lake City—KDYL.

AUTHOR'S VIEWS ON WIRELESS.

Broadcasting was the subject discussed recently at the annual general meeting of the Incorporated Society of Authors, Playwrights, and Composers, held at Westminster, London.

Major Ian Hay Beith ("Ian Hay"), who presided, said it was useless to bar broadcasting, as it had come to stay.

The Society would be willing to help the British Broadcasting Company if it paid a reasonable fee, by supplying lists of authors willing to have their works broadcast, or in any other way.

Several members declared that no member of the Society should allow his works to be broadcast without a fee.

Mr. Bernard Shaw said that any author who did anything for nothing was a blackleg!

TOUR CAMP SITES.

Recently Raymond Roca and H. J. Malarin of the Radio Corporation of America toured the camp sites near Tahoe and displayed that fact that the magnetic waves of radio broadcast in San Francisco are possible for reception anywhere in the mountain fastness. They took with them a portable Radiola receiving set.

RADIO CHURCH SERVICES.

Radio church services are held in the radio studio of "KPO," Hale Brothers, one of San Francisco's big emporiums every Sunday morning between 11 and 12.30 o'clock. An extensive programme of sacred music follows the sermon.

NEW ALPHABET FOR RADIO ANNOUNCED.

A new telegraph alphabet for use in radio, telegraph and cable, in all languages, has just been given to the world by Major General George O. Squirer, chief signal officer of the U.S. army and one of America's most prolific electrical communication inventors.

With his new code system a speed 2.65 times the present transmitting rate is attained.

Meeting Called by Radiophone

N.S.W. Experimenters Meet Mr. Malone

New Regulations Discussed

MR. J. MALONE, Chief Manager of Telegraphs and Wireless, arrived in Sydney on official business on Saturday, August 4, and it was hurriedly decided that the opportunity should be taken for him to address the officers and committee of each Wireless Institute, Society and Club in and around Sydney on Monday evening, August 6.

Mr. Phil Renshaw had the matter of the meeting in hand, and as the time was so short he resorted to the various amateur Radiophone stations around Sydney to announce the meeting. The announcement was broadcasted from stations operated by Messrs. Maclurcan, Marsden, Crocker, and Marks. No other announcement of any description was made, and the effectiveness of the radiophone advertisement was shown at the meeting, at which almost 100 officers and committeemen of various clubs in and around Sydney were present.

Mr. Renshaw was in the chair and those present included:—Mr. J. Malone, Chief Manager of Telegraphs & Wireless; Mr. W. T. S. Crawford, Radio Inspector, Sydney, and Mr. Chas. Maclurcan, President of the N.S.W. Division of the Wireless Institute.

Prior to Mr. Malone's arrival, Mr. Marsden spoke regarding the New Zealand Tests, which he reported were proceeding satisfactorily.

Two-way Daylight communication had been established on a set using only 5 watts.

Mr. S. F. Colville announced that quite a lot of work had been done in connection with the Australian Radio Relay League. Practically the whole of the organisation work had been completed, rules drawn up, and cards and forms printed. Next all licensed experimental stations will be circularised regarding the A.R.R.L. Then tests will be commenced on "fading signals." Mr. Colville announced that practically 1000 messages will have to be relayed to finish that one particular test.

Mr. Charlesworth also spoke regarding the A.R.R.L., and stated:

"It rests with experimenters themselves to make the Australian Radio Relay League a success."

Mr. Mingay, speaking about the forthcoming Radio Exhibition, announced that it will take place before Christmas. He asked Clubs and experimenters to prepare exhibits. Several good prizes have been offered, and it is expected that several more will be coming forward. Everything going well, and all things permitting, it is hoped that the Exhibition, which will be open for a week, will finish with a grand Radio Ball.

The Chairman, Mr. Renshaw, pointed out that the previous speakers had shown that great things were doing in the wireless experimental field in Sydney. He also stated that as far as he knew *this meeting was the first ever called by Radio in any part of the world*, and it was exceedingly gratifying to be able to say that out of thirty-nine experimental wireless clubs and societies in New South Wales, there were twenty-one represented. Mr. Renshaw then introduced Mr. J. Malone, who was received with applause.

Mr. Malone sincerely thanked those present for coming along, and stated that on Sunday night he took the opportunity of "listening-in" to wireless work by experimenters in Sydney. When he heard the announcement regarding this meeting being broadcasted he felt sort of nervous! He was, however, very pleased indeed to note the splendid organisation of the New South Wales experimental work, especially regarding transmissions. He acknowledged the great assistance rendered to the Department by the Honorary Radio Inspectors, and expressed the appreciation of both Mr. W. T. Crawford and himself.

He was exceedingly surprised to know that twenty-one clubs were represented at the gathering, and stated that he did not know there was such a number in New South Wales. "The Clubs," said Mr. Malone, "are alright provided they are under proper con-

trol, but I would stress the point that quality and not quantity is necessary in radio clubs."

Dealing with the regulations recently gazetted, Mr. Malone stated that no station can function without a license, not even a naval or military station.

As it would have taken too long to deal with the whole of the regulations Mr. Malone confined his remarks to those portions of the regulations directly affecting experimenters. First and foremost he advised experimenters to get a copy of the regulations, and read them very carefully. He dealt with the conditions under which licenses for experimental stations are issued, and stated that all applicants for licenses should fill in the forms properly, especially the clause which reads: "Nature and Object of Experiments to be Carried Out."

Mr. Malone announced that in the new regulations an operating certificate of twelve (12) words per minute is not necessary for an experimenter to use a valve receiver provided he does not use a regenerative circuit.

He also stated that the Postmaster-General, Mr. Gibson, authorised him to state to the experimenters of New South Wales:

"That Amateur Broadcasting will not be stopped." (Cheers.)

Both the Postmaster-General's Department and the Department of the Controller of Wireless will encourage and assist experimenters as far as possible, continued Mr. Malone. Experimenters will not be interfered with by the Departments unless commercial broadcasters can show that they are being interfered with by amateur broadcasters, and then investigations will be made.

A point stressed by Mr. Malone was this: "When demonstrations are given an acknowledgment of permission should be announced during the demonstration."

He asked all experimenters to see that the regulations are carried out, and that licensed stations carry out the conditions of the license. He pointed out that the penalty for breach of the regulations had been reduced from £500 to £50.

Mr. Maclurcan: "The high cost of penalties is coming down." (Laughter.)

Continuing, Mr. Malone stated that future applicants for transmitting licenses must be competent operators, and give very good reasons for desiring to transmit. The representatives of experimenters at the recent Conference in Melbourne asked for a definite band of wave lengths. Provision had, therefore, been made for the experimental band of wave lengths to be between 100 and 250 metres, but in special cases, such as demonstrations or tests, other wave lengths could be authorised.

The fees for licenses are as follow:
Receiving 10/- per year.
Receiving and Trans-
mitting £1 per year.

Mr. Malone emphasised the fact that applicants for licenses should NOT send money until advised by the Department.

In all cases of experimental licenses it is necessary that the licensee should make the declaration of secrecy, but it is not necessary in the case of broadcasting receiving licenses, but he considered that:

"Every member of any Institute, Club or Society should take the declaration of secrecy. It would not, however, be necessary for each member to make out a separate form. One form would be sufficient, provided all members signed same in the prescribed manner."

He also considered it would be to the general benefit of all experimenters if they would keep in touch with the Department of the Controller of Wireless in Melbourne, or with the Radio Inspector in the various States. In this way they would be able to let the Department know what they are doing, and both he and his officers will be glad to assist the advancement of experimental wireless in every possible way.

Speaking of broadcasting, Mr. Malone said that:

"Broadcasting is purely a competitive entertainment business."

All interested had attended the Melbourne Conference, and made certain proposals which, after being drafted, re-drafted, and drafted again, were subsequently submitted to the Postmaster-General, and had been adopted. The regulations were drawn up thereon.

Although there had been a lot of criticism in Melbourne, Mr. Malone considered that the most reasonable thing to do was to give the Broadcasting Regulations a chance to be proved all right or otherwise, and he hoped that commercial broadcasting would commence very shortly.

In order to make it easy for the general public, the following arrangements would be placed in operation:

When a man desires to purchase a broadcast receiver he can go to a licensed wireless dealer, buy his set, and the dealer will be authorised to collect the license fee, the subscription to the broadcasting station, and issue receipts and licenses all at the one time.

Speaking of sealed receivers, Mr. Malone said that these were necessary for competitive entertainment. If, however, a user desires to receive more than one broadcasting station, the regulations made provision for a radio dealer to alter the set so that it can be tuned to the other station, or stations, desired, and the user will have to pay the extra fee to the broadcasting station. When the receiver is altered and tested, it will be again sealed and handed back to the owner. A person can also buy parts for a broadcast receiver, and build same for himself, but it must employ no reaction, and when complete it must be taken to a radio Inspector and tested, after which it will be sealed.

In conclusion, Mr. Malone again cordially thanked the audience for their attention, and stated that the officers of his Department will at all times be glad to assist experimenters generally, but one thing he would suggest was that every Club and Institute should have a technical balance-sheet, and produce some evidence of what they have done, and thus inform the Department as to what is happening in experimental wireless. (Applause.)

Mr. Renshaw, in responding, said that Mr. Malone was the best friend the experimenter ever had. The speaker eulogised both Mr. Malone and Mr. Crawford for their goodwill towards experimenters, and said that the Postmaster-General should be heartily congratulated on his attitude towards amateur broadcasting. The technical balance-sheet suggested by Mr. Malone was a good one, and no doubt Clubs will make use of it.

In conclusion, Mr. Renshaw congratulated Mr. Malone on the simpli-

city of the new regulations, and called on the meeting to accord a hearty vote of thanks to Mr. Malone by acclamation and three cheers.

Mr. Malone then thanked them for their very cordial vote of thanks, and stated that he would be pleased to answer any questions those present desired to ask. Needless to say these were many.

One of the questions he answered was as to whether wave lengths under 100 meters were reserved. He stated that the band between one and one hundred was reserved, but transmission on that band could be used in special cases if authority were given by the Department.

Answering a question concerning regenerative circuits, Mr. Malone said that the use of regenerative receivers was being discouraged principally owing to the bad interference that is now apparent. Another reason is to give broadcasting a chance.

Call signs of receiving stations are being cancelled, and reserved only for transmitting stations. Referring to the latter, Mr. Malone announced that Mr. Maclurcan had kindly offered to check up the wave lengths of transmitting stations with his (Mr. Maclurcan's) wave meter, which was fairly accurate, and he recommended those holding transmitting licenses who were not sure of their lengths to get in touch with Mr. Maclurcan.

Mr. Chas. Maclurcan then read a letter he had received from the American Radio Relay League in connection with amateur call signs. *This letter is reproduced elsewhere in this issue of "Radio," and every experimenter should read it.* Subsequently a motion proposed by Mr. Stowe, and seconded by Mr. Crocker, reading:

"That this meeting of representative Societies approve of the suggestion regarding International break signs as put forward by American amateurs."

was carried unanimously.

Mr. Spencer Nolan, one of the oldest members of the Wireless Institute, in a brief speech said that he always had the interests of wireless at heart, and was always willing to assist experimenters whenever possible. He announced that the Wentworth Club was doing good work, and that they were holding a dance at the Lawn Tennis Association on August 23.

Items of Interest

During the month of July, some splendid receiving results were recorded in daylight at Geraldton Radio Station, traffic being exchanged between the stations mentioned.

The results were obtained using one "Expanse B" Valve, and the following were communicated with:—

Orvieto	1,140 miles.
Moreton Bay	1,020 "
Narkunda	1,000 "
Largs Bay	1,100 "

At the Wattle Tea Rooms on July 27, a Card Party was held in aid of Queen Victoria Hospital. During the course of the evening, Amalgamated Wireless gave a demonstration of Broadcasting.

By kind permission of Messrs. J. C. Williamson Ltd., Miss Cecil Bradley, Mr. Robert Chisholm and Mr. H. Ratcliffe sang at Collins House, whilst Mr. Alaric Howett presided at the Steinway Grand, kindly lent by Messrs. Allans, Ltd.

It is interesting to note that Mr. Robert Chisholm stepped straight from the stage of Her Majesty's Theatre (at which he is at present appearing in "Sybil") into a taxi, was driven swiftly to Collins House, sang two songs, and was immediately motored back again to the theatre. Mr. Chisholm was absent only twenty minutes, and immediately on his return was due on the stage again.

Miss Bradley, who does not appear on the stage until 9.55 p.m., first of all "made up" for her part and journeyed down to Collins House dressed as the "Grand Duchess." She also had to return promptly in order to take her part in "Sybil."

The arrangement for an artist to leave the stage of a theatre, be taken to a Broadcasting Station, and then immediately return to the stage, is unique in the history of Broadcasting in Australia.

Great credit is due to Mr. Leslie Holland, who greatly assisted Amalgamated Wireless in making the arrangements.

Needless to say, the songs rendered by Miss Bradley, Mr. Chisholm and Mr. Ratcliffe were thoroughly enjoyed by the big crowd which had gathered at the Wattle Tea Rooms.

On July 31, a successful demonstration of Wireless Telephony was given by Amalgamated Wireless to the members of the Broken Hill Pty. Ltd.'s Social Club, in the Board Room of the above Company at their offices in Equitable Buildings.

Several members of the Club rendered items from Collins House Broadcasting Station, including songs, speeches and humorous stories. All were received at the club on a Loud Speaker with remarkable clarity.

At the conclusion of the demonstration, the Chairman of the Broken Hill Club conveyed the thanks of all present to Amalgamated Wireless for the entertainment.

BIG BOMBING PLANE CONTROLLED BY RADIO.

A three hundred horsepower bombing airplane, carrying two passengers, made a flight recently, all movements of which were controlled by radio from the ground. The demon-

stration was made at the flying field at Etampes, France, and was directed by Captain Boucher, of the French air service, from a hangar, in which was located the switchboard for controlling the airplane's movements. The landing was made without difficulty.

Radio Crystal Set

(Continued from page 249.)

buzzer in any way. Press down the key and move the catwhisker about on the crystal until the loudest buzzer note is heard in the 'phones. This can be done with switches and variable condenser in any position, remembering that the buzzer is giving out an "untuned" wave which can be received on any wave length. The set as a whole can be tested any evening, when the coast and ship stations will be heard loudest.

The art of tuning the above described set can be easily accomplished. The amateur will soon be able to tune the set to receive code messages, or local telephony, which will provide a constant source of interest and entertainment. With the inductance coil and the condenser, a chart or graph could be readily constructed so that an experimenter could speedily tune in to any station likely to be transmitting, after a glance at the chart. The writer safely recommends the construction of the single coil set in preference to the loose-coupler for all crystal reception, and the advanced amateur will find the set as a standby, just as useful as the beginner will find it for general crystal reception.

Inductance Coils for all Wave Lengths



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The Experimenters' Corner



A SPARK COIL-VALVE TRANSMITTER.

THE formation of the Australian Radio Relay League will give a great stimulus to experimental transmission in this country. At present—almost without exception—the transmitting stations are confined to cities and towns where a supply of electric light and power is available. This gives rise to fairly large gaps in the relay chain, and confines Interstate transmission to night time, when conditions are more favourable. Country experimenters will welcome the following informa-

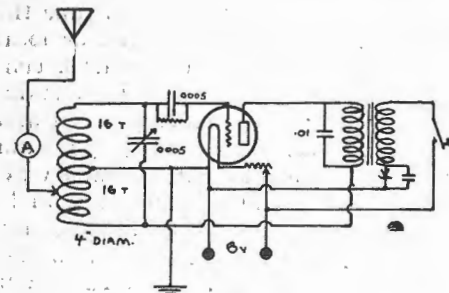


Fig. A.

tion regarding the construction of valve transmitters which need only one battery of about six volts for the power supply.

The connections shown in Fig. A are applicable to any make of hard valve, and possibly with the exception of the spark coil, all the necessary apparatus can be found on any experimental station. For stations employing a receiving valve such as the "R," "Q," or "UV 201," a half-inch spark coil or an ignition coil from a Ford motor car will serve for the high tension power supply, but where a five watt valve is used, a one-inch spark coil is better. The voltage supplied by spark coils is far too high to be applied direct to the valve, therefore means will have to be taken to reduce it to a suitable figure.

This can be done by connecting across its terminals a high tension condenser of about 0.01 microfarads. This serves as a reservoir for the energy delivered by the coil and spreads the current over a longer interval of time than would be possible without it. A suitable condenser can be made from 50 old half-plate negatives which are 6½ in. x 4½ in. in dimension. These are covered on each side with tinfoil, 6 in. x 4 in., connected in the usual fashion. The best plan is to build a special coil for the purpose or rewind the secondary of the existing one. A Ford coil can be converted in this manner by winding on a new secondary consisting of 5000 turns of No. 36 double cotton covered wire. The special coil is wound on a former of the dimensions shown in Fig. B. This can be turned out from a solid piece of close-grained wood or built up from a fibre tube 5/8 in. diameter and 4 in. long with end pieces 2 in. diameter and ¼ in. thick. The primary consists of 400 turns of No. 24 d.s.c. wound on evenly in layers. Over this is placed several layers of Empire Cloth for insulation between the windings. The secondary is wound with 5000 turns of No. 30 d.s.c. wire, which has been previously boiled in paraffin wax. For the core use sufficient four inch lengths of annealed iron wire to form a tightly packed bundle 5/8 in. diameter. An independent interrupter is used with this coil owing to the greater ease of adjustment. This can consist of an ordinary buzzer re-wound to be able to carry the additional current which will be in the neighbourhood of 1.5 amperes with a 6-volt accumulator. The electrical dimensions of buzzers differ greatly, but if 25 per cent. of the existing number of turns are put on—using as large a gauge as the space will allow—the magnetising effect of the

current will remain about the same. To take care of the sparks caused by the inductive kicks of the windings when broken by the interrupter, a large capacity fixed condenser will have to be shunted across the break. A 0.25 microfarad telephone condenser is a very suitable capacity. The new secondary winding will have a much lower voltage than that on the spark coil, therefore the shunt condenser need only be a small value, sufficient to act as a radio by-pass for the high frequency currents in the plate circuit. The transmitter is put into operation as follows:—Light the filament and adjust it to normal brilliancy, then energise the spark coil. With the aerial disconnected from the

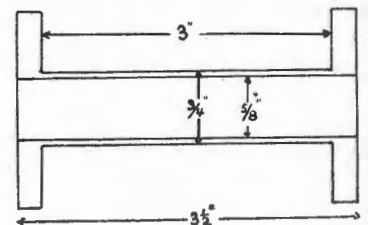


Fig. B.

transmitter, listen in on the receiving set, and adjust the tuning condenser on the transmitter until signals are heard at a setting on the former which denotes that the wave being generated is within the limits set apart for experimental use. Now bring the aerial clip into play, and using a small, hot wire milliammeter or small tungsten filament lamp as a current indicator in the aerial circuit, adjust the position until maximum radiation is secured. A slight retuning will be necessary to allow for the extra load introduced by the coupling of the aerial circuit. The buzzer should be adjusted to a smooth, even tone, and not forced to give a high squeak, for the former has much more carrying power.

These transmitters when using a hard receiving valve can be expected to give a radiation of 150 to 200 milliamperes, and with a five watt Radio-tron operating from a one-inch coil, anything between 0.3 and 1.0 amps. may be expected, depending upon the aerial. The data given in Fig. A is for 150 to 250 metre work in conjunction with an aerial 60 feet long and 40ft. high. Reports from the United States show that distances up to 500 miles are common with these transmitters.

A CHEAP VARIABLE CONDENSER.

When experimenting with various circuits, difficulties often arise regarding the supply of sufficient variable condensers. In the majority of these cases the purchase of the shop made variety is not warranted owing to the expense involved. At a cost below two shillings a very efficient condenser can be built as will be described below.

From a chemical supply house obtain a glass beaker of about 250 cubic centimetres capacity, and for half the way around the outside paste on a piece of tinfoil. Now take a piece of cardboard about 1/32in. thick, and cut it so that it will form a cylinder which will just fit inside the beaker. On this cardboard is pasted another piece of tinfoil of about the same size as that on the outside of the glass beaker. Connection is made to both these tinfoil sheets by means of light copper wires, and when the inside cylinder is rotated the two surfaces form the plates of a variable condenser with the glass wall of the beaker as the dielectric. The thickness of the beaker will vary slightly, but the

average may be taken at about one millimetre. This with tinfoil sheets of fifty square centimetre area will form a condenser of approximately 0.0002 microfarads capacity. By using larger beakers the capacity can be altered accordingly. If the cardboard cylinder is made about an inch longer than the height of the beaker, a pencil can be passed through it from side to side to form a handle. These condensers will be found very handy when assembling tuned radio frequency amplifiers, and if they are mounted in small containers to protect the glass and fitted with the regulation dial control they form permanent pieces of apparatus.

RECEIVER NOISES AND THEIR REMEDY.

Static is very often blamed for noises in the telephones which actually originate in the receiver itself. One of the most frequent causes, and a very difficult one to locate—is leakage between the legs of valve sockets. Originally the sockets may have been of high insulation, but if an excess of flux has been used when soldering the connections to its base some of it will be found to have run down on the insulation, and formed a high resistance bridge between the terminals. Even when connections are made underneath nuts, trouble is likely to rise if the sockets are mounted on fibre or wood which has not been soaked in wax.

The highly polished surface film on hard rubber is another bad offender in this direction. Frequently polishing materials of a conducting nature are used to obtain this surface, and if they are not removed by

sandpapering, serious leakage will take place. Panels can easily be tested as follows. Take a high resistance set of telephones and connect them in series with a battery of about 15 to 20 volts. With a lead from one of the telephone terminals, and one from the opposite end of the battery, touch the two on the surface of the ebonite. If the surface insulation is good, only a very faint click will be heard.

In regenerative valve receivers employed for the reception of continuous wave telegraph signals, a harsh, scratching sound is often heard when rotating the variable condensers. This is caused by a faulty contact on the rotary plates. To get over this replace the usual rubbing contact with a direct connection from the bottom of the rotary spindle by soldering on a short length of flexible wire.

Correction

In No. 9 issue of "Radio," dated July 25, page 203, the call letters of Garden Island radio station were shown as VKW. These call letters should have been VKQ.

Coastal Radio Service

STAFF CHANGES.

- Mr. E. J. O'Donnell, Radio Telegraphist, Melbourne Radio, has been transferred to Adelaide Radio.
- Mr. A. R. Finch, Rigger, on completion of overhaul of mast and aerial at Sydney Radio Station, is proceeding to Cooktown Radio to overhaul the mast at that station.

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Victorian Notes

(By Our Special Correspondent.)

At the Rialto lecture rooms on July 31, members of the Wireless Institute had the pleasure of hearing Mr. J. Malone, Commonwealth Controller of Wireless, give an interesting address on "Experimenters and the new Regulations."

Naturally the subject attracted a substantial "house." Over 200 agitated experimenters were greatly relieved by the Controller's sympathetic interest in their research. Bona fide experimenters certainly have a father in Mr. Malone.

Mr. Malone's interesting announcement of the dispensing with the 12-words-a-minute test to non-users of regenerative circuits was, perhaps, the biggest surprise packet opened by the Controller. The next largest gift was presented by the experimenters who returned a hearty and well-earned vote of thanks to the man, who despite his multifarious duties

can still find time for a "game with the lads" of radio.

Afterwards Mr. M. Howden entertained the audience with a lecture entitled, "A 1000 Mile Short-Wave Receiver." This concluded a very pleasant and informative evening.

Press reports of the support alleged to be given by experimenters to the recently formed Radio Development Association have been denied by the President, Mr. H. K. Love, on behalf of the members of the Wireless Institute and affiliated bodies.

If broadcasting companies care to collect data upon transmitting every variety of concert, they can well take note of the tests conducted by various experimenters in this State. Carlyons, of St. Kilda, invited Mr. N. Culliver (3DP) to transmit their renowned jazz band, and to this end despatched the complete orchestra to his residence at East Melbourne. Another interesting event was the effort of Mr. Beattie, of Box Hill. The complete Box Hill District Band of 30 performers was reported to have been heard successfully over 200 miles away on August 1. It is believed that this is the first occasion in Australia on which a full brass band has been heard over the radiophone.

An innovation appreciated by patrons and assistants alike is the mid-day radio time signal at the Wireless Department of Myers, Little Bourke Street. This section is in charge of Mr. G. W. Steane, who also finds time to be Hon. Secretary of the now exceedingly active branch of the Wireless Institute. The signal is heard all over the building and there is a general resetting of timepieces when the hour is announced.

AN UP-TO-DATE PROGRAMME.

The members were seated in the club room formulating plans for the "real wireless concert."

"Of course, you'll include 'Amp! Amp! Amp! The Boys are Marching,'" suggested Wilson.

"Followed by 'The Pride of Battery B,' I suppose," said Robinson.

"Not forgetting 'Ora Pro Nobis,'" contributed Jacks.

"And ending with 'Ohm, Sweet, Ohm,'" put in the little quiet man in the corner, "and you will have to announce them plainly or nobody will know (s) witch is (s) witch!"

THE RADIO EXPERIMENTERS HANDBOOK

By PHILIP R. COURSEY,
B.Sc. (Eng.), F. Inst. P.

113 pages.

99 Diagrams and Illustrations.

Price, 5/- Nett.

(Postage 6d.)

The aim of the true Wireless Experimenter should not be merely to purchase a complete installation or to build one up from a complete set of working drawings, but rather to design his set to meet his own requirements.

The object of this handbook is to foster, if possible, such an attitude by indicating the chief features of such design work and the principles upon which it depends.

CONTENTS:

General Considerations — Components of Wireless Installation — The Aerial Circuit — Receiving Tuners — Receivers, including detailed instructions on the making of the many types of inductances and useful Mark III. tuner modifications, Amplifiers and Valve Detectors with circuits of high-frequency, low-frequency and resistance — Capacity coupled Amplifiers — Heterodynes, giving working instructions for making up a long range heterodyne wavemeter — Appendix: High-Frequency Measurements and Calculations with valuable data and tables.

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Experimental Break Signs

THE following letter received by Mr. Chas. Maclurcan, of Sydney, from the American Radio Relay League was read by the recipient at the meeting of Club executives held on August 6 in Sydney.

A motion was carried reading:

This meeting of representative Societies approve of the suggestion regarding international break signs as put forward by American amateurs.

Every experimenter should carefully read and digest the contents of this letter, which is self explanatory.

The American Radio Relay League,
Executive Headquarters,
Hartford, Connecticut,
June 16, 1923.

Mr. Charles Maclurcan,
13 Brisbane Street,
Sydney, Australia.

Dear Mr. Maclurcan,

I am writing to you as one intimately interested in amateur radio, and hope you will give the subject matter of this letter your earnest consideration, and let me have your best judgment on the matter. I would suggest that it be referred to your amateur organizations in Australia so as to get a consensus of opinion.

During and subsequent to the last Trans-Atlantic tests the question came up of the best way of distinguishing or differentiating the nationalities of various amateur stations, especially when there is inter-communication between those different countries. Various suggestions have been made, all with more or less merit, and I

would like to present for your consideration the one which seems to have found the most favour, and is the simplest.

While our present arrangement between Canadian and U.S. amateurs of designating the nationality by the separation signs "fm" and "aa," instead of "de," is satisfactory, when applied to communications between British, French, Australian, South American, Mexican, Cuban, and other amateurs, you can readily see that in each case it would mean an individual separation sign of some sort or combination of letters, and if these combinations were simply arbitrary, and did not mean anything, we would be required to learn practically a whole new alphabet in order to know who was being called and who was doing the calling.

It therefore is apparent that a simpler method of identification is in order, and we believe that using the initial of the country to which the station belongs as the separation sign will solve this difficulty. To illustrate, if Canadian 9AL is called by U.S. 1AW he would call as follows: "9AL cu 1AW," the letters "cu" designating the nationality of the station called and the station calling. As another example, if British 2SH should call French 8AB he would use this procedure, "9AB fb 2SH." British "b": French "f": Canadian "c": United States "u".

This arrangement is on the same order as that now existing between Canadian and U.S. amateurs, except that instead of using the arbitrary letters as separatives, we use the initials of the countries in question. This makes identification easy and sure, requires no additional explaining of the intermediate or separate

sign by the amateurs, and does not increase the length of call as the other systems suggested would do.

I have had the matter of the legality of this arrangement taken up with our Department of Commerce, who advise that while it is not strictly in accordance with international regulations, yet at the same time they do not think it would give rise to any international or governmental complications, and if the amateurs of the various countries were to adopt it, they could present their recommendation or request for its official recognition at the next international radiotelegraphic congress.

I wish you would think over this matter carefully, and if you have objections let me hear from you in the near future, or if you see no objections will you talk it over with your own amateurs, and if it meets with their favour, give it what publicity you can in order that we may know whether the Australian amateurs as a whole endorse this plan or not. We would like to have their endorsement, in order that a uniform arrangement may be used, so that we can present a unified plan at the next congress.

Please let me hear from you at your convenience.

Yours sincerely,

(Sgd.) C. A. Service, Jr.,
Assistant Secretary.

Mr. Maclurcan would like the various clubs to give earnest consideration to the suggestions contained in the foregoing letter, and write him concerning same.

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South Africa's Broadcasting Regulations

How They Compare with Australia's

THE regulations governing Broadcasting in South Africa came into operation some little time ago. When compared with those recently gazetted in Australia it will be found that the latter are in many respects more up-to-date and liberal. This applies particularly in the case of experimenters, who enjoy much greater freedom in the Commonwealth than in South Africa. After producing satisfactory evidence that he is a bona fide student of radio science the experimenter in the latter country must procure a Government license, but before doing this he *must enter into a contract with the Broadcasting Company serving his particular district to pay one-third of the ordinary charge to listeners.*

No such charge is to be made on bona fide experimenters in Australia.

A clause in the South African regulations stipulates that *amateur transmitting stations shall be allowed to operate not more than twice each week.*

Mr. Malone, Commonwealth Controller of Wireless, recently announced that amateur transmitters in Australia would not be interfered with.

Every experimenter in South Africa must have an aerial not exceeding certain specified dimensions, and it *must be in such a position that it is easily seen from a public roadway.*

In Australia experimenters may work on an inside aerial.

The free and open competition which is one of the strong points of

the Australian regulations is not provided for in South Africa. On the contrary, it is stipulated that when one broadcasting license has been issued within a certain area no other broadcaster will be allowed a similar license within such distance during the currency of the original one.

The above comparisons by no means represent the full extent to which the Australian regulations surpass those of South Africa. Of course, local conditions may account for some of the restrictions there which do not exist here. It is, however, well to emphasise that Australia has laid an excellent foundation for her broadcasting service. So far as is possible nothing has been left undone which could contribute to success.

Adelaide Activities

Excellent two-way wireless telephone conversations have recently been conducted between Mr. R. A. Hull, of St. Kilda, Victoria, and Mr. H. A. Kauper, who has an amateur station at Dulwich, Adelaide.

Interviewed by a representative of "Radio," Mr. Jones, another Adelaide experimenter, stated that he commenced experimenting just before the war, but on the outbreak of hostilities, had to close down. About twelve months after the armistice he opened up again, but radio had made such progress meanwhile that his set was almost out-of-date. He first turned his attention to wireless telegraphy and with Mr. H. A. Kauper carried out successful tests with Melbourne. Musical tests made in Adelaide were first heard faintly in Melbourne. After the success which attended their experiments in telegraphy, Mr. Kauper turned to telephony. He carried on conversations with Melbourne and was heard by experimenters in New South Wales, and even at Charters Towers, Queensland.

Mr. Jones succeeded in establishing wireless telegraphic communication between Adelaide and New Zealand. On the short waves on which

Adelaide experimenters work the signals often faded away quickly. Nevertheless, considering the small power used—just sufficient energy to light a small motor car electric bulb—the distance achieved was excellent. Mr. Jones said he hoped before long to speak directly with New Zealand by radio. The messages of the Melbourne experimenters were now very clear, but the reason why communication was not more regular lay in the different wave-lengths used. Melbourne experimenters work on a 440 metre wave-length, and Adelaide on a 220.

At the recent demonstration given by the members of the South Australian branch of the Wireless Institute of Australia at the North Adelaide Royal Institution for the Blind, considerable interest was displayed in the first wireless instrument used in South Australia, which was on exhibition. It was used in 1900 by the late Sir Charles Todd in communication with Henley Beach. Its appearance made a strange contrast to the modern apparatus used at the demonstration.

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WIRELESS INSTITUTE OF AUSTRALIA

SOUTH AUSTRALIAN DIVISION.

At the August meeting of the above Division, nominations of officers for the ensuing twelve months were received. The candidates will be elected by ballot at the Annual General Meeting which takes place next month.

The Institute has been honoured by the election of Professor Kerr Grant as a member.

The remainder of the evening was devoted to the practical side of Wireless Telephony. By special arrangement with Mr. K. Milne and Mr. H. L. Austin, a particularly fine receiving set installed at the University was exhibited. After the set had been examined and technical details explained, its utility was demonstrated by the reception of some particularly fine wireless telephony in the form of speech, music, etc., from Mr. H. L. Austin's transmitting station at Norwood. By means of a Brown's loud speaker the music was clearly audible all over the room.

An engraved Institute badge in gold was to have been presented to Mr. R. M. Dunstone, the retiring treasurer on the eve of his departure for Europe, but owing to a delay in obtaining the memento the presentation will have to be made privately.

ILLAWARRA RADIO CLUB.

At the Club meeting on July 31 members indulged in a lively discussion on Club matters generally, particularly regarding the Club's future policy. It was thought that in order to make the general fortnightly meetings of greater interest and appeal, business matters at such should be reduced to a minimum, and all business conducted in committee.

As a result of the discussion it was decided that the committee should review the whole position at an early date, and endeavour to lay down a practical and progressive plan for future working. The technical committee will also consider the question of getting the receiving and transmitting apparatus into working order at an early date.

The Hon. Secretary, Mr. W. D. Graham, 44 Cameron Street, Rockdale, would be pleased to hear from any person interested, or desirous of becoming a member of the Club.

ESSENDON RADIO CLUB.

A branch of the Wireless Institute has been formed in the Essendon District. The Club meets in the Regent Street Hall, Ascot Vale, on alternate Thursdays.

Provision is being made to instal receiving apparatus at an early date. At the second general meeting there was an exhibition and demonstration of home-made apparatus, which proved very interesting. Some excellent valve panels were shown, notably that of Mr. M. Chaffer. Mr. Elder's 3-valve set brought in signals from VIM loud enough to be read all over the hall.

At the next meeting there will be a lecture and demonstration of Accumulators by Mr. Doherty.

All information regarding the Club may be obtained from Hon. Secretary at 40 Munro Street, Ascot Vale, Victoria.

WAVERLEY AMATEUR RADIO CLUB.

Mr. M. Perry presided at a meeting of the above Club on July 26. It was decided to endeavour to arrange debates with the Metropolitan Club, the Bondi Club, and, when it is inaugurated, the Railway Institute Club. Two subjects would be suggested in each case; "Panel Sets v. Isolated Apparatus" and "Home-made v. Bought Apparatus." Four speakers would represent each Club.

A short impromptu debate was then held on the "panel" and "isolated set" question, Mr. Perry adjudicating. Messrs. Bowman, Tatham, Burrows and Plumb fought the case for the panel apparatus, while Messrs. Thomson, Powell, Anderson and Nott essayed to convince the adjudicator that isolated sets were the better. In summing up, Mr. Perry said that ingenious and convincing arguments were put forward by both sides. He was personally convinced that isolated sets were undoubtedly the superior type, but on the arguments employed that evening, he must award the verdict to the "panel set" advocates. The announcement was greeted with cheers by the winners—most of whom then admitted that they were speaking against their experience.

NEW CLUB AT NEUTRAL BAY.

A meeting of Neutral Bay experimenters was convened on August 1st and a new club known as "The Neutral Bay Radio Club" was formed. The foundation membership was over twenty. Another

meeting of the club, held on August 9, showed a considerable increase in the attendance and many applications for membership were handed in.

The election of officers resulted:—President, S. E. Tatham; Vice-Presidents, G. Watkins and N. F. Gilmour; Hon. Secretary, E. J. T. Moore; Asst. Hon. Sec., R. Stranger; Hon. Treasurer, C. W. Donne; Hon. Auditor, J. B. Miles. The Committee election will be announced at the next general meeting.

Many interesting things are promised to members of the Neutral Bay Club, which, by courtesy of Mr. Watkins, meets at his residence, "Belle Vue," 180 Kurraba Road, to which address all communications should be sent.

General meetings are held every alternate Tuesday at 8 p.m., August 21, September 4, etc. All experimenters are cordially invited to attend.

WESTERN SUBURBS AMATEUR WIRELESS ASSOCIATION.

At a meeting of the W.S.A.W.A. held at the Club room, Auburn, on August 1, Mr. Rawlinson lectured on Primary Cells. He touched on the very first weird arrangement of cells, and very capably worked up to the present day commercial ones, giving their action very clearly.

In the latter half of the evening, Mr. Hoile lectured on Valve Theory. He is an X-Ray expert and the thorough manner in which he dealt with the subject was much appreciated by his audience.

BRIGHTON AND DISTRICT RADIO CLUB.

On Tuesday, July 24, the Club gave a public demonstration of wireless telephony in the Wilson Recreation Hall, North Brighton. The items were transmitted by Mr. Hull (3JU), St. Kilda, and thanks to a Brown's "loud speaker," were audible throughout the hall. The receiving set, composed of parts belonging to various members, consisted of a detector and three stages of audio frequency amplification, and was controlled by Captain R. P. Whalley, President of the Club. The demonstration did much to educate the people of the district to the possibilities of radio telephony.

MANLY RADIO CLUB.

There was a fair attendance at the August 6 meeting of the above Club.

The President reported satisfactory progress in erecting the aerial, and announced that the committee had decided



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to hold a social evening on Monday, September 3, to which members will have the privilege of inviting friends. A demonstration of radio music will be given.

Mention was also made of several other important decisions arrived at by the committee, one of which, the establishment of a Technical Library has already been put into operation. Mr. C. Wilcox has been appointed librarian.

At the conclusion of the general business, Mr. Wilcox lectured on "Simple Crystal Circuits."

NEWCASTLE DISTRICT RADIO CLUB.

Another successful meeting of the above club was held at the Club Rooms, 25 Winship Street, Hamilton, on Wednesday, August 1.

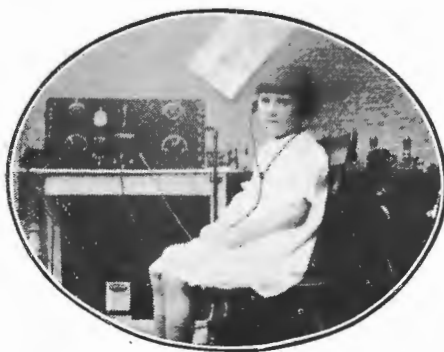
Several of the members "listened-in" until 7.30, when the business was dealt with. This consisted of an invitation by Mr. R. Filmer, to visit his residence and laboratory, for a demonstration of the mysteries of Electricity and Science. The invitation was gratefully accepted by members.

At the conclusion of the business a very interesting lecture was given by Mr. A. Cotton, on the "Electron Theory in Relation to Valves." It was much appreciated.

The lecture set down for next meeting night, is entitled "How to Begin." It will be delivered by Mr. L. T. Swain.

MISS MABEL FOOTE.

The set, at which Miss Mabel Foote is "listening-in," was built by Mr. Arthur Burman. It consists of a detector and three stages of audio frequency am-



plification. When this photo was taken the little girl was enjoying a fine programme played by a jazz orchestra of eleven performers at the experimental station of Mr. N. Culliver (3DP). Mr. Culliver has been doing some excellent work of late and his programmes are always eagerly awaited by "listeners-in."

SUCCESSFUL STUDENTS.

At a recent examination held at the Marconi School of Wireless, Melbourne, the following candidates were successful in qualifying for the Government Certificate of Proficiency in Radio Telegraphy:—

- A. Shacklock, W. Jacobs, D. H. Harkin, T. E. Greenwood.

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Broadcasting Will Help the Country

Graziers' Association Interested

AT the Annual Conference of the Graziers' Association held in Sydney recently, a resolution was carried urging that an up-to-date method should be provided for broadcasting news to all country centres of the Commonwealth. Conference discussed the matter of radio broadcasting thoroughly and members indicated that they fully recognised the necessity and value of such a service to outback centres.

At a later date a reply was received from the Postmaster-General, stating that at the time the resolution was carried the Government was busy framing regulations to achieve the object referred to. These regulations have now been issued, and were published in the last issue of "Radio."

There are, unquestionably, many members of the Graziers' Association who realise better than any purely city man can hope to do, just how great a boon radio broadcast programmes will be to dwellers outback. Therefore, they are to be complimented for throwing their influence into the scale in favour of providing a means by which rural settlers can share in a knowledge of what is doing in the outside world. The cry for good roads, extensions of railway lines and cheap motor cars and fuel is all evidence that Australia realises that justice must be done to her pioneers. Anything tending to destroy the isolation which is still to a very

great extent inseparable from country life is both timely and welcome. Unfortunately one cannot foresee a time when trains and motor cars will be so speedy as to bring distances of from three or four hundred miles upwards within a couple of hours of the city. Aviation may do that some day, but even if it does it will not be able to drop the daily newspaper into every home each night and provide a programme of up-to-date musical items for the inmates. Radio can do this, and therefore its place as a home educator and entertainer is absolutely unassailable.

Whatever progress may be made in other methods of communication it is obvious that there can be no clashing of interests. As civilisation advances mankind craves more and more for a corresponding advance in the pleasures and conveniences of life. An up-to-date news service is one of the most effective checks to that isolated, out-of-the-world feeling which envelops the majority of rural settlers. Radio broadcasting can, and will, supply this, and in addition will carry entertainment programmes into every home in which a receiving set is installed.

Small wonder then that the Graziers' Association is anxious to have the scheme pushed forward. The Government, with the assistance of representatives of the various interests concerned has done its part by

issuing regulations to provide for smooth and efficient working. These are now available, and it is expected that at an early date private companies will undertake the erection of broadcasting stations and the transmission of regular news and entertainment programmes.

South Australian Notes

(By a Correspondent.)

Professor Kerr Grant, of the Adelaide University, in conjunction with Mr. K. Milne, has announced his intention of conducting a course in Wireless Telegraphy and Telephony, at the Adelaide University during the months of September to December, 1923. Full particulars can be had from the Registrar of the University.

South Australia loses another of its prominent amateurs for a while, in the person of Mr. Dunstone, the late Hon. Treasurer of the Wireless Institute. He left for Europe early this month.

The ranks of the licensed amateurs have grown tremendously in the last six months, and it is to be regretted that those of the unlicensed have likewise increased.

At the last meeting of the S.A. Division of the Wireless Institute, a few lady radio enthusiasts were present. It is to be hoped that these ladies will soon help to swell the ranks of the Institute.

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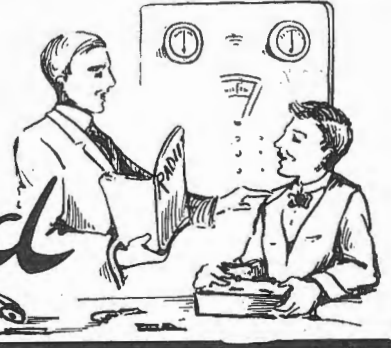
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Queries Answered



Perplexed (Warren), using "Ex-pense B" Valve as Detector and two Myers valves as audio frequency amplifiers, asks: (1) Cause of trouble when receiving telephony. (2) Would Brown's 'phones instead of Murdoch's be an improvement?

Answer: (1) Possibly your aerial is swinging and de-tuning the primary circuit. Swing it clear of all surrounding trees or buildings if possible. (2) Yes, for the reception of very weak signals from CW stations.

Fan (Mincha West) asks: (1) Wave-length of coils with 25-35-50-75 and 100 turns, using .001 VC in series, and shunt wound with 26 SCC on former (spider web) with 11 slots 1 1/4 in. centre. (Submits measurements of aerial)? (2) Would aerial be more efficient if of twin type spaced 5ft. of 2 2/4? (3) Would circuit submitted be suitable for a DER valve? (4) What is plate voltage of a DER valve? (5) Would above-mentioned coils be suitable for primary, secondary and tickler?

Answer: (1) Estimating the aerial capacity at 0.0003 mf's, the ranges with a 0.001 mf condenser in series and parallel are approximately:—

WAVE RANGE.

Coil.	Series.	Parallel.
25	160 to 230	260 to 480
35	200 " 300	350 " 650
50	280 " 450	500 " 900
75	400 " 630	700 " 1350
100	650 " 1000	1100 " 2100

(2) The capacity would be increased to about 0.004 mfd's—but for reception the increase in efficiency would scarcely be noticeable when using valves. (3) Yes. We suggest trying 0.00025 mfd's and 2 to 5 megohms for the grid condenser and leak respectively. (4) 30 to 40 for a detector and 60 to 80 as an amplifier. (5)

This was answered in your previous query under E.S. (Mincha West), issue "Radio" July 25.

Thanks for complimentary remarks of "Radio."—Ed.

D. P. P. (Charleville) referring to article "Radio," May 2nd issue, on "How to Make an Electrolytic Rectifier," asks: (1) In charging a 6V 40 amp. accumulator at 3 amps. how much current will it consume in one hour at 240 v. AC? (2) Is rectifier referred to suitable for using off an electric light socket at 240 v. AC, using quart jars? (3) How many hours can it be run at one time, charging as above? (4) How often must the solution be changed? (5) Will a step down transformer be necessary?

Answer: (1) 0.72 units. (2) For continuous use, four jars in series must be used with plates of 20 sq. inches of active surface. (3) This depends upon cooling facilities. The larger the jar and quantity of electrolyte, the lower the operating temperature. (4) As soon as the white sludge which collects at the bottom of the jar reaches the electrodes. (5) A step down transformer reducing the pressure to about 25 volts before rectification, will give about an 80 per cent. saving in energy consumption. Whether it would be a financial proposition in your case depends upon the frequency with which you charge the battery.

K. K. K. (Turrumurra) submits diagram and particulars of receiver and aerial asks: (1) Size of honey-comb coils for primary, secondary and tickler with range of 300/1200 metres. (2) Size of coils required to receive long range European and American stations. (3) Best position of condenser, across secondary (as in diagram) in aerial, or in earth lead? Is it necessary to use two condensers?

Answer: (1) See answer to E. S. (Mincha West), July 25th issue. (2) Primary, 1000 turns, secondary 1500 turns, reaction 1000 turns. (3) You will need two variable condensers for tuning a 3-coil receiver. It is essential that the primary be tuned for efficient reception.

C. R. W. (Tenterfield) asks if telephony can be received situated about 480 miles from Sydney, using 1 step radio and 1 audio amplification. (Particulars of aerial submitted.)

Answer: Yes, but depends to a great extent on local conditions.

J. K. (South Singleton) referring to *Sea, Land and Air*, November and December, 1922. issues, regarding vario-couplers asks: (1) What adjustments will be necessary to receive telephony at 100 miles? (2) Cause of loud untuned signals at specified times.

Answer: (1) The vario-coupler referred to was designed for use between about 400 and 1800 metres. Owing to the reduction of experimental wave-lengths to below 250 metres you will have to reduce the stator winding to 40 turns and the rotor to 50 turns. (2) Induction from nearby power or P.M.G. wires is a likely cause of the strange periodical interference your station is subject to.

E. S. (Brandon, Qld.) asks: (1) Will the regenerative short wave tuner described in *Sea, Land and Air*, December, 1922, issue be of any use when broadcasting begins. (2) Would above tuner in conjunction with a DER valve be capable of working 2CM on 1 valve, already accomplished by an experimenter at Charters Towers.

Answer: (1) This receiver has a range suitable for tuning in experimental stations which will shortly be
(Continued on next page.)

Movements of Wireless Officers

Mr. N. W. G. Scott signed off s.s. *Australpeak*, at Sydney, on July 24.

Mr. V. J. Foreman, who was relieved by Mr. W. Hill on s.s. *Oonah*, at Melbourne, on July 20, terminated service.

Mr. H. F. Tye was relieved by Mr. M. H. Stuart on s.s. *Marrawah*, at Melbourne, on July 21, and signed on s.s. *Junee* on the same date.

Messrs. A. J. Costa and R. C. V. Humphrey, 2nd and 3rd operators respectively, signed on s.s. *Victoria*, at Sydney, on July 26.

Mr. A. H. Beard, who was relieved by Mr. V. E. Stanley on s.s. *Karoola*, at Sydney, on July 27, relieved Mr. F. A. Cook as senior operator on s.s. *Victoria* on the same date.

Mr. F. C. Smith relieved Mr. R. T. Stephen on s.s. *Whangape*, at Sydney, on July 30.

Messrs. J. H. Hawkins and E. C. Bouel, Senior and 3rd Operators respectively, signed off s.s. *Arafura*, at Sydney, on July 30.

Mr. R. P. Ginders, who was relieved by Mr. W. C. Brown on s.s. *Katoa*, at Wellington, on July 23, signed on s.s. *Wahine*, at Wellington, July 23.

Mr. F. E. Duggan was relieved by Mr. R. P. Ginders on s.s. *Moeraki*, at Wellington, on July 25, and signed on s.s. *Wahine* same date.

Mr. I. B. Gibson signed on s.s. *Ceduna*, at Sydney, on August 1.

Mr. J. P. Banney signed off s.s. *Australford*, at Sydney, on July 31, and signed on s.s. *Milluna*, at Sydney, on August 2.

Mr. F. A. Cook relieved Mr. A. S. Smith as Senior operator on s.s. *Jervis Bay*, at Sydney, on August 3.

Mr. T. M. Alexander returned from sick leave and signed on s.s. *Kooringa*, at Melbourne, on August 2.

Mr. M. Webb-Watts was relieved by Mr. J. B. Ponsonby on s.s. *Moora-bool*, at Melbourne, on August 1, and signed on s.s. *Aeon*, at Melbourne, on August 2.

Mr. L. Graham signed off s.s. *Waimarino*, at Sydney, on August 3 and signed on s.s. *Hexham*, at Newcastle, on August 4.

Mr. E. H. Pollard signed off s.s. *Maira*, at Brisbane, on August 4 and returned to Sydney.

Messrs. T. V. Tressler and E. Meisner signed off s.s. *Booral*, at Sydney, on August 4.

Mr. L. F. O'Donnell signed off s.s. *Booral* as 3rd operator, at Sydney, on August 4 and proceeded to Melbourne on Home Port leave.

Mr. J. R. Gilligan signed on s.s. *Age*, at Sydney, on August 6.

Mr. J. H. Wilken's services terminated on August 9.

Mr. H. A. De Dassell, Chief Wireless Officer of the Commonwealth Government Liner *Largs Bay*, was married in London during his last visit to England. On behalf of his numerous wireless friends and acquaintances, "Radio" extends heartiest congratulations to "Dass."

Queries Answered

(Continued from previous page.)

restricted to wave-lengths below 250 metres. No definite information is available at present regarding the wave-length which will be allotted for commercial broadcasting. (2) So much depends upon local conditions that no assurance can be given as to the probable distances from which signals can be picked up.

Audio (Turrawan) asks: (1) Gauge of wire (sample enclosed). (2) Is a one to one audio transformer as efficient as three to one or four to one?

Answer: (1) The wire is No. 44 single silk and is suitable for audio and long wave radio transformers. (2) No. Use at least a three to one ratio between secondary and primary.

Thanks for complimentary remarks of "Radio."—Ed.

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