The Hundred per cent. Australian Radio Journal.

THE WIRELESS WEEKLY

A Journal Devoted to the Interests of Wireless Enthusiasts both Amateur and Professional

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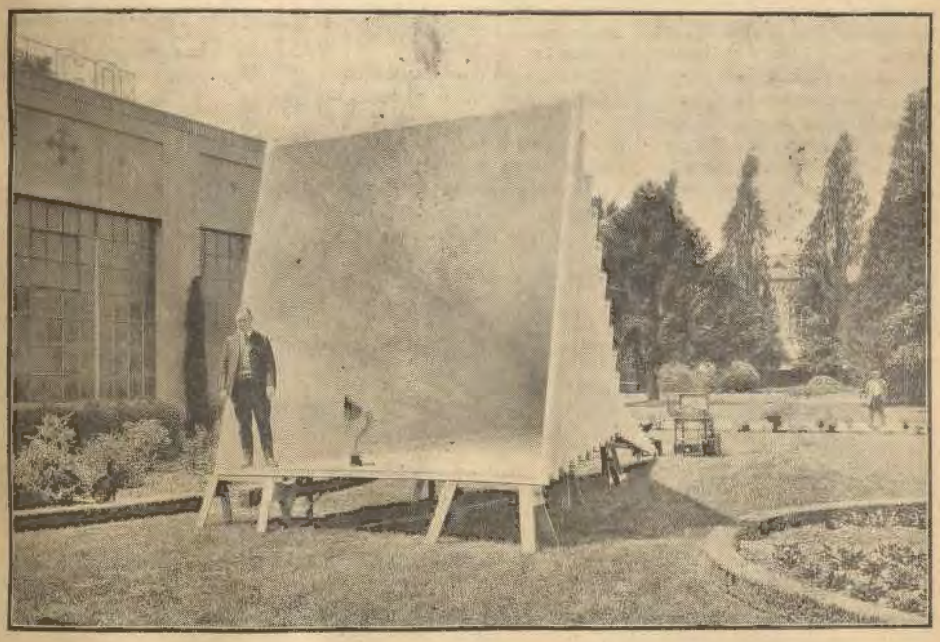


A Loud Speaker. *Photo lent by Mr. W. Veitch (Magnavox Co.)*

A TALK WITH "WIRELESS WEEKLY."

The year 1922 is fast drawing to a close, and for wireless experimenters it has been a year of great events.

From the end of the great war till the end of 1921 amateur wireless remained in a state of stagnation, despite the fact that the science in other countries was going ahead. The lack of encouragement by the Government was, of course, responsible for that state of affairs.

Then came the awakening, so to speak. The Sydney "Evening News" devoted space weekly to the science as it affected amateurs, and interest came at once. Strong clubs were formed in the City and suburbs of Sydney, and there began to arise the demand for a newspaper devoted wholly to Radio.

"Wireless Weekly" came on the scene, despite many difficulties and setbacks, and won favor with the experimenters. The publicity then given to the subject awakened the Government to the fact that Radio laws for the amateur were urgently needed, and the contract with the Amalgamated Wireless (Australasia) Ltd. finally decided this point.

So the amended regulations were drafted, and as everybody knows, came into operation on December 1st.

Thus we are now starting about where America was a year or more ago, and we have got to go very hard to catch up. From all accounts, there will be plenty of public broadcasting in Australia soon, and the Government should see that it is encouraged.

We can only hope that 1923 will be as fruitful as has been 1922.

Much, of course, remains with the experimenters themselves.

TRANS-PACIFIC TESTS.

SYDNEY AMATEURS PREPARE

At a well represented meeting, held in Sydney on 6th December, it was unanimously decided to form a Committee to carry out the necessary organisation of the Experimental Wireless Stations in N.S.W., for successfully receiving the wireless signals to be transmitted by American amateurs in May, 1923.

The main points of this organisation are as follows:—

(a) To avoid all interference between stations receiving the signals on account of most stations probably using regenerative circuits and thus causing interference one with another.

(b) To arrange that no interference be caused by experimenters listening in but not taking part in the tests.

The Committee feel that the obligation upon every experimenter, more especially those in the congested wireless area in N.S.W. is to do either of the following:—

(a) Enter for the test, and

(b) If not taking part in the tests, agree not to operate his station during the times that the signals will be received.

These times will probably consist of one hour duration a night, and are expected to be arranged at a time when the least interference is likely to be caused.

The entrance fee has been fixed by the meeting at 10/- for each station. Any number of experimenters can be entered under one station. Already many prizes have been donated, and prizes will also be given out of the surplus funds of the organisation.

Two forms are available, one for those experimenters participating in the tests, and another for those who are not taking part, but who are anxious to assist those receiving the signals by closing down their stations during the hours that the tests are being carried out.

It is essential, to bring success to the movement, that, every experimenter in N.S.W. signs one of the forms and returns it to the **Hon. Secretary, "Lourdis," Nelson Bay Road, Bronte,** at the earliest possible moment, in order to facilitate the organisation work, which will be exceptionally heavy.

The closing date for entries has been definitely fixed for the 28th **February, 1923,** but, naturally, the **Committe in order to get the organisation well ahead, want application in promptly.**

The Committee is composed as follows:—Malcolm Perry (Chairman), F. H. Harvey, Hon. Secretary and Treasurer; E. Bowman, A. W. Mackellar, G. Thompson, E. Lavington, C. Tatham, R. H. Howell.

The forms are worded as follows:—

(No. 1).

To Hon. Secretary, Radio Tests Organisation Committee.
"Lourdis,"
Nelson Bay Road,
Bronte, Sydney.

I ..... desire to enter my station for the reception of Wireless signals to be transmitted by American Amateurs in May, 1923, and enclose herewith 10/- being the entrance fee.

Signature .....

Call Sign .....

Postal Address .....

Exact location of station, is possible .....

This station to be operated by the following experimenters .....

N.B.—Entrants will be supplied with all possible information and literature in connection with the above, and will also be entitled to admission to any lectures which may be arranged.

(No. 3).

As I am not taking part in the forthcoming Trans-Pacific Tests, and being anxious to assist those who are taking part, I agree not to operate my experimental wireless station during the times that the test signals will be received.

Signature .....

Postal Address .....

EXIT THE SPARK.

C.W. TO THE FORE.

BETTER RESULTS.

A writer in an American newspaper, discussing the spark and C. W. systems, foretells the early death of the former on the Pacific Coast of America. He says:—

"The elimination of spark telegraphy as a factor in radio communication is being brought about primarily by two conditions: the preference of the Government for CW in operators' licenses, and the sharper selecticity of the tube transmission under ordinary conditions. In other words, for a given band of wave lengths, more CW sets may be operated without mutual interference than with any unmber of sparks set.

"In the bygone days of radio, so familiar to the 'old timer,' when crystal detectors were de luxe for receivers, and a 1-kilowatt ship set was standard for transmission, radio short stations were few and far between. Hundreds of boats were not equipped with wireless apparatus, and interference was not a large factor, each boat or station working on the most convenient length.

"The Government introduced in its naval stations the first standardization of wave length. This was for convenience of tuning. From this was born the general control of all wireless, after that crystallised into congressional legislation when boat owners were compelled to equip passenger carrying craft with radio and maintain operators as a part of the Federal regulations.

CHANGES U. S. RULES.

"Then came the wonderful development of the three-element tube for receiving and its application to the transmission end of radio. From the tube came CW, and from CW came a solution of the radio man's trouble, as applied to congested traffic conditions which made the ordinary spark set archaic. The value of the new system caused the Government to change the requirements imposed upon licenses.

"Now commercial and Government operators are required to be familiar with both spark and CW operation. Ship companies, more and more, are favouring the CW. Its silent operation, small space required for installation, high efficiency, small power factor, and selectivity have brought it a popularity never attained by the spark methods in the heydey of their greatest popularity.

DIVERSIFIED USES.

"In addition, the marine field is no longer the only one open for the radio operator. In manufacturing lines, in newspaper stations, in broadcasting stations, in financial circles, in construction camps, in a myriad of directions, the small, compact, easily set up, controlled and handled CW sets have widened the field of operative need. To-day scores of young men are preparing for this work, which is one of the big industrial developments of the past year.

"In the Pacific Coast Shipping business CW has not had the impetus that has driven it on the Atlantic Coast. For one thing, magnetic conditions are better and static is not as bas as on the east coast, and spark radio clung longer because of its increased range over that of the Eastern Time section. But now the hour of change has come. The tide is turning. On all sides boat owners are bidding for CW, and insisting on it, and the time is not far off when every boat on the coast will carry CW as its main equipment.

"The usual type installed on coast boats for commercial work consists of a combined CW telegraph and radio equipment, rated at 200 watts and 1000 watts capacity. The sets use four 50-watt raditron tubes, giving a combined output of 200 watts in the antenna circuit—an output that can be increased by a still higher percentage under emergency conditions. The sets are designed for intership and ship-to-shore communication.

"The model ET-3602 equipments of the Radio Corporation are built to operate on either 110 volts direct current or 110 volts, 60-cycle, single phase alternating current supply. They require an input of 3.5 kilowatts to the motor generator set. The antenna constants fall between the wave lengths of 300-375 metres, although transmission may be effected on any wave length between 300 and 800 metres.

"Sets have been designed with a view to high voltage clearance, ruggedness, accessibility. The general design is panel construction, with easy access to coil, plate and grid adjustments. Fuses and terminal control are handled through a lower panel in the sets. The sets are all automatically controlled. Their over-all dimensions are 29 inches in width, 23 inches depth, 69 inches height, and a weight of 225lb.

"In the telephone work four tubes are used—two for oscillators and two for modulators, with a speech amplifier attached. A change-over switch gives wave-length control. On these sets, rated at 200 watts, beter distance records can be achieved than with the best two-kilowatt spark set ever designed, and as a result of this factor alone the CW outfits are gradually displacing all other types of equipment in Pacific Coast installations."

WRONG IMPRESSION.

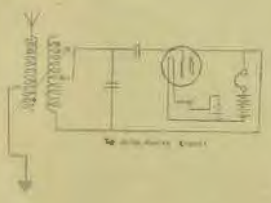
ABOUT A CIRCUIT

(By Oscillating Valve.)

It was communicated to me indirectly that the president of a radio club told one of the members that the ultra audion circuit could be used with success on all-round work. As this circuit is widely used, and far too many amateurs have a mistaken impression relative to the merits and demerits of it, the following article I hope will enlighten them somewhat:—

In the first place, it would be well to point out that the ultra audion was designed primarily for the reception of long wave C.W. stations, for which it is efficient. It was not, however, designed as a regenerative circuit for spark or damped stations of the shorter wave lengths, and for the simple reason that its degree of regeneration is not easily controlled.

A glance at the sketch will probably make this clear. This is the ultra audion circuit as it is generally shown:—



It will be noted that the phones and "B" batteries are in both the input and output circuits, and that the oscillating circuit, from the Grid through the secondary of the loose coupler to the plate, contains no impedance to the flow of high frequency current other than that offered by the secondary inductance. When this inductance is adjusted to the exact frequency of the wave passing through the primary, the two circuits are said to be in resonance, and the impedance of the secondary or input circuit (and consequently of the entire oscillating circuit) is equal to the D.C. resistance of the secondary inductance.

It is at this adjustment that the circuit oscillates vigorously, so vigorously, in fact, that the reception of any phone station on this wave is impossible, the operator of the transmitting station, when talking, sounding very much as though he was choking.

This is not strange when it is remembered that the difference in frequency between the beats emitted by the transmitter and those generated by this circuit are within the limits of audibility, and are super-imposed upon the voice of the speaker as it is received.

The only way to prevent this circuit from oscillating and still regenerate, is to either change the value of the secondary inductance or else cut down on the filament temperature. In any circuit when the proper value of filament temperature and "B" battery potential are once found for maximum efficiency of any given tube, it is advisable to leave them at that setting.

Changing the value of the inductance, and coupling the plate with the grid, causes the circuit to cease oscillating, and at the same time brings the secondary circuit out of resonance with the primary circuit, thus preventing maximum results from being obtained.

MAKE YOUR OWN.

CONVERTIBLE RADIO AMPLIFIER.

Specially written for "Wireless Weekly" by Ora.

The means of "building up" or increasing the strength of incoming wireless signals by means of valves are, generally speaking, divided into two classes.

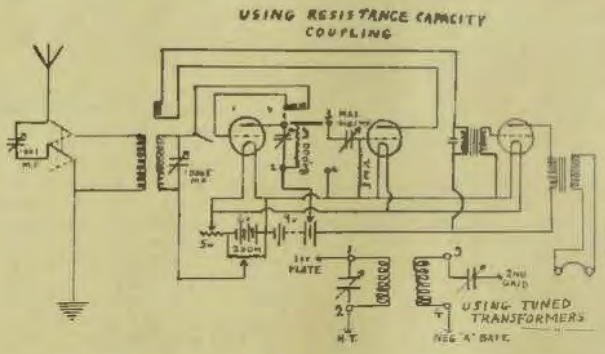
Firstly those in which the high frequency component of the wireless wave is boosted, and secondly, systems wherein the already rectified signal now at a frequency within the limits of reception by the human ear is passed, through suitable circuits to valves, and the actual strength of signal greatly magnified; the ultimate value depending on the number of valves used on the magnifier.

Whilst with the audible frequency magnificent effect extremely loud signals can be built up from what would be otherwise very weak ones, it is not usually possible to bring in signals of which there was no trace in the sensitive head telephones before the magnifier was added.

With this type of 'strengthening" apparatus, however, one has the advantage of its being equally sensitive to an impressed signal of any wavelength ordinarily used in wireless working, such signal being passed to it for "boosting" by a receiving tuner. It therefore plays a most useful part in any receiving system, and the sketch of the writer's set shows it in place as the third valve and circuit.

With the high or radio-frequency amplifier, particularly those using tuned intervalve transformers, the very weak oscillatory received currents inpinging on the aerial are strengthened by the amplifying relay action of the valves preceding the actual rectifying valve (or crystal). By this means signals capable of actuating the head telephones are the result, whereas had the original weak aerial-current oscillations been passed to the rectifier fithout being previously amplified, they could not possibly have been able to operate the detector, hence would not affect any magnifying system coming after detection.

A drawback to this type of radio-frequency valve coupling is that the transformers show a marked degree of falling-off in efficiency when they are worked at other than their natural frequency, and also the fact that, in order to reach the higher wavelengths commercially used today (Bordeaux 24,000 metres), a great deal of self-capacity is unavoidably introduced in the windings, consequently reducing the effective voltage transfer.



One may, however, take it that Radio Frequency Intervalve Transformers, tuned by means of a variable primary condenser, show an extremely high degree of efficiency and selectivity for wavelengths from 200 metres to 3000 metres, particularly so in the case of the modern form of valve-holder-four-pin "plug-in" type of transformer which eliminates "dead-end turn" effect.

Four or five of these will cover this type's most efficient range of wavelengths, and the variable primary condenser (fitted with extension handle) will be found essential for critical adjustments such as are demanded for good work in telephony. The so-called Vernier condenser would be found a useful adjunct, and a very high efficiency degree reached thereby.

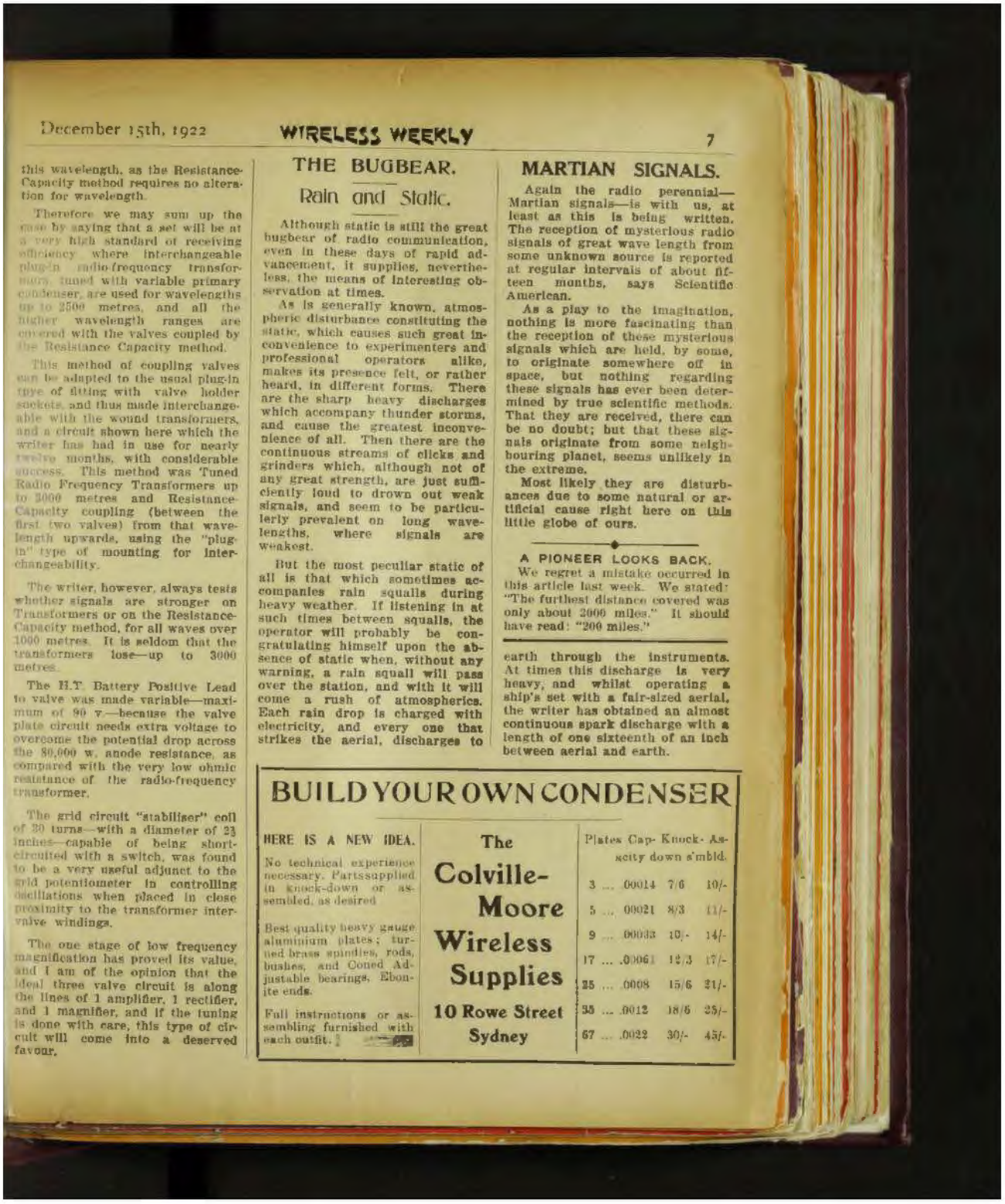
Another type of transformer is often used in commercial wireless receivers, which has a high resistance "Aperiodic" winding. While this type has a best response to a given wavelength, it is nevertheless fairly efficient over a very broad field of wavelength settings, the one transformer being used throughout all ranges.

Even at its best wavelength, this type is not as sensitive by a good deal, as the Tuned Transformer Type. The point in favour of the Aperiodic Transformer for valve coupling is that it does not require careful adjustment.

RESISTANCE—CAPACITY AMPLIFIERS.

This method of amplification is very simple, convenient to handle, and junctions very well on the wavelengths above 2000 metres.

In fact, there is not much to be gained, usually, by going to the expense of providing extra "plug-in" radio-frequency transformers above



this wavelength, as the Resistance-Capacity method requires no alteration for wavelength.

Therefore we may sum up the case by saying that a set will be at a very high standard of receiving efficiency where interchangeable plug-in radio-frequency transformers, tuned with variable primary condenser, are used for wavelengths up to 2500 metres, and all the higher wavelength ranges are covered with the valves coupled by the Resistance Capacity method.

This method of coupling valves can be adapted to the usual plug-in type of fitting with valve holder sockets, and thus made interchangeable with the wound transformers, and a circuit shown here which the writer has had in use for nearly twelve months, with considerable success. This method was Tuned Radio Frequency Transformers up to 3000 metres and Resistance-Capacity coupling (between the first two valves) from that wavelength upwards, using the "plug-in" type of mounting for interchangeability.

The writer, however, always tests whether signals are stronger on Transformers or on the Resistance-Capacity method, for all waves over 1000 metres. It is seldom that the transformers lose—up to 3000 metres.

The H.T. Battery Positive Lead to valve was made variable—maximum of 90 v.—because the valve plate circuit needs extra voltage to overcome the potential drop across the 80,000 w. anode resistance, as compared with the very low ohmic resistance of the radio-frequency transformer.

The grid circuit "stabiliser" coil of 30 turns—with a diameter of 2¾ inches—capable of being short-circuited with a switch, was found to be a very useful adjunct to the grid potentiometer in controlling oscillations when placed in close proximity to the transformer inter-valve windings.

The one stage of low frequency magnification has proved its value, and I am of the opinion that the ideal three valve circuit is along the lines of 1 amplifier, 1 rectifier, and 1 magnifier, and if the tuning is done with care, this type of circuit will come into a deserved favour.

THE BUGBEAR.

Rain and Static.

Although static is still the great bugbear of radio communication, even in these days of rapid advancement, it supplies, nevertheless, the means of interesting observation at times.

As is generally known, atmospheric disturbance constituting the static, which causes such great inconvenience to experimenters and professional operators alike, makes its presence felt, or rather heard, in different forms. There are the sharp heavy discharges which accompany thunder storms, and cause the greatest inconvenience of all. Then there are the continuous streams of clicks and grinders which, although not of any great strength, are just sufficiently loud to drown out weak signals, and seem to be particularly prevalent on long wavelengths, where signals are weakest.

But the most peculiar static of all is that which sometimes accompanies rain squalls during heavy weather. If listening in at such times between squalls, the operator will probably be congratulating himself upon the absence of static when, without any warning, a rain squall will pass over the station, and with it will come a rush of atmospherics. Each rain drop is charged with electricity, and every one that strikes the aerial, discharges to earth through the instruments. At times this discharge is very heavy, and whilst operating a ship's set with a fair-sized aerial, the writer has obtained an almost continuous spark discharge with a length of one sixteenth of an inch between aerial and earth.

MARTIAN SIGNALS.

Again the radio perennial—Martian signals—is with us, at least as this is being written. The reception of mysterious radio signals of great wave length from some unknown source is reported at regular intervals of about fifteen months, says Scientific American.

As a play to the imagination, nothing is more fascinating than the reception of these mysterious signals which are held, by some, to originate somewhere off in space, but nothing regarding these signals has ever been determined by true scientific methods. That they are received, there can be no doubt; but that these signals originate from some neighbouring planet, seems unlikely in the extreme.

Most likely they are disturbances due to some natural or artificial cause right here on this little globe of ours.

A PIONEER LOOKS BACK.

We regret a mistake occurred in this article last week. We stated: "The furthest distance covered was only about 2000 miles." It should have read: "200 miles."

POTTED HISTORY

RADIO YEAR BY YEAR.

Most of us are more interested in contemporary happenings than in comparative records; but the entire development of radio is so recent that the full scope of its history is concerned with matters of our own generation. So comprehensive a summary of the salient events in the progress of the new art is given by C. D. Wagoner in "Radio World" (New York) as to furnish a record well worth transcribing. Here it is:—

1883. Thomas A. Edison discovered what is now called the "Edison Effect," a phenomenon occurring in a burning incandescent bulb, in that an electric current can be made to pass through space from the burning filament to an adjacent cold metallic plate. While not applied to radio at this early date, the discovery was later used in developing the vacuum tube, now a veritable modern Aladin's lamp, and the very heart of radio communication.

1885. Electric signalling through the air without connecting wires begins when an English experimenter stretches two lengths of wire, one-quarter of a mile apart, and by charging one with a local electric current is able to induce a response in the distant wire.

1887. Professor Heinrich Hertz, a German scientist, proves experimentally that electric waves are sent through space with the speed of light by the electric discharge that takes place when a spark is made by an induction coil or a static machine. These waves have since been called "Hertzian Waves."

1890. Professor E. Branly, of Paris, develops the coherer, which considerably improves reception.

1894. British experimenters bridge a distance of one and one-quarter miles by means of improvements on the original induction system of 1885.

1895. Guglielmo Marconi proves that electric waves can be transmitted through the earth, air or water by means of sparks producing high-frequency electrical oscillations.

1896. Marconi further proves that telegraph signals can be sent and received by means of Hertzian waves up to a distance of three miles.

1900. A. F. Collins bridges distance up to eight miles by means of his so-called electro-static system of wireless signalling.

1901. Marconi, spurred by his early success, finally succeeds in bridging the Atlantic Ocean from Poldhu, Cornwall, England, to St. Johns, Newfoundland, by sending the historical series of the letter "S," the distance being 1,800 miles.

1902. Professor E. Ruhmer's photophone system of wireless covers a distance of twenty miles at Kiel, Germany.

1902. Wireless telegraphy is adopted on large transatlantic passenger vessels, the test being on the American steamer "Philadelphia."

1902. Professor J. A. Fleming, of London, England, invents the two-element thermionic valve-detector for radio reception.

1906. Professor R. A. Fessenden, an American experimenter, develops a high-frequency alternator system having a range of 20 miles.

1906. The Telefunken arc system of wireless telegraphy is developed and covers a distance of 25 miles.

1906. Dr. Lee de Forest, an American radio expert, improves the Fleming original vacuum tube by inserting the third or control element, known as the grid.

1908. Professor Poulsen prefects another arc-transmitting system which covers more than 150 miles on first test.

1908. Marconi transatlantic radio stations are opened to the general public for the transmission and reception of radiograms between Great Britain and Canada.

1908. Professor Marjorana perfects on arc oscillating-generator and liquid microphone-system, and bridges Rome with Sicily, a distance of 300 miles.

1911. The radiotelephone covers a range of 360 miles between Nauen, Germany, and Vienna, Austria.

1912. The International Radio Telegraphis Conference approves regulations to secure uniformity of practise in radio services.

1912. E. H. Armstrong, an American, invents the now famous regenerative vacuum-tube circuit while experimenting at Columbia University.

1913. The powerful radio station at Nauen, Germany, successfully bridges a practical telegraphing distance of 1550 miles.

1914. Laws are formulated by foremost maritime nations requiring vessels of certain grades to carry wireless equipment and operators.

1914. The Marconi Wireless Telegraph Company of America inaugurates a new American trans-ocean wireless service by opening its Californian-Honolulu circuit.

1915. The American Telephone and Telegraph Company, working in conjunction with the Western Electric Company, succeeds in telephoning by radio from Washington to Paris, a distance of 3700 miles, and from Washington to Hawaii, a distance of 5000 miles.

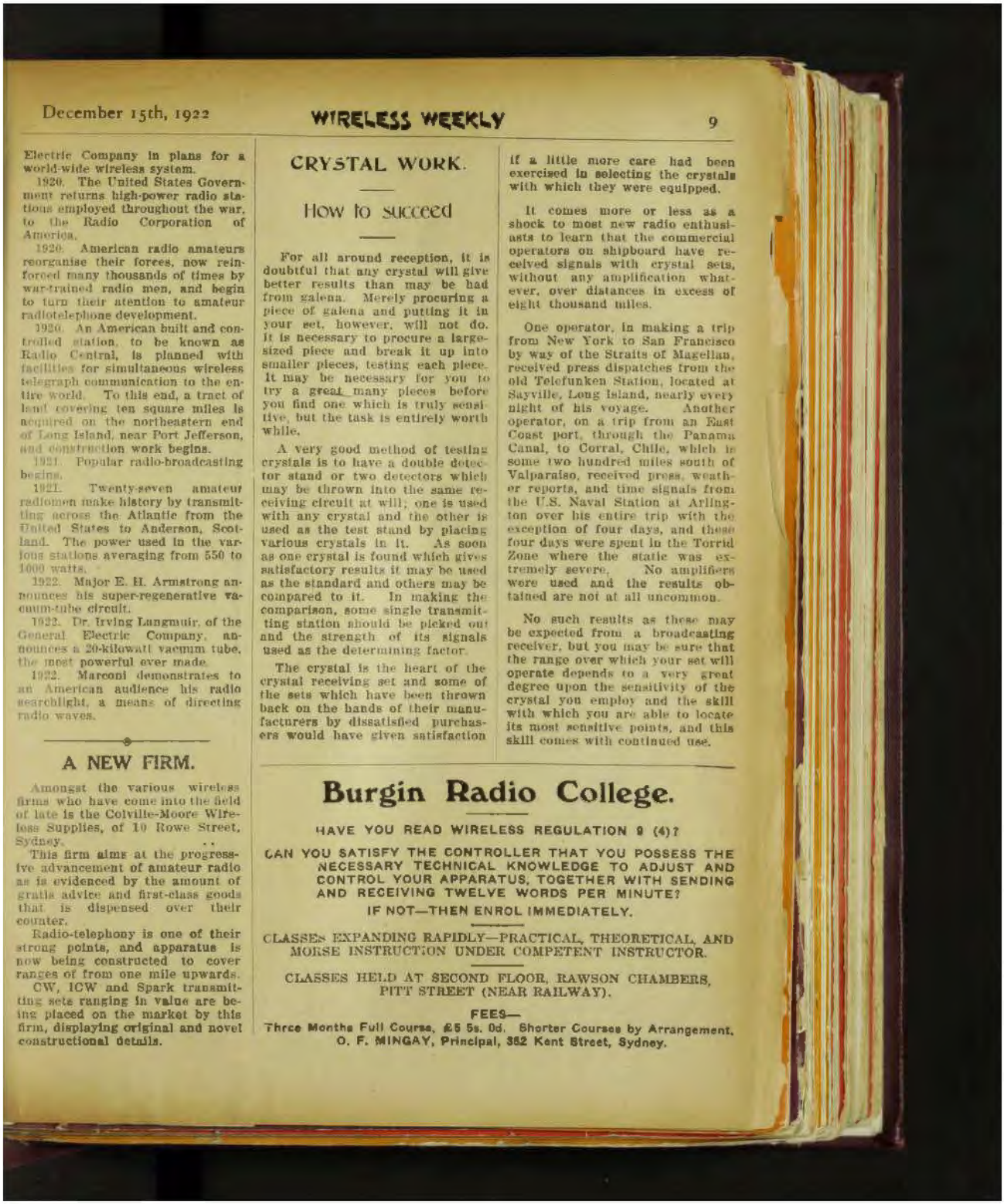
1916. President Wilson and the Mikado of Japan exchange radiograms at opening of newly-established transpacific radio service between the United States and Japan.

1917. Dr. E. F. W. Alexanderson, consulting engineer of the General Electric Company, developes a 200-kilowatt high frequency alternator now used almost exclusively in transoceanic radio communication.

1918. Both radiotelegraph and radiotelephone conclusively prove their tremendous importance in warfare in the world war.

1919. Canada and England are linked by radiotelephone for the first time, vacuum-tube transmitters being used.

1919. The Radio Corporation of America is formed, taking over the interests of the Marconi Wireless Telegraph Company of America and the radio activities of the General



Electric Company in plans for a world-wide wireless system.

1920. The United States Government returns high-power radio stations employed throughout the war, to the Radio Corporation of America.

1920. American radio amateurs reorganise their forces, now reinforced many thousands of times by war-trained radio men, and begin to turn their attention to amateur radiotelephone development.

1920. An American built and controlled station, to be known as Radio Central, is planned with facilities for simultaneous wireless telegraph communication to the entire world. To this end, a tract of land covering ten square miles is acquired on the northeastern end of Long Island, near Port Jefferson, and construction work begins.

1921. Popular radio-broadcasting begins.

1921. Twenty-seven amateur radiomen make history by transmitting across the Atlantic from the United States to Anderson, Scotland. The power used in the various stations averaging from 550 to 1000 watts.

1922. Major E. H. Armstrong announces his super-regenerative vacuum-tube circuit.

1923. Dr. Irving Langmuir, of the General Electric Company, announces a 20-kilowatt vacuum tube, the most powerful ever made.

1922. Marconi demonstrates to an American audience his radio searchlight, a means of directing radio waves.

A NEW FIRM.

Amongst the various wireless firms who have come into the field of late is the Colville-Moore Wireless Supplies, of 10 Rowe Street, Sydney.

This firm aims at the progressive advancement of amateur radio as is evidenced by the amount of gratis advice and first-class goods that is dispensed over their counter.

Radio-telephony is one of their strong points, and apparatus is now being constructed to cover ranges of from one mile upwards.

CW, ICW and Spark transmitting sets ranging in value are being placed on the market by this firm, displaying original and novel constructional details.

CRYSTAL WORK.

How to succeed

For all around reception, it is doubtful that any crystal will give better results than may be had from galena. Merely procuring a piece of galena and putting it in your set, however, will not do. It is necessary to procure a large-sized piece and break it up into smaller pieces, testing each piece. It may be necessary for you to try a great many pieces before you find one which is truly sensitive, but the task is entirely worth while.

A very good method of testing crystals is to have a double detector stand or two detectors which may be thrown into the same receiving circuit at will; one is used with any crystal and the other is used as the test stand by placing various crystals in it. As soon as one crystal is found which gives satisfactory results it may be used as the standard and others may be compared to it. In making the comparison, some single transmitting station should be picked out and the strength of its signals used as the determining factor.

The crystal is the heart of the crystal receiving set and some of the sets which have been thrown back on the hands of their manufacturers by dissatisfied purchasers would have given satisfaction if a little more care had been exercised in selecting the crystals with which they were equipped.

It comes more or less as a shock to most new radio enthusiasts to learn that the commercial operators on shipboard have received signals with crystal sets, without any amplification whatever, over distances in excess of eight thousand miles.

One operator, in making a trip from New York to San Francisco by way of the Straits of Magellan, received press dispatches from the old Telefunken Station, located at Sayville, Long Island, nearly every night of his voyage. Another operator, on a trip from an East Coast port, through the Panama Canal, to Corral, Chile, which is some two hundred miles south of Valparaiso, received press, weather reports, and time signals from the U.S. Naval Station at Arlington over his entire trip with the exception of four days, and these four days were spent in the Torrid Zone where the static was extremely severe. No amplifiers were used and the results obtained are not at all uncommon.

No such results as these may be expected from a broadcasting receiver, but you may be sure that the range over which your set will operate depends to a very great degree upon the sensitivity of the crystal you employ and the skill with which you are able to locate its most sensitive points, and this skill comes with continued use.

N.S.W. WIRELESS INSTITUTE.

A general meeting of the N.S.W. division of the Wireless Institute of Australia, was held on Thursday, 7th December, at the Railway Institute, Sydney. Mr. C. P. Bartholomew presided. The following applicants for membership were elected:—Mr. S. Colville and Mr. W. G. Keogh.

It was resolved "that the annual subscription rate be increased to £3 3s. per annum for full membership and £2 2s. per annum for associate members, to take effect on the 1st January, 1923, in the case of new members, and from the 1st April, 1923, in respect to existing members." It was also announced that in future all applicants for membership would be considered by a Qualifications Committee, of which Mr. Charles Maclurcan is the chairman.

Mr. F. Basil Cooke gave a very instructive and illustrative lecture on "Resonance," which was thoroughly enjoyed by all present. Mr. Harry Stowe then followed with a lecture on the construction and uses of a wavemeter. This lecture was of great interest, and several questions resulted which solved many difficulties experienced by members. The next meeting of the Institute will be held on February 1st at the Sydney University, when Mr. Edgar Booth, M.C., B.Sc., who has selected the subject of "Sound Ranging appliances in Peace and War." This is to take the form of an invitation evening to members and their friends.

ILLAWARRA RADIO CLUB.

The last meeting of the Illawarra Radio Club was held at 75 Montgomery Street, Kogarah, on 7th inst., when the result of the Club's Benefit Entertainment and Wireless Demonstration (held at Tolley's Pictures, Kogarah, on Tuesday, 5th inst. by permission of the Controller of Wireless and Amalgamated Wireless, Ltd.) was discussed.

The show is an open-air one, and as everyone knows the night was wet, so it will be realised that we were up against a pretty difficult proposition. A test was held at the Show on the Sunday night previous with very fair results, the music being heard all round the Show, and it was thought that with a few adjustments, and providing the weather held good (which it didn't) all would be well. The testing early on Tuesday evening showed a big drop in signal strength due to dampness and local aerial leakages (not to mention the losses at the transmitting end), and as the rain grew worse and "static" increased, the prospect was by no means a happy one, and Mr. Gorman's job as operator was not to be envied.

However, when he switched over to the Magnavox at the appointed time (8.30) the results were really surprising, and although the first two or three items were not so clear, the remainder of the music for the most part could be heard by everybody in the Theatre, some of the numbers (especially "Coming Through the Rye") coming out particularly strong and clear, and drawing much applause.

In face of such adverse conditions the success of the demonstration was remarkable, mainly due to Mr. Gorman's able and skilful handling of the set, upon which he is to be congratulated, and is also deserving the credit and the Club's thanks for the time and trouble put into the constructing, testing and operating of the set, which will be published next week.

The Club's acknowledgments are due to Mr. Maclurcan for the special transmission of the musical programme, and many thanks are also due to the Colville - Moore Wireless Supplies for kindly lending the Magnavox to the Club for the demonstration, and tests prior to the show, the use of which contributed largely towards the success of the demonstration.

Despite the wet night, the attendance was excellent, and although all ticket returns are not yet in, the Club is confident of clearing a substantial financial balance for its funds.

Discussion also took place on the forthcoming Trans-Pacific tests ,after Mr. Gorman had outlined the scheme which had been discussed at a conference called by the Waverley Club on the 6th inst. Although this Club will possibly not enter the tests as a Club, no doubt several of the members will take part.

The next Meeting of the Club will be held at the Club-room (as above)on Thursday, 21st inst., at 8 p.m.

The Secretary (W. D. Graham, 44 Cameron St., Rockdale), would be pleased to hear from anyone interested or desirous of becoming members of the Club.

THE MARRICKVILLE & DISTRICT RADIO CLUB.

The first (inaugural) meeting of this Club was held on Monday evening last, 11th December. There was a fair atendance, and it is expected that the membership will be increased considerably when the existence of the Club becomes more generally known.
comes more generaly known.

Various motions as to the formation of the club were carried, and the following office-bearers were elected pro tem:—President, S. Farrell; Hon. Secretary, R. G. Ellis; Committee F. A. Scott, G. W. Round, E. Walton, H. W. M'Quoti, R. G. Ellis.

The next meeting is arranged for Tuesday, 19th December, at rear of 14 Park Road, Marrickville (take Addison Road tram)

at 8 p.m. Something of great interest is promised for the next meeting, so a good attendance is requested.

The Hon. Sec. is Mr. Reg. G. Ellis, "Eastbourne," 40 Park Rd., Marrickville; Pet. 1628.

KURIN-GAI DISTRICT RADIO CLUB.

A new club has been formed at Chatswood to embrace all districts from Chatswood to Hornsby. Mr. W. W. Wilson was elected president, Mr. O. F. Mingay and Mr. A. Stowe, vice-presidents; Mr. R. R. Wiltshire, Secretary; Mr. R. Hinton, Treasurer.

Meetings are held at Memorial Hall, Chatswood.

Intending members can obtain all information from Secretary, "Lauristan," Help St., Chatswood.

LEICHHARDT AND DISTRICT RADIO SOCIETY.

At the Society's Ninth General and Third Business Meeting, held at the Club Room, 3 Annesley St., Leichhardt, on Tuesday, December 5th, six new members were elected. The first of the series of elementary lectures, as set out on the syllabus recently adopted, was delivered by Mr. W. J. Zech, the subject being "Electricity and its Application to Radio Communication." The subject was carried through to Ohm's Law and Simple Calculations, and the calculation of E.M.F., Current, and Resistance by the application of when the second lecture, under this formula was fully dealt with.

The next meeting is to held o Tuesday next, December 19th, the heading of Accumulators, will be delivered, after which the Society will go into recess until January 9th.

Members are reminded that the Club Room is available for Morse practice on Thursday nights.

All inquiries relative to the Society's activities are welcomed.

Address to the Hon. Secretary, Mr. W. J. Zech, 145 Booth St., Annandale.

THE NORTH SYDNEY RADIO CLUB.

last business meeting of the North Sydney Radio Club, on Tuesday, the 5th inst., was largely attended, and a number of important matters were brought forward for discussion.

The auditor's report, which was read and adopted, showed the club to be in a very satisfactory position financially, a substantial credit balance being carried forward to the current half-year.

A committee, consisting of Messrs. McIntosh, Evans, Hill and McClure was appointed to represent the Club at the meeting convened by the Waverley Club with regard to the forthcoming Trans-Pacific tests.

Owing to the growth of the Club, it has been found necessary to make extensive additions to the seating accommodation; although it is expected that arrangements will soon have to be made for the enlarging of the Club's premises.

The syllabus for the ensuing half-year includes a comprehensive programme of lectures, the first of which will be delivered by Mr. Raymond McIntosh on the subject of "Wireless Telephony" and is set down for 9th January, 1923.

The next meeting will be held on Tuesday, the 19th inst.

AMATEUR CALLS

NEW SOUTH WALES.

The following is a list of Licences issued to amateurs in the State of New South Wales to the end of October, 1922:—

Call Signal.	Name.	Address	Nature of Licence.
2 E K	A V. Graham	709 Culwalla Chambers, King St., Sydney	R.
2 E L	F. G. Bevan	"Swanes," Anzac Parade, Bankstown	R.
2 E M	L. A. Bright	"Lochiel," Dungowan, via Tamworth	R.
2 E N	J. W. Robinson	Macpherson St., Ryde	R.
2 E O	W. J. Rowland	30 Belmont Road, Mosman	R.
2 E P	Orange Bay Scouts	(W. T. Faulkner), "Eleralle," Summer St., Orange	R.
2 E Q	N. O. Glasson	"Shiel," Woodstock	R.
2 E R	W. G. H. Best	Carlisle St., Rose Bay	R.
2 E S	B. Symes	70 Quinton Road, Manly	R.
2 E T	R. A. White	100 Phillip St., Sydney	R.
2 E U	A. F. Peters	Carlisle St., Rose Bay	R.
2 E V	J. F. Flynn	Pennant Hills Road, Beecroft	R.
2 E W	F. H. Kirkby	14 Henry St., West Kogarah	R.
2 E X	R. R. Wilshire	"Lauriston," Help St., Chatswood	R.
2 E Y	T. R. Grinter	Lockhart	R.
2 E Z	R. H. Webster	Ariah Park	R.
2 F A	S. V. Colville	10 Rowe St., Sydney	R.
2 F B	P. Chaleur	269 Edgecliff Road, Sydney.	R.
2 F C	H. H. Chappell	"Belle Vue," Carrington Av., Mortdale	R.
2 F D	S. G. White	"Kelso," Third St., Canterbury	R.
2 F E	E. Polle	"Mascotte," 91 Balmain Rd., Leichhardt	R.
2 F F	Western Suburbs Amateur Wireless Ass.	77 Park Road, Auburn	T.
2 F Q	E. M. Telgate	Hill Top, Southern Line	R.
2 F H	H. A. Rofe	Cambridge St., Stanmore	R.
2 F I	R. S. Hinton	"Amberley," Robinson St., Chatswood	R.
2 F J	A. J. Pickering	"Bromley," Wigram St., Haris Park	R.
2 F K	R. F. Moore	"Timor," Neil St., Marylands	R.
2 F L	A. Mitchell	65 Gerard St., Watersleigh, Nth. Sydney	R.
2 F M	W. C. Bolton	"Bromley," Blackheath St., Leura	R.
2 F N	J. S. Barling	287 Stanmore Rd., Petersham	R.
2 F O	C. P. Bartholomew	Royal Sydney Yacht Squadron, Kirribilli	R.
2 F P	E. J. Baker	62 Estell St., Maryville, via Newcastle	R.
2 F Q	G. J. Fox	27 Brightmore St., Neutral Bay	R.
2 F R	F. G. Pratten	Telegraph Rd., Pymble	R.
2 F S	H. G. Convoy	106 Percival Rd., Stanmore	R.
2 F T	J. Charleson	43 Lamb St., Lilyfield, Sydney	R.
2 F U	T. G. Mitchell	11 Wunda St., Mosman	R.
2 F V	L. J. Allomes	Victoria St., Kurri Kurri	R.
2 F W	F. C. Tye	33 Croydon Avenue, Croydon	R.
2 F X	J. A. Kerr	270 Glebe Point Rd., Glebe Point	R.
2 F Y	N. W. A. Harrison	"Beresford," Prospect St., Rosehill	R.
2 F Z	L. Hogan	C/o. J. Ritchie, Warner's Ave., Wyong	R.
2 G A	Miss F. V. Wallace	18 Royal Arcade, George St., Sydney	R.
2 G B	F. A. Schonhardt	"The Nook," Major St., Coogee	R.
2 G C	F. G. Geddes	"Almour," Macpherson St., Waverley	R.
2 G D	Concord Radio Club	"Quondong," La Mascotte Ave., Concord	T.
2 G E	S. W. Ingram	Cross St., Brookvale, via Manly	R.
2 G F	H. E. G. Rayner	Post Office, Five Dock	R.
2 G G	W. J. Rogers	3 Glenmore Terrace, Sutherland Ave., Paddington	R
2 G H	S. G. E. Lees	"Cotswold," Gilliver Ave., Rose Bay	R
2 G I	A. D. Ryan	26 Beresford Rd., Strathfield	R.
2 G J	L. E. W. Holland	"Arcadia," Bayview Hill St., Rose Bay	R
2 G K	C. E. M. Kerry	Kingscliffe Flats, Milson Rd., Cremorne	R

SALE & EXCHANGE

FOR SALE.—Loose Couplers, complete, with 2,000-ohm. receivers, from £5 5s.; receivers re-wound from 7/- each. R. G. Ellis, 40 Park Rd., Marrickville.

FOR SALE.—Phones, Brown's 8,000-ohms. Adjustable Diaphrams. Ring Nth. 2534.

FOR SALE.—Loose coupler set, new, perfect order. Cheap. Sherry, 3 Holborrow St., Croydon.

Edison Business Phonograph—Suit wireless transmission and receiving. Exchange for wireless valve set or offer. Value £15. Phone U8631, H. J. Rumsey, Dundas.

Binocular Camera, Zeiss Anistigmet lens. Magazine holds 16 plates. £8 or exchange wireless. Worth £20. Phone U8631, H. J. Rumsey, Dundas.

STATION CALLS.

SHIPS STATIONS. GREAT BRITAIN

Tremere GBLC, Tremorvah GBPI, Trenegles XKC, Trentino GRX, Tresillian ZUO, Tresithney GDFW, Trevalgan BAB, Trevanion YCI, Trevarrack GOM, Trevean XLK, Trevaylor YGG, Trevelyan GBRX, Treverbyn GCBP, Trevessa GCVJ, Trevethoe ZUH, Trevider OEF, Treville YIW, Trevince YRX, Trevisa ZGR, Trevose XKD, Thevithick GCXZ, Trevorian GDWR, Trewallard GIE, Trewilden BMT, Trewinnard GBPZ, Trewyn GCMW, Trident ZWX, Trinculo ENM, Trivia GRK, Tritonia ZNP, Troilus GDZD, Trophon ERM, Trojan Prince XLS, Tropic GDV, Trostan EQJ, Troutpool ETL, Turbo ZNA, Tudor Prince YJK, Tudorstar MRB, Tullamore XMZ, Tunisian MTN, Turcoman GCPD, Turkestan BNQ, Turkistan GVY, Tuscan Prince YJG, Tuscanstar YVS, Tuscany ZKR, Tuscarora EYE, Tusculum ERK, Twickenham EWS, Twilight BMN, Tydeus ZJM, Tymeric GBJX, Tyndareus ZKC, Tyne GAM, Tynedale GDRB, Tynedale BBQ, Tynemouth EYX, Tynwald GFPW, Tyria ZZW.

UhlenhorstGBPC, Ujina GOR, Ula GOL, Ulidia BGP, Ulster MC-W, [illegible] GBU, Ulysses GBU, Ul[illegible], [illegible]afoli GFYW,

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