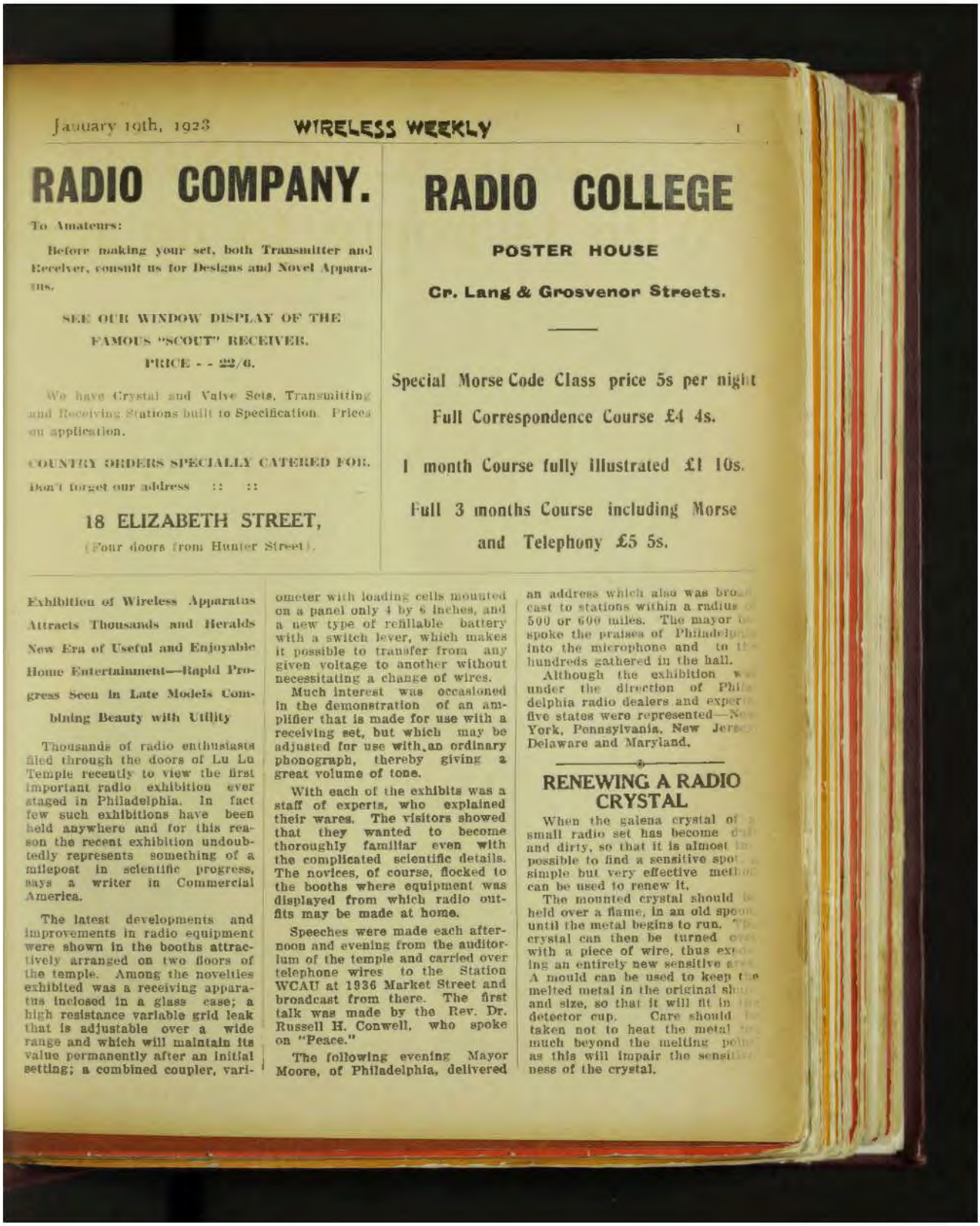


Exhibition of Wireless Apparatus Attracts Thousands and Heralds New Era of Useful and Enjoyable Home Entertainment—Rapid Progress Seen in Late Models Combining Beauty with Utility

Thousands of radio enthusiasts filed through the doors of Lu Lu Temple recently to view the first important radio exhibition ever staged in Philadelphia. In fact few such exhibitions have been held anywhere and for this reason the recent exhibition undoubtedly represents something of a milepost in scientific progress, says a writer in Commercial America.

The latest developments and improvements in radio equipment were shown in the booths attractively arranged on two floors of the temple. Among the novelties exhibited was a receiving apparatus inclosed in a glass case; a high resistance variable grid leak that is adjustable over a wide range and which will maintain its value permanently after an initial setting; a combined coupler, variometer with loading cells mounted on a panel only 4 by 6 inches, and a new type of refillable battery with a switch lever, which makes it possible to transfer from any given voltage to another without necessitating a change of wires.

Much interest was occasioned in the demonstration of an amplifier that is made for use with a receiving set, but which may be adjusted for use with an ordinary phonograph, thereby giving a great volume of tone.

With each of the exhibits was a staff of experts, who explained their wares. The visitors showed that they wanted to become thoroughly familiar even with the complicated scientific details. The novices, of course, flocked to the booths where equipment was displayed from which radio outfits may be made at home.

Speeches were made each afternoon and evening from the auditorium of the temple and carried over telephone wires to the Station WCAU at 1936 Market Street and broadcast from there. The first talk was made by the Rev. Dr. Russell H. Conwell, who spoke on "Peace."

The following evening Mayor Moore, of Philadelphia, delivered an address which also was broadcast to stations within a radius of 500 or 600 miles. The mayor spoke the praises of Philadelphia into the microphone and to the hundreds gathered in the hall.

Although the exhibition was under the direction of Philadelphia radio dealers and experts five states were represented—New York, Pennsylvania, New Jersey, Delaware and Maryland.

RENEWING A RADIO CRYSTAL

When the galena crystal of a small radio set has become dull and dirty, so that it is almost impossible to find a sensitive spot, a simple but very effective method can be used to renew it.

The mounted crystal should be held over a flame, in an old spoon, until the metal begins to run. The crystal can then be turned over with a piece of wire, thus exposing an entirely new sensitive area. A mould can be used to keep the melted metal in the original shape and size, so that it will fit in the detector cup. Care should be taken not to heat the metal too much beyond the melting point as this will impair the sensitiveness of the crystal.

A TALK WITH "WIRELESS WEEKLY."

The man who dabbles in wireless for a hobby is described as an "amateur" or an "experimenter."

Strictly speaking, both terms are correct, but it does not seem to us that they can both fairly apply to all who take up the science as a hobby. At the present time enthusiasts must be divided into two classes—amateurs and experimenters.

Those we call experimenters are the men who went into the game when it was in its infancy, and when there were no radio laws and regulations. These men worked under difficulties, and were compelled to find out for themselves. There were no clubs, at the meetings of which they could gather hints, and most of their knowledge was gained by experience.

These pioneers worked with gear that to-day would seem crude, but they got results, and as a result of their experiments, were often able to give their professional brethren a hint or two. To-day, the majority of these men are still experimenting, and still getting wonderful results.

They do not rest content with a circuit or piece of apparatus that gives satisfaction, but are constantly trying out something different; striving ever for elusive perfection, regardless of time and trouble.

These men, and these only, are entitled to be called experimenters. The rest, for the want of a better name, we call amateurs. They comprise those who buy, or, perhaps, build a set, and merely listen in occasionally to a concert, or, if the set is good enough, to some long distance commercial work.

There are many of the amateur class, however, who find the science sufficiently attractive to follow whole-heartedly, and it is then that they become true experimenters.

Every effort should be made to encourage the genuine experimenter, for he is often the commercial operator of the future. And it must not be forgotten that from the ranks of the amateur the experimenter graduates.

RADIO CLUBS.

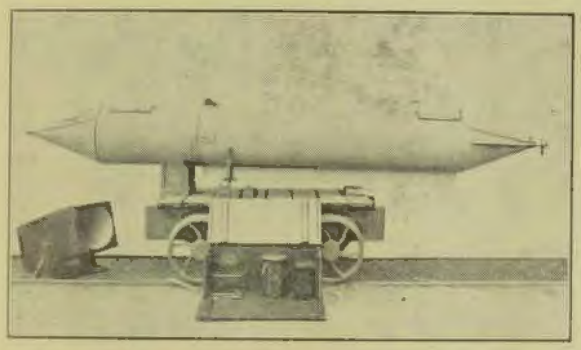
Publicity Officers and Secretaries are requested to see that their copy reaches us on Friday of each week for insertion in the following week's issue.

RADIO NOTES

Should Receivers Be Rated In Ohms?

The policy of selling headsets on the strength of their direct-current resistance is held to be wrong by many radio engineers. It is claimed that the average 2,000-ohm headset is as sensitive, and in many instances even more so, than the receiver with a resistance of 4,000-ohms. Radio receivers should be rated by their impedance. The impedance varies, of course, with the frequency of the current. One well-known headset manufacturer has taken as a standard 1,000 cycles, and at this frequency his headsets have an impedance of 22,000 ohms. It has been found that this is the resistance of the average crystal or tube circuit. This in itself, however, does not guarantee the efficiency of a headset, since there are many other requirements and features that determine the operating efficiency and sensitiveness of the radio headset.

Stranded and Braided Aerial Cable is made of 16 flat strands of the highest grade copper, each three-sixty-fourths of an inch wide, braided into a hollow cable about one-half inch in circumference. This makes it twice the circumference of the ordinary aerial. It gives an unusually large conducting surface and consequently low "skin effect" at radio frequency, and thus greatly increases the receiving and sending range. Its flexibility makes it especially practical for portable antenna for the camper, as it can be wound on frames. It can be used with marked results for indoor loop aerial, as it can readily be draped from the picture moulding. The writer of these lines has been using this stranded and braided aerial cable for some time with remarkable long-distance results, whereas the same receiving apparatus, with ordinary aerial wire, never gave such distances.



"JONES" WIRELESS CONTROLLED TORPEDO

AN AUSTRALIAN INVENTION.

LONG DISTANCE RECEPTION ON A CRYSTAL SET

Mr. Lynford Reynolds, of Jacksonville, Illinois, U.S.A., reports having heard distinctly on a crystal set, using a Galent Crystal, concerts broadcasted 110 miles from his station.

WAVE LENGTH.

Though wave-length has often been discussed in this and other publications, a great deal of confusion still exists in the mind of the novice as to just what wave-length is. The accuracy of the average broadcast enthusiast's conception of the subject is well reflected in a recent newspaper write-up of an installation capable of receiving waves sixty meters long. The writer goes on to explain:— "which means that the set is particularly susceptible to atmospheric disturbances sixty meters above sea level."

The term "wave-length" is really self explanatory, for it is generally understood that the impulses from a transmitting station assume somewhat the form of a wave. Wave-length is, obviously, the size or length of the wave in meters (1 meter = 39.37 inches).

Electromagnetic impulses (radio waves), under practically all conditions, and regardless of length, travel 300,000,000 meters in one second, during which time a certain number of waves are sent out. If only one wave leaves the antenna each second, the first part of it will travel three hundred million meters before it is broken off and a new wave starts—in other words, the wave is "stretched" over a distance of three hundred million meters. If the frequency is two, the first wave will travel one hundred and fifty million meters, in only half a second, before it is terminated by the commencement of the following wave. If the frequency is three,, the wave-length will be 100,000,000 meters, etc., thus establishing an evident relationship between frequency and wave-length; 300,000,000 divided by either quantity giving you the other. The frequency at a two-hundred meter wave (300,000,000 divided by 200) is one million, while the wave-length at a frequency of one million cycles (300,000,000 divided by 1,000,000) is three hundred meters. It will be observed that frequency varies inversely with the wave-length, and short waves are often referred to as "high frequencies."

The above relationship, stated in a mathematical formula, is $\lambda = \frac{V}{N}$ and, transporting, $N = \frac{V}{\lambda}$ λ =where wave-length in meters, N = frequency in cycles per second, and V = velocity of radio waves in meters per second.

It is evident from the above that wave-length, in one sense, does not directly effect the number of turns of wire on a receiving coil. However, more than one tyro in his desire to receive 360-meter stations, has multiplied 360 by three (three feet to the meter), and, zealously wound 1,080 feet of wire on a tuning coil!

But, in a less literal way, wave-length does determine the amount of wire on our receiving instruments. Alternating currents (radio currents are alternating currents of high frequency) in traversing a circuit, such as from antenna to ground, experience not merely the retarding effect of resistance, but also that of "reactance." Positive reactance is a result of inductance, a quality existing in almost every circuit, which causes the amperage and voltage to reach their maximum strengths at different moments. Work, such as turning a motor, or actuating a telephone receiver diaphragm, can be best accomplished only when volts and amperes work in unison (giving watts). Reactance thus results in a loss of power, which, in small radio currents, makes reception impossible. To overcome this negative reactance, condensers are introduced into the circuit, which, when properly balanced, exactly counteract the reactance caused by inductance, bringing the lagging amperes back into phase with the volts, thus permitting work to be accomplished. But reactance varies with the frequency of the current, and, therefore, at different waves, various values of condenser and coil windings (inductance) must be used. Tuning is nothing more than a balancing of the two kinds of reactance, positive and negative, so that at the wave-length to which the receiver is tuned, they nullify each other, and the weak radio currents will encounter only the comparatively negligible effect of resistance.

DIRECT WIRELESS SERVICE TO AUSTRALIA

"Scientific America" publishes the following paragraph:

Direct commercial wireless service to Australia from North America and England, with feeder stations in many of the large intermediate cities, are the essentials of a development contemplated by an English concern. This company has agreed to carry all messages between England and Australia at 33-1/3 per cent. less than existing charges, with a corresponding reduction on press and government exchanges. It is also its announced intention to introduce wireless telephony throughout the southern continent for public and private convenience.

As we cannot get our own authorities to wake up, I am sure we would all welcome this English Company. DO YOU KNOW THEIR NAME?

DE FOREST RADIO EQUIPMENT

Every amateur and experimenter has read in the various technical journals for the past few years, of the wonderful and most efficient De Forest Products. Up to date none of this material has appeared on the Australian market, but we are now to be actually introduced to it by the BURGIN ELECTRIC CO., of 352 Kent St., Sydney. This enterprising firm, of which Mr. O. F. Mingay is the radio manager, has secured a considerable quantity of this De Forest equipment, and now prepared to supply the experimenters. One of the most unique and probably one of the most excellently finished products in the way of complete crystal sets is that of the "Everyman Radiophone Receiver." This receiver was planned for the use of the average man who knows nothing about radio but who wishes to "listen" on the radio telephone broadcasts, and for the amateur just entering the field. It is an excellent set for use by jewellers to receive time signals. The "Everyman" is a simple single circuit, crystal detector receiver, designed to receive signals on ALL wave lengths from 150 to 800 metres. This range takes in amateur and ship stations, and possibly future broadcasting stations. By the addition of "Duo-Lateral" coils the "Everyman" will respond to wave lengths up to 20,000 metres.

The instruments are cased in a handsome walnut finished cabinet, with carrying handle, which contains space for "Duo-Lateral" coils, head telephones, and pad and pencil. A full descriptive illustration is enclosed in the top of the lid.

This set is sold complete with headphones, aerial wire, insulators, earth clip, all complete to hook up.

The "Everyman" set should fill the want of an efficient and yet very attractive set.

TRANSPACIFIC TESTS,

MR. C. W. SLADE (CROYDON) WRITES:—

I have recently come out from England, and have read with keen interest the articles which have been written by Mr. A. A. Stone, Mr. F. H. Harvey and Mr. Cooke, in connection with the forthcoming tests with American amateurs.

Perhaps you might be interested to know what routine was carried out in England during preparations for tests.

Every radio operator who anticipated being able to listen in for American Signals during the Final Tests was encouraged to listen in during the periods of preliminary tests which took place between October 26th, and November 4th, 1922.

Those amateurs who were unable to read American signals during preliminary tests were requested to earth their aerials during final tests, which, unfortunately, did not take place until after I sailed. No entrance fee was imposed. Why not the same arrangements here?

No Australian amateur, I am sure, would set his valve hooting across mine during the final Tests if he had previously made sure his set was not capable of receiving such signals.

I do not wish to be misunderstood, I am not trying to discourage the present arrangements in any way, but I think it very unfair to expect an amateur to earth his aerial because he hasn't 10/- to spare.

All amateurs do not belong to clubs where the expense can be shared.

TALLEST CONCRETE TOWER FOR JAPANESE RADIO

The tallest reinforced-concrete tower in the world has recently been completed in Tokyo, Japan, and will be used to support the aerial of a wireless station. It is 672 feet in height. The lofty structure is built in the form of a chimney, having an inside diameter at the base, of 55 feet, and tapering to 3 feet 6 inches at the top. The wall thickness graduates from 33 inches at the bottom, to 6 inches at the apex. A spiral steel stairway winds up through the interior, landings being located approximately every 150 feet, these connecting to exterior balconies, from which sight-seers can view the surrounding country. Engineers are said to be preparing plans for two similar towers, which, however, will be almost twice as tall, since the success of the initial structure has led them to believe that re-inforced-concrete towers 1,200 feet in height are practicable.

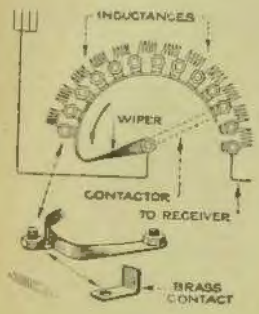
The Light Socket As An Antenna.

Various devices have made their appearance of late, having for their object the elimination of the usual outdoor antenna. The use of wire loops is well known, but these substitutes for the usual outdoor antenna require radio-frequency amplication or the new Armstrong super-regenerative arrangement to permit of covering a fair distance. The latest method for doing away with the usual outdoor antenna is to use one of the several attachment plugs now available, permitting the receiving set to be attached to any electric light socket so that any electrcl light socket so that the electric wires form the antenna. The special plugs generally contain two or more mica condensers, and provision is made so that various combinations of the two wires and the condensers can be obtained until the most satisfactory results are attained. Remarkably good work can be done with such an attachment and the usual electric light circuit. This method is especially desirable in city apartments, where outdoor antenna will not be permitted by the landlord.

MAKE YOUR OWN.

Dead End Switch For Inductances.

The efficiency of a radio-receiving set can often be improved to

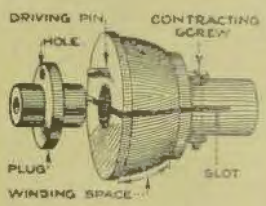


a considerable extent by the use of a dead-end switch to short-circuit the unused turns of the inductance. The switch illustrated can be added to the set without disturbing the existing arrangement, and at a negligible cost. It consists simply of a piece of spring brass, bent as indicated, and soldered to the knob shaft, at the back of the panel. Small pieces of brass, bent to a right angle, are drilled and fastened under the head of each contact-point screw, to provide positive contacts for the spring-brass wiper. A little care is necessary to insure that each contact piece is placed correctly, and that the wiper is in the proper position, relative to the regular switch contactor, to short-circuit the unused turns and to touch all the contact pieces.

This switch can be used with any multipoint switch in which the points are arranged in an arc, and where contact is made by a rotating switch arm.

Variometer-Winding Form.

Amateurs who wish to build their own radio instruments will find the stator-coil winding form illustrated a great convenience. The larger piece is the form proper; it is made of hardwood, the radius of the section on which the wire is wound being the same as the radius of the winding slot in the stator half, less twice the over-all thickness of the wire used. A cylindrical section, a few inches long, is turned on the smaller side of the form, and the face on the larger side is recessed to take the plug shown. This plug may be of hardwood or metal, as preferred; it is drilled to fit a driving pin driven into the form, and is centered, as is the opposite end of the form, to permit winding between lathe or other centers. The form is slotted, as shown, for a portion of its length, and fitted with a screw and nut. When the



form has been wound, and the stator half coated with adhesive, the form is dropped into place and weighted or clamped until the cement is dry. Then the contracting screw is tightened, and the form can be removed very easily. —H. F. Lowe, Washington, District of Columbia.

Locating Illegal Radio Stations

All transmitting stations within range are really sources of interference if you are trying to listen to some other station. No receiver thus far developed can tune out absolutely all signals excepting those it is desired to hear. Receiving sets differ greatly in this particular, and it is possible to tune much more sharply now than a few years ago; but the problem of eliminating the signals from certain stations is particularly troublesome when you have to deal with near-by transmitters. In fact, it has been suggested that high-power transmitting stations be prohibited from operating in regions where there are a number of receiving stations, says a writer in an American magazine, handling a large amount of commercial traffic.

Since these difficulties are all too plentiful among stations which are handling commercial business and are entirely legal in their operation it is of particular importance that interference be avoided from stations which are operating illegally.

Sometimes stations cause interference quite unknowingly, and sometimes radio waves which cause a great deal of trouble are sent out from electrical apparatus or circuits whose useful performance lies entirely in some other field of activity. It has been observed that there may be serious interference from X-ray machines, violet-ray machines or apparatus employed in electrical precipitation processes. Leaky insulators on high-voltage power transmission lines may also be the cause of radio waves capable of reception by near-by sets. The recent radio telephony conference recommended that a study be made of the means required to avoid interference from such sources. It is sometimes difficult, especially on the part of operators who are not thoroughly acquainted with radio apparatus, to distinguish between the interference caused by these electrical machines and power lines and the interference caused by actual transmitting stations.

Those who have just become interested in constructing their own transmitting sets sometimes find it convenient to use a small automobile spark coil with a plain fixed gap, instead of a well-designed transformer and quenched gap with its associated circuits. Entirely by ignorance, these operators in experimenting with their sets send out waves which are extremely broad and cause serious interference in their immediate localities over a wide band of wave-lengths. Certain operators of radio telephone broadcasting stations do not realize that when the programmes have ceased or during an intermission, the transmitting set, if allowed to continue to operate, emits unmodulated waves which cause a blanketing of other signals in the immediate neighborhood, or give a troublesome beat note in receiving sets which are tuned to closely adjacent wave-lengths. These radio telephone sets should, therefore, be disconnected from the power supply at all times when the broadcasting service is discontinued. Much unnecessary testing is done with the transmitting set connected to the antenna instead of disconnecting the antenna circuit entirely while using a "dummy" or "phantom" antenna which causes very little radiation.

It speaks very highly for the radio amateurs of this country that in spite of the fact that there are over 15,000 licensed amateur transmitting stations at the present time, there has been so little wilful and unnecessary interference that almost no attention has been required from the radio inspectors in tracing sources of such trouble. The amateurs have, through their local clubs, co-operated very heartily in almost every case in solving for themselves the problems arising from ignorant use of transmitting stations.

The rapid growth of broadcasting, however, has brought forth a number of complaints of interference which perhaps seem more aggravated on account of the fact that many of those who listen in are not familiar with the limitations of radio as a method of communication.

The radio laws call for the licensing of all transmitters whose signals can affect the reception of messages from beyond the boundaries of the state in which the transmitting station is located. On account of the very sensitive receiving apparatus now employed, this practically means that all transmitting stations must be licensed in order to operate legally. The call letters which are assigned to them at the time they are licensed, are for use in identifying the transmitting station whose signals may be heard. Sometimes the operators forget to sign their call letters at intervals during the handling of traffic and this raises a question as to whether or not the messages are being sent out from a station which is properly authorized.

In locating outlaw stations, the direction finder is indispensable. By its use it is possible to determine promptly the general direction of a transmitting station, and often to find its position exactly within a short time.

A direction finder in its simplest form consists of a few turns of wire wound upon a frame 3 or 4 feet square. The two terminals of this coil are merely connected to the terminals of a variable air condenser. From these terminals connections are made to the grid and filament terminals of a detector-amplifier. The signals from the transmitting station are loudest when the coil is turned so that its plane is in line with the direction in which the received waves are travelling and the signals are weakest when the coil frame is turned at right angles to this direction.

The coil constituting a direction finder is really merely an antenna so constructed as to be easily portable. Such an antenna when used with a radio-audio-frequency amplifier constitutes a receiving set sensitive enough to receive loud signals from considerable distances when the coil is turned in the

LOCATING ILLEGAL RADIO STATIONS.

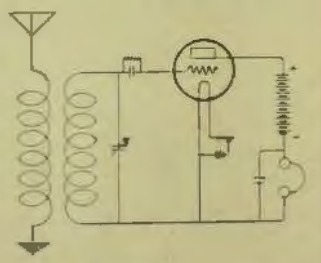
maximum direction, or to obtain a sharp indication of the direction of the minimum signal when used within a few miles of the transmitting station.

It happens, unfortunately, that in densely populated districts, where sources of radio interference are most likely to be serious, the waves from a transmitting station are distorted and carried out of their normal path by electric power lines, trolley wires, the metal frames of large buildings and other metallic objects. The effect of such distorting influences was described in an article in the June issue of Radio Broadcast, entitled "Objects that Distort Radio Waves." A radio detective should be able to make good use of the knowledge of the distortion which radio waves undergo, but without this knowledge he might be seriously handicapped in his efforts to locate an illegal radio station or determine the location of some electrical machine which is causing interference.

The rapidly increasing congestion of radio traffic will require that amateurs and radio inspectors be equipped in the future to trace illegal radio stations and determine their locations. Whenever possible, direction-finder observations should b emade in open fields or parks where the distortion is not serious. Two or three such observations of direction at points quite distant from one another will enable the inspector to locate on his map quite closely the position of the station which is being sought. Sometimes this brings him close enough to see the antenna and approach the station without difficulty.

Where these open spaces are not available, or after the general location is first determined, it may be necessary to use the direction-finder in city streets or among buildings where distorting wires are present. In such a case the inspector will set up a radio direction-finder and receive the signals or communications which are being transmitted by an undesirable station. He will observe the apparent direction of the transmitting station, make note of the surrounding objects which may cause a bending of the waves and an apparent change in the direction of the station which is being sought. He will then move his direction-finder to some distant point possibly symmetrically placed with respect to the distorting structure and make another observation of the direction of the received wave. By moving his direction-finder to several points some distance from one another and taking his observations with proper consideration of the effect of the surroundings, he can rapidly go toward the point of intersection of the direction lines and finally move up to the transmitting station itself.

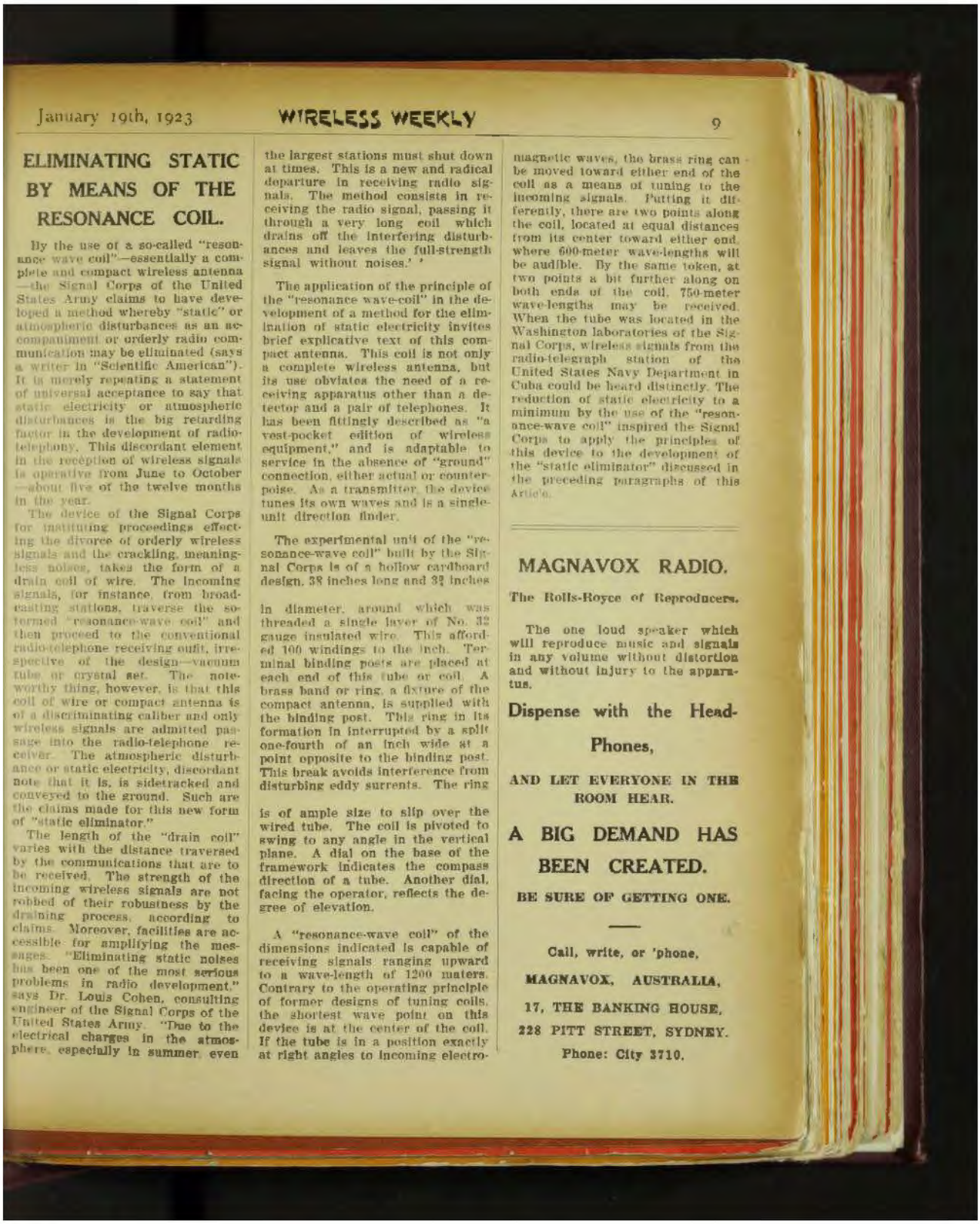
In the streets of a large city the objects which cause a bending of the radio waves are so numerous and so varied in size as to make this problem a difficult one. Sometimes the waves will appear to travel along the street while the transmitting station is actually in the line of a cross street, but by taking a series of observations at carefully chosen points and noting particularly the location of large steel buildings, bridges, elevated lines, or trolley wires, the errors may be foreseen to a great extent and the inspector may find the transmitting station much more quickly than if he were merely to move in the apparent direction of the wave as first determined. The cases which the inspector or the amateur radio detective finds which do not give the correct direction serve as interesting examples for further study leading to a fuller knowledge of the behaviour of radio waves.



AN ULTRA AUDION CIRCUIT

Minerals As Radio Detectors.

The action of a crystal detector may be explained as follows, according to H. S. Roberts and L. H. Adams of the Carnegie Institution of Washington. The alternating currents induced by radio waves are of such high frequency that even if a telephone were produced whose diaphragm could vibrate in time with them, the sound resulting from this vibration would be so shrill as to be beyond the range of the human ear. In order that they may be made audible, the waves must be either (1) be broken up into like groups or trains which follow one another at an audible frequency (radio telegraphy) or (2) so "modulated" that their amplitude varies in time with an audible vibration such as speech or music (radio telephony). In either case they remain high-frequency electromagnetic waves. In the receiving apparatus, the high-frequency—or radio frequency—electromotive force is impressed on a circuit whose function is to distort the alternating-current wave in such a way that more current flows in one direction than in the other. This distorted wave may now be thought of as the sum of a radio frequency alternating current and a direct current, of which only the direct current is capable of actuating the telephone receiver. The ideal detector would allow current to pass freely, but in only one direction. A detector is, merely an electrical rectifier, and although in actual practice the rectifying action is far more complete yet a certain amount of direct current is produced: moreover, it is a pulsating direct current, and the final effect in the telephone circuit is an alternating current of comparatively low (audio) frequency. Therefore, as the amplitude of the original radio wave changes, the diaphragm of the telephone receiver vibrates and reproduces, more or less faithfully, the changes impressed on the radio waves at their source.



ELIMINATING STATIC BY MEANS OF THE RESONANCE COIL.

By the use of a so-called "resonance wave coil"—essentially a compiete and compact wireless antenna—the Signal Corps of the United States Army claims to have developed a method whereby "static" or atmospheric disturbances as an accompaniment or orderly radio communication may be eliminated (says a writer in "Scientific American"). It is merely repeating a statement of universal acceptance to say that static electricity or atmospheric disturbances is the big retarding factor in the development of radio-telephony. This discordant element in the reception of wireless signals is operative from June to October—about five of the twelve months in the year.

The device of the Signal Corps for instituting proceedings effecting the divorce of orderly wireless signals and the crackling, meaningless noises, takes the form of a drain coil of wire. The incoming signals, for instance, from broadcasting stations, traverse the so-formed "resonance-wave coil" and then proceed to the conventional radio-telephone receiving outfit, irrespective of the design—vacuum tube or crystal set. The noteworthy thing, however, is that this coil of wire or compact antenna is of a discriminating caliber and only wireless signals are admitted passage into the radio-telephone receiver. The atmospheric disturbance or static electricity, discordant note that it is, is sidetracked and conveyed to the ground. Such are the claims made for this new form of "static eliminator."

The length of the "drain coil" varies with the distance traversed by the communications that are to be received. The strength of the incoming wireless signals are not robbed of their robustness by the draining process, according to claims. Moreover, facilities are accessible for amplifying the messages. "Eliminating static noises has been one of the most serious problems in radio development," says Dr. Louis Cohen, consulting engineer of the Signal Corps of the United States Army. "Due to the electrical charges in the atmosphere, especially in summer, even the largest stations must shut down at times. This is a new and radical departure in receiving radio signals. The method consists in receiving the radio signal, passing it through a very long coil which drains off the interfering disturbances and leaves the full-strength signal without noises." '

The application of the principle of the "resonance wave-coil" in the development of a method for the elimination of static electricity invites brief explicative text of this compact antenna. This coil is not only a complete wireless antenna, but its use obviates the need of a receiving apparatus other than a detector and a pair of telephones. It has been fittingly described as "a vest-pocket edition of wireless equipment," and is adaptable to service in the absence of "ground" connection, either actual or counterpoise. As a transmitter, the device tunes its own waves and is a single-unit direction finder.

The experimental unit of the "resonance-wave coil" built by the Signal Corps is of a hollow cardboard design, 38 inches long and 3½ inches in diameter, around which was threaded a single layer of No. 32 gauge insulated wire. This afforded 100 windings to the inch. Terminal binding posts are placed at each end of this tube or coil. A brass band or ring, a fixture of the compact antenna, is supplied with the binding post. This ring in its formation is interrupted by a split one-fourth of an inch wide at a point opposite to the binding post. This break avoids interference from disturbing eddy currents. The ring is of ample size to slip over the wired tube. The coil is pivoted to swing to any angle in the vertical plane. A dial on the base of the framework indicates the compass direction of a tube. Another dial, facing the operator, reflects the degree of elevation.

A "resonance-wave coil" of the dimensions indicated is capable of receiving signals ranging upward to a wave-length of 1200 maters. Contrary to the operating principle of former designs of tuning coils, the shortest wave point on this device is at the center of the coil. If the tube is in a position exactly at right angles to incoming electro-magnetic waves, the brass ring can be moved toward either end of the coil as a means of tuning to the incoming signals. Putting it differently, there are two points along the coil, located at equal distances from its center toward either end, where 600-meter wave-lengths will be audible. By the same token, at two points a bit further along on both ends of the coil, 750-meter wave-lengths may be received. When the tube was located in the Washington laboratories of the Signal Corps, wireless signals from the radio-telegraph station of the United States Navy Department in Cuba could be heard distinctly. The reduction of static electricity to a minimum by the use of the "resonance-wave coil" inspired the Signal Corps to apply the principles of this device to the development of the "static eliminator" discussed in the preceding paragraphs of this Article.

WHERE RADIO IS HELPING THE PHONOGRAPH BUSINESS.

There is a general belief existing among those who do not know, that the advent of radio, with its broadcasted entertainments from many stations, is working to the detriment of the phonograph and record business in those parts of the country where the amateur receiving outfits are numerous. One section of the country which is not being hurt, but helped, is the Hudson River Valley in New York State. This district is fairly well supplied with receiving outfits. It is mainly an agricultural district, and there are few farms which have not aerials of one kind or another on top of the barns, silos, or other buildings. The Newburgh "Daily News," which maintains broadcasting station WCAB in the centre of this district, sends out concerts farm talks and lectures three times daily.

Now, phonograph selections are one of the features of the WCAB concerts. Wishing information as to the report that radio was reducing phonograph and record sales the writer sought out the manager of a musical instrument store in Newburgh. He was told: "There isn't a thing to it. In fact, just the reverse is true. Since a broadcasting station has been located in Newburgh, our record business has increased 45 per cent. while our phonograph business has jumped 50 per cent. We have customers come into our store every once in a while to ask for a number 'that was broadcasted from Newark, N. J., Pittsburgh, Pa., Schnectady, N. Y., or Newburgh, N. Y., the other night.' We keep files of the concert programmes of all the concert broadcasting stations. We go over these with the patrons, and invariably find what they are trying to ask for.

"Yes, this radio broadcasting has stimulated the record and phonograph business wonderfully. Any dealer will tell you that August is the dull month of the year in the phonograph business. But August, 1922, was by far the biggest summer month we have had in our seven years of existence. I believe this same condition is true all over the United States. We find that it pays us to keep tabs on every antenna that goes up. In this manner we know just where to send our outside salesmen. The phonograph business and the radio business seem to be going hand in hand."

Trans-Atlantic Broardcasting.

What is reported to be a successful attempt to bridge the Atlantic with a radio-phone talk was recently made by the WOR station of L. Bamberger & Sons, of Newark, N.J. The person who spoke into the transmitter was Sir Thomas Lipton, who was in the United States at that time. The speech was sent out on the usual 400-meter wave length, since WOR is a Class B radio broadcaster. Considerably more power than usual was employed for this attempt. The speech of Sir Thomas Lipton, as well as a vocal selection, were picked up and heard in the Selfridge store in London.

THE NORTH SYDNEY RADIO CLUB

The usual fortnightly business meeting of the above club was held at their rooms on Tuesday, the 9th inst.

Although a diligent enquiry has been prosecuted by the members during the last few days with regard to the damage done to their apparatus, they have been unsuccessful in running the culprit to earth. He is, however, promised a highly exciting time should he become known.

Temporary repairs have been effected to the set, which will be in operation next Tuesday night.

Visitors are cordially invited.

KURING-GAI DISTRICT RADIO SOCIETY

The 3rd general meeting of the Society was held on January 9th at Chatswood. The attendance, owing to the Xmas vacation, was not up to the previous meeting; however, several new members were enrolled.

Mr. P. Renshaw gave an instructive and interesting lecture on elementary electricity, while Mr. Kingsay had some receiving apparatus in operation. The aerial structure more or less bore slight resemblance to the V-I-S, and needless to say, brought in the adjacent A.C. very well.

During the meeting, a circular was read from the Trans-Pacific Test Committee. The suggestions of same being endorsed by members present at the meeting.

The next meeting of the Society will be held on Tuesday, January 23rd, at 7.45 p.m., at The Memorial Hall, Chatswood.

BALMAIN DISTRICT RADIO SOCIETY

The inaugural meeting of the Balmain District Radio Society was held in St. John's School Hall on Monday, the 8th January, 1923.

There was a good attendance of local wireless experimenters, including some very prominent citizens.

Intense interest was displayed throughout the evening, which resulted in formation of the above Society, and the election of the following gentlemen to hold office for the next twelve months:—President, Dr. Stopford, M.L.A.; Vice-Presidents, Dr. Cookson, Mr. A. Boyle; Hon. Secretary, Mr. P. G. Stephen; Hon. Treasurer, Mr. F. W. Riecords; Technical Committee, Mr. D. Dickens, Mr. G. Every, Mr. T. J. Wylie; Hon. Auditors, Mr. S. Davis, Mr. D. Dickins.

All interested are invited to write to the Hon. Sec., P. G. Stephen, 69 Phillip St., Balmain, or to attend any meeting of the Society, which are held every Wednesday evening from 7.30 to 10 p.m. in St. John's School Hall, Birchgrove Road, Balmain. (Take Birchgrove tram and alight at Grove St.), where all information can be obtained regarding membership, etc.

LEICHARDT & DISTRICT RADIO SOCIETY

The Leichhardt & District Radio Society commenced its New Year activities by holding its Fourth Business and Twelfth General Meeting in its new club room, Victory Hall, rear of Methodist Church, Johnstone Street, Annandale, on Tuesday, January 9th.

Formal business, including the election of four new members, having been dispensed with, the meeting was addressed by Mr. Atkinson, Hon. Secretary of the recently formed Radio Society of Australia. This gentleman provided members with a considerable amount of valuable information regarding the activities of his Association, and at the conclusion of his address, was accorded a hearty vote of thanks by acclamation.

Permission having been obtained to erect an aerial and instal a set on the premises, the Society is hopeful of having a set in operation at an early date.

Inquiries regarding the Society's activities are welcomed, and should be addressed to the Hon. Secretary, Mr. W. J. Zech, 145 Booth Street, Annandale.

The next meeting is to be held on Tuesday night next, when all interested are invited to attend.

MARRICKVILLE AND DISTRICT RADIO CLUB.

An interesting lecture is promised for the next meeting. Meetings are held every Monday at rear of 14 Park Rd., Marrickville, at 8 p.m.

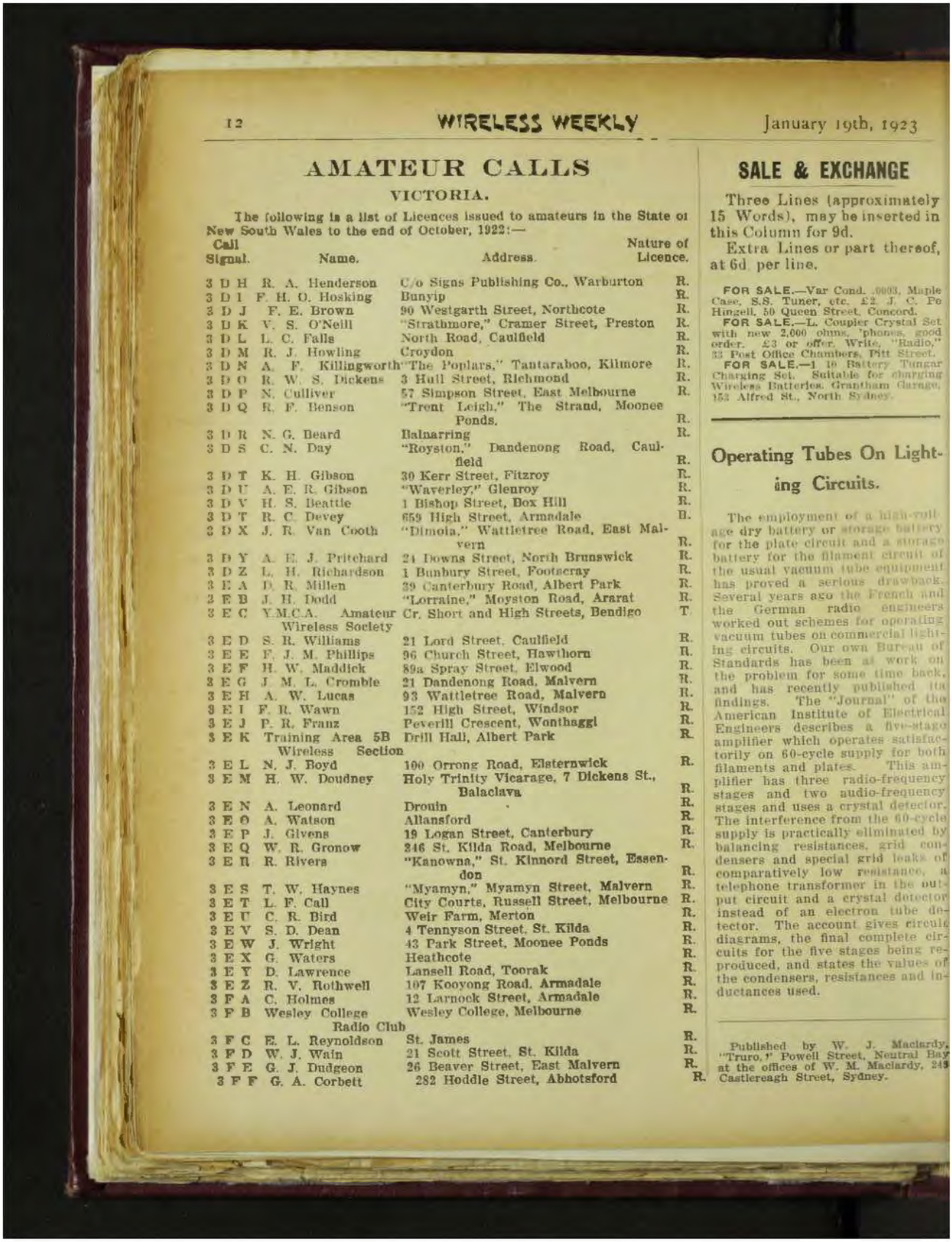
REG. G. ELLIS, Hon. Sec.,
40 Park Rd., Marrickville.
Pet. 1628.

CAMPSIE & DISTRICT RADIO CLUB

The first (inaugural) meeting of the Club was held on Monday evening, the 8th inst. There was a fair attendance, but it is expected that the membership will be increased when the existence of a club in the district is more known. Various proposals as to the formation of the Club were discussed and the following Office-Bearers elected:—President, Mr. R. Thelton; Secretary, Mr. W. Hughes; Committee, Mr. A. E. Keep, Mr. A. E. Steel, Mr. G. Allingham.

It was decided at the meeting quested to become the official orga that "Wireless Weekly" be requested to become the official organ of the Club. The secretary would be glad to hear from members of other clubs who would deliver a lecture and so help the young Club along.

The next meeting will be held on Monday, 22nd January, at 7.45 p.m., at "Loch-Veunachar," Evaline St. (opp. Loch St.) Campsie, the secretary's address.



AMATEUR CALLS

VICTORIA.

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.
3 D H	R. A. Henderson	C/o Signs Publishing Co., Warburton	R.
3 D I	F. H. O. Hosking	Bunyip	R.
3 D J	F. E. Brown	90 Westgarth Street, Northcote	R.
3 D K	V. S. O'Neill	"Strathmore," Cramer Street, Preston	R.
3 D L	L. C. Falls	North Road, Caulfield	R.
3 D M	R. J. Howling	Croydon	R.
3 D N	A. F. Killingworth	"The Poplars," Tantaraboo, Kilmore	R.
3 D O	R. W. S. Dickens	3 Hull Street, Richmond	R.
3 D P	N. Culliver	57 Simpson Street, East Melbourne	R.
3 D Q	R. F. Benson	"Trent Leigh," The Strand, Moonee Ponds.	R.
3 D R	N. G. Beard	Balnarring	R.
3 D S	C. N. Day	"Royston," Dandenong Road, Caulfield	R.
3 D T	K. H. Gibson	30 Kerr Street, Fitzroy	R.
3 D U	A. E. R. Gibson	"Waverley," Glenroy	R.
3 D V	H. S. Beattie	1 Bishop Street, Box Hill	R.
3 D T	R. C. Devey	659 High Street, Armadale	R.
3 D X	J. R. Van Cooth	"Dimoia," Wattletree Road, East Malvern	R.
3 D Y	A. E. J. Pritchard	24 Downs Street, North Brunswick	R.
3 D Z	L. H. Richardson	1 Bunbury Street, Footscray	R.
3 E A	D. R. Millen	39 Canterbury Road, Albert Park	R.
3 E B	J. H. Dodd	"Lorraine," Moyston Road, Ararat	R.
3 E C	Y.M.C.A. Amateur Wireless Society	Cr. Short and High Streets, Bendigo	T.
3 E D	S. R. Williams	21 Lord Street, Caulfield	R.
3 E E	F. J. M. Phillips	96 Church Street, Hawthorn	R.
3 E F	H. W. Maddick	89a Spray Street, Elwood	R.
3 E G	J. M. L. Cromble	21 Dandenong Road, Malvern	R.
3 E H	A. W. Lucas	93 Wattletree Road, Malvern	R.
3 E I	F. R. Wawn	152 High Street, Windsor	R.
3 E J	P. R. Franz	Peverill Crescent, Wonthaggi	R.
3 E K	Training Area 5B Wireless Section	Drill Hall, Albert Park	R.
3 E L	N. J. Boyd	100 Orrong Road, Elsternwick	R.
3 E M	H. W. Doudney	Holy Trinity Vicarage, 7 Dickens St., Balaclava	R.
3 E N	A. Leonard	Drouin	R.
3 E O	A. Watson	Allansford	R.
3 E P	J. Givens	19 Logan Street, Canterbury	R.
3 E Q	W. R. Gronow	346 St. Kilda Road, Melbourne	R.
3 E R	R. Rivers	"Kanowna," St. Kinnord Street, Essendon	R.
3 E S	T. W. Haynes	"Myamyn," Myamyn Street, Malvern	R.
3 E T	L. F. Call	City Courts, Russell Street, Melbourne	R.
3 E U	C. R. Bird	Weir Farm, Merton	R.
3 E V	S. D. Dean	4 Tennyson Street, St. Kilda	R.
3 E W	J. Wright	43 Park Street, Moonee Ponds	R.
3 E X	G. Waters	Heathcote	R.
3 E Y	D. Lawrence	Lansell Road, Toorak	R.
3 E Z	R. V. Rothwell	107 Kooyong Road, Armadale	R.
3 F A	C. Holmes	12 Larnock Street, Armadale	R.
3 F B	Wesley College Radio Club	Wesley College, Melbourne	R.
3 F C	E. L. Reynoldson	St. James	R.
3 F D	W. J. Wain	21 Scott Street, St. Kilda	R.
3 F E	G. J. Dudgeon	26 Beaver Street, East Malvern	R.
3 F F	G. A. Corbett	282 Hoddle Street, Abbotsford	R.

Operating Tubes On Lighting Circuits.

The employment of a high-voltage dry battery or storage battery for the plate circuit and a storage battery for the filament circuit of the usual vacuum tube equipment has proved a serious drawback. Several years ago the French and the German radio engineers worked out schemes for operating vacuum tubes on commercial lighting circuits. Our own Bureau of Standards has been at work on the problem for some time back, and has recently published its findings. The "Journal" of the American Institute of Electrical Engineers describes a five-stage amplifier which operates satisfactorily on 60-cycle supply for both filaments and plates. This amplifier has three radio-frequency stages and two audio-frequency stages and uses a crystal detector. The interference from the 60-cycle supply is practically eliminated by balancing resistances, grid condensers and special grid leaks of comparatively low resistance, a telephone transformer in the output circuit and a crystal detector instead of an electron tube detector. The account gives circuit diagrams, the final complete circuits for the five stages being reproduced, and states the values of the condensers, resistances and inductances used.

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