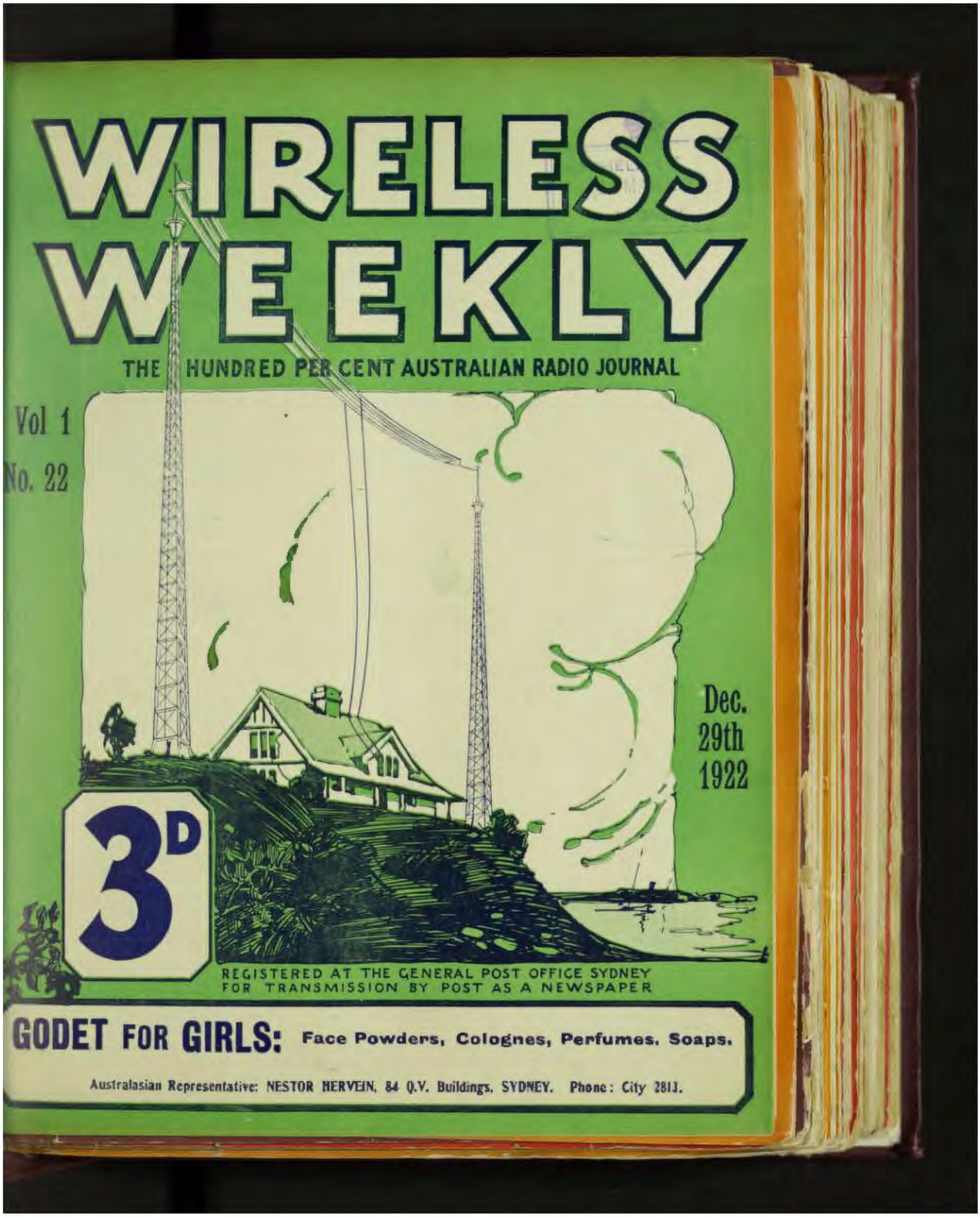
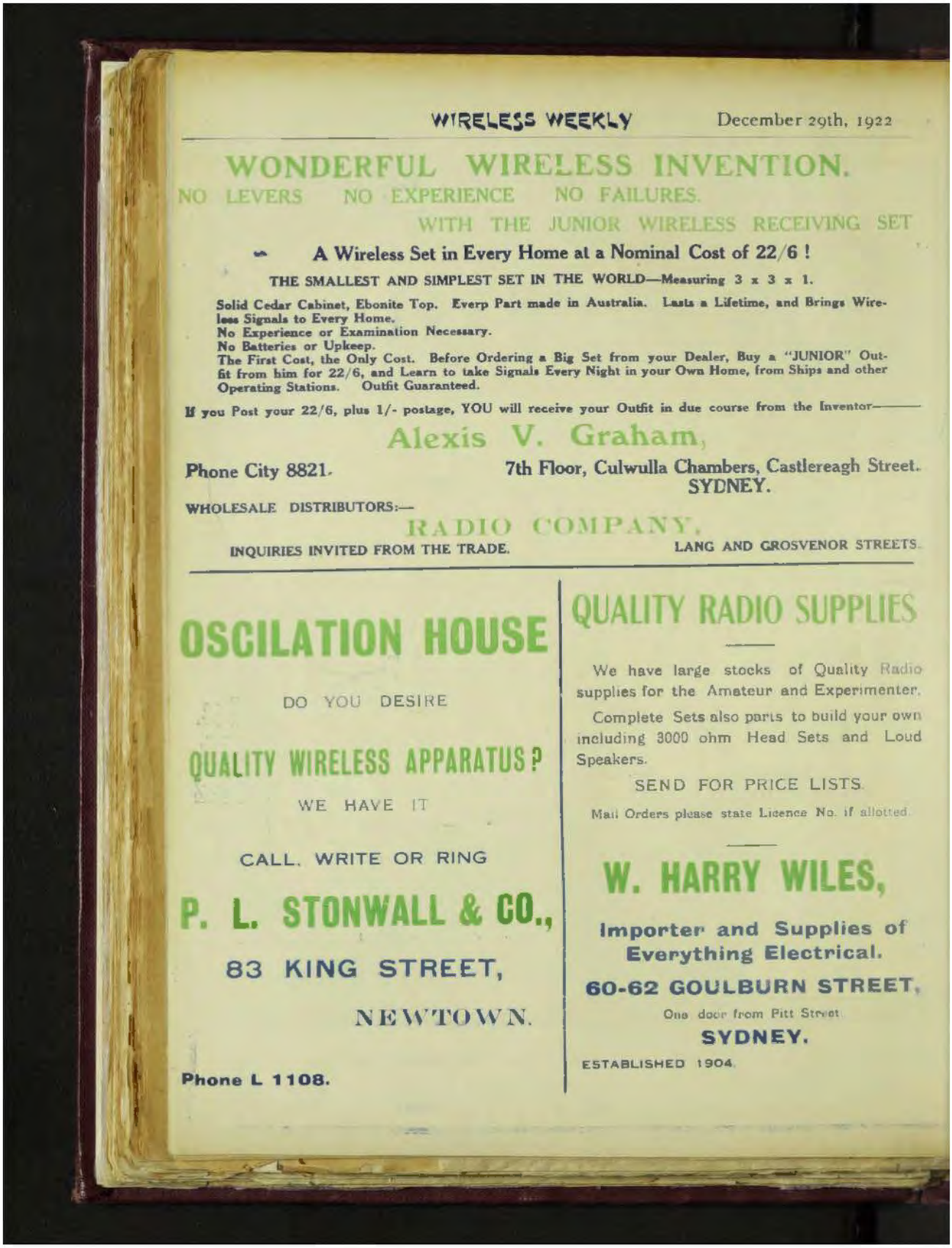
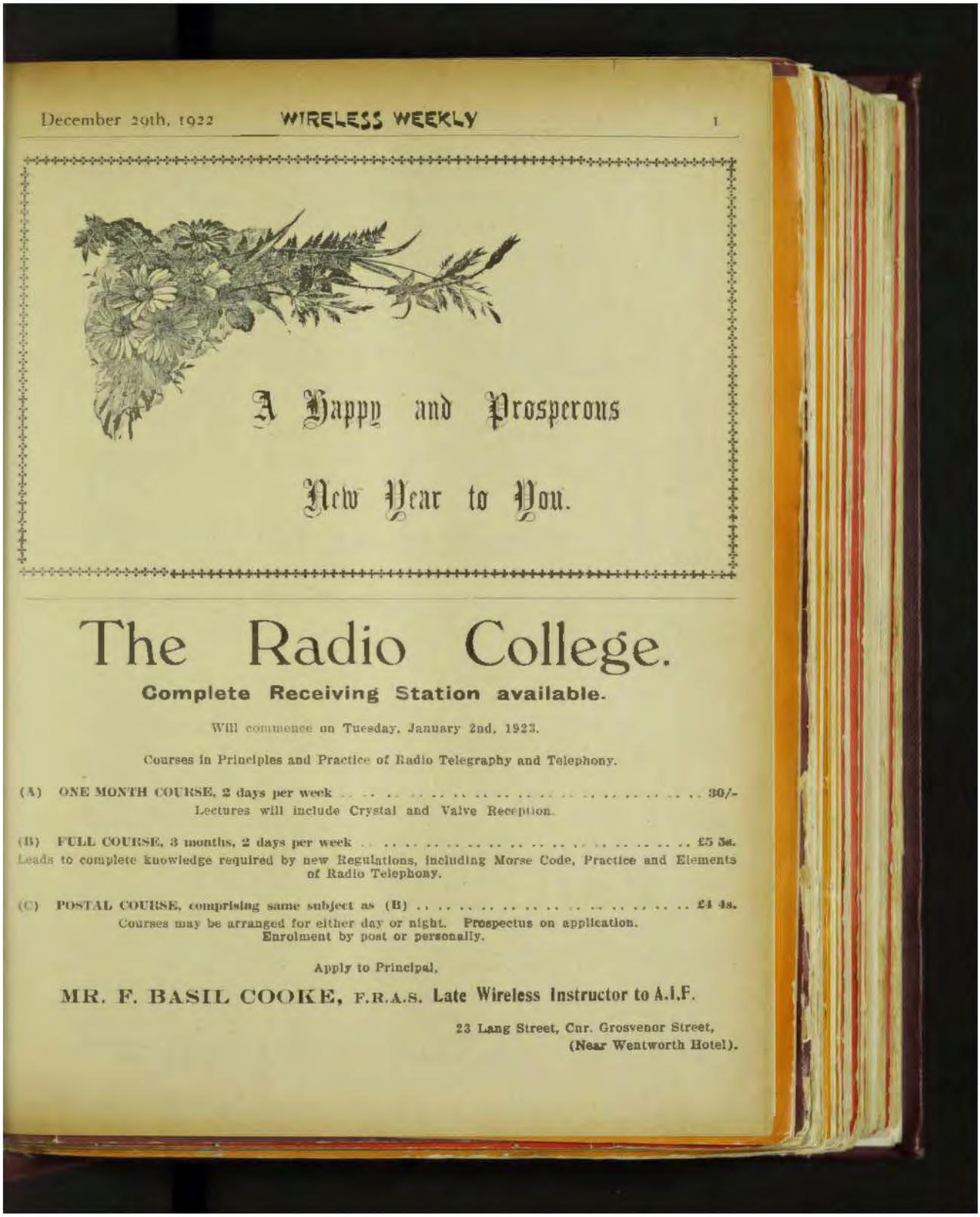






A TALK WITH "WIRELESS WEEKLY."

In a few more days it will be 1923. The old year is finishing and we approach the New Year with the feeling that it is going to be Australia's Wireless Year. Let us make it such. First, let us have Broadcasting.

For some time past we have heard rumors of official Broadcasting, but it still seems to be only a rumour.

How long did we have to wait for the Regulations? Are we going to have the same wait for Broadcasting? Wireless Men Awake! Why this Apathetic Spirit? What are your clubs for? Is the newly-formed Radio Association doing anything? Was it not formed for the purpose of being the mouth piece of the Amateur Wireless man.

"Wireless Weekly" is out to help you, but it is also necessary to have your co-operation. Early in the New Year we will have the Trans-Pacific Tests. A number of prominent Amateurs are already preparing their apparatus for this test. Wireless men, assert yourselves and show the world that Australia though starting late is level, if not ahead, with her amateur Wireless Experimenters.

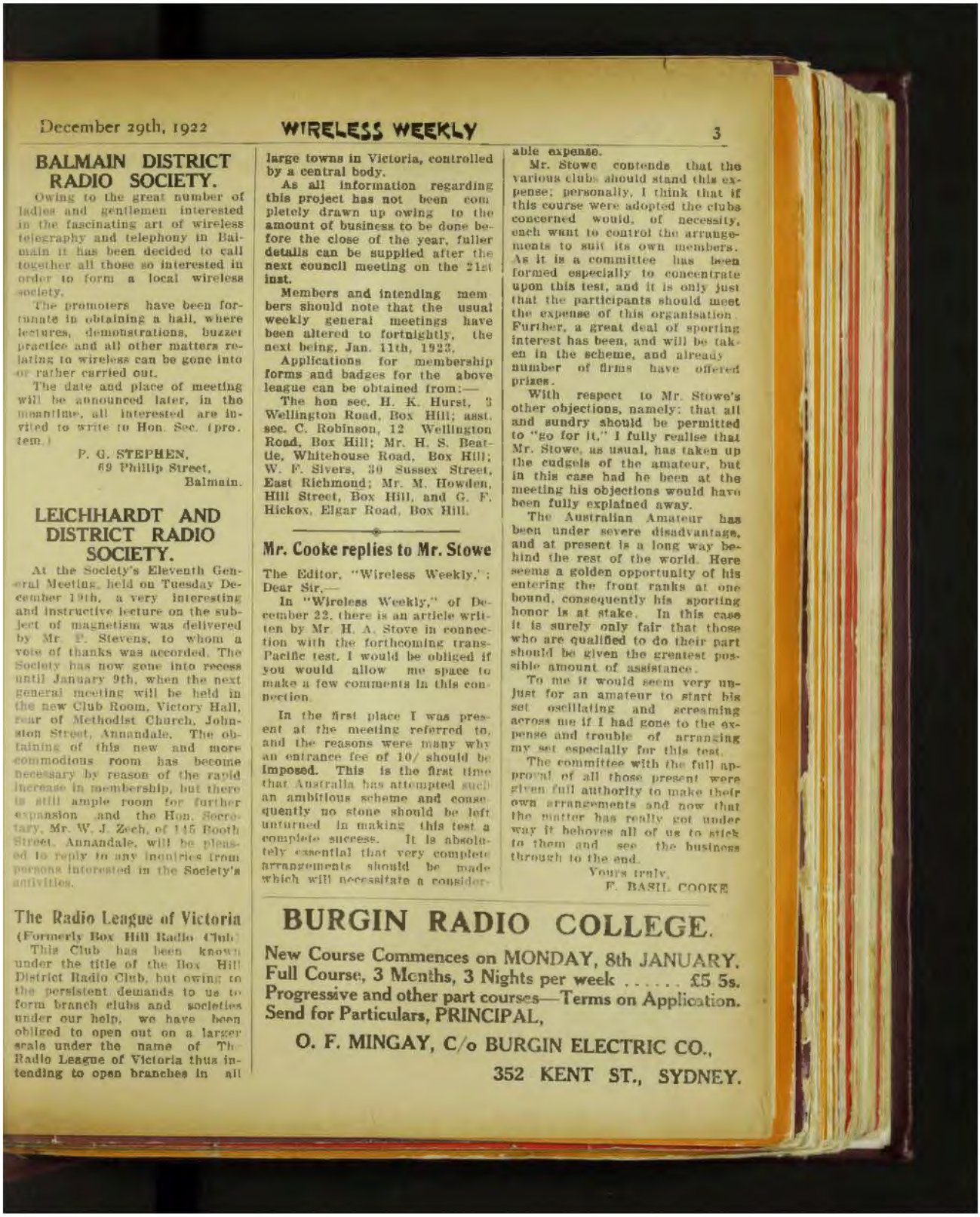
COMBINED LOUD SPEAKER.

A loudspeaker can be made out of an auto horn and a portion of a phonograph horn. The volume of sound it produces easily fills a whole apartment, and it is absolutely devoid of rasping, mechanical noises.

To make one like it, obtain one of the oldtime auto horns with a 4in. bell, if possible. The larger the bell, the better. Remove the flexible tubing that joined the bulb to the horn and with the reed of the horn. Then get an old tin phonograph horn with a brass bell that will fit the outer rim of the auto horn. Remove the bell from the phonograph horn and solder it to the bell of the auto horn.

Bend a piece of brass rod so that one end will fit in the socket of the auto horn where it was fastened to the auto, and insert the other end of the rod in a wooden base, which should be well weighted. Glue a piece of felt to the bottom of the stand. Phones can be connected by means of a piece of rubber hose slipped over the phone and held to the horn by a rubber band or fastened with a metal clip soldered to the horn.

Polish up the old horn, give the base and body of the horn back of the bell a coat of black enamel, and you will have a dependable and satisfactory loudspeaker.



BALMAIN DISTRICT RADIO SOCIETY.

Owing to the great number of ladies and gentlemen interested in the fascinating art of wireless telegraphy and telephony in Balmain it has been decided to call together all those so interested in order to form a local wireless society.

The promoters have been fortunate in obtaining a hall, where lectures, demonstrations, buzzer practice and all other matters relating to wireless can be gone into or rather carried out.

The date and place of meeting will be announced later, in the meantime, all interested are invited to write to Hon. Sec. (pro. tem.)

P. G. STEPHEN,
69 Phillip Street,
Balmain.

LEICHHARDT AND DISTRICT RADIO SOCIETY.

At the Society's Eleventh General Meeting, held on Tuesday December 19th, a very interesting and instructive lecture on the subject of magnetism was delivered by Mr. P. Stevens, to whom a vote of thanks was accorded. The Society has now gone into recess until January 9th, when the next general meeting will be held in the new Club Room, Victory Hall, rear of Methodist Church, Johnston Street, Annandale. The obtaining of this new and more commodious room has become necessary by reason of the rapid increase in membership, but there is still ample room for further expansion and the Hon. Secretary, Mr. W. J. Zech, of 145 Booth Street, Annandale, will be pleased to reply to any inquiries from persons interested in the Society's activities.

The Radio League of Victoria

(Formerly Box Hill Radio Club)

This Club has been known under the title of the Box Hill District Radio Club, but owing to the persistent demands to us to form branch clubs and societies under our help, we have been obliged to open out on a larger scale under the name of The Radio League of Victoria thus intending to open branches in all large towns in Victoria, controlled by a central body.

As all information regarding this project has not been completely drawn up owing to the amount of business to be done before the close of the year, fuller details can be supplied after the next council meeting on the 21st inst.

Members and intending members should note that the usual weekly general meetings have been altered to fortnightly, the next being, Jan. 11th, 1923.

Applications for membership forms and badges for the above league can be obtained from:—

The hon sec, H. K. Hurst, 3 Wellington Road, Box Hill; asst. sec. C. Robinson, 12 Wellington Road, Box Hill; Mr. H. S. Beattie, Whitehouse Road, Box Hill; W. F. Sivers, 30 Sussex Street, East Richmond; Mr. M. Howden, Hill Street, Box Hill, and G. F. Hickox, Elgar Road, Box Hill.

Mr. Cooke replies to Mr. Stowe

The Editor, "Wireless Weekly,":
Dear Sir,—

In "Wireless Weekly," of December 22, there is an article written by Mr. H. A. Stove in connection with the forthcoming trans-Pacific test. I would be obliged if you would allow me space to make a few comments in this connection.

In the first place I was present at the meeting referred to, and the reasons were many why an entrance fee of 10/ should be imposed. This is the first time that Australia has attempted such an ambitious scheme and consequently no stone should be left unturned in making this test a complete success. It is absolutely essential that very complete arrangements should be made which will necessitate a considerable expense.

Mr. Stowe contends that the various clubs should stand this expense; personally, I think that if this course were adopted the clubs concerned would, of necessity, each want to control the arrangements to suit its own members. As it is a committee has been formed especially to concentrate upon this test, and it is only just that the participants should meet the expense of this organisation. Further, a great deal of sporting interest has been, and will be taken in the scheme, and already number of firms have offered prizes.

With respect to Mr. Stowe's other objections, namely: that all and sundry should be permitted to "go for it," I fully realise that Mr. Stowe, as usual, has taken up the cudgels of the amateur, but in this case had he been at the meeting his objections would have been fully explained away.

The Australian Amateur has been under severe disadvantage, and at present is a long way behind the rest of the world. Here seems a golden opportunity of his entering the front ranks at one bound, consequently his sporting honor is at stake. In this case it is surely only fair that those who are qualified to do their part should be given the greatest possible amount of assistance.

To me it would seem very unjust for an amateur to start his set oscillating and screaming across me if I had gone to the expense and trouble of arranging my set especially for this test.

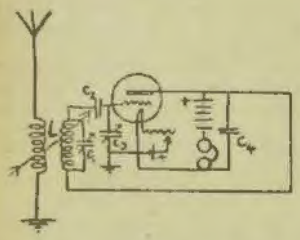
The committee with the full approval of all those present were given full authority to make their own arrangements and now that the matter has really got under way it behoves all of us to stick to them and see the business through to the end.

Yours truly,
F. BASIL COOKE

THE ULTRA AUDION CIRCUIT.

When the amateur graduates from the crystal to the valve stage he usually has in his possession a loose coupler and is able to buy but one valve. Under these circumstances by far the best circuit for him to use is the Ultra-Audion. It is a regenerative circuit and will receive all classes of damped and undamped waves. The one valve is used simultaneously as radio-frequency amplifier, detector, and in receiving straight C.W. heterodyne oscillator.

Referring to the circuit diagram L is your loose coupler which does not need to altered in any way. C, and Cs, are variable condensers, preferably of the multi-plate type (23 plates) but test tube condensers will do. C2 is a fixed grid condenser of small capacity. C4 may be another variable condenser if you have one but you may use a fixed condenser of .001 mf. or dispense with one altogether and trust to the self capacity of the telephone and battery leads. Note that the negative filament is grounded. This is not absolutely necessary but it makes the set oscillate more readily.



To operate put the condenser C3 at zero capacity and tune in any convenient station on the loose coupler in the usual way by varying the coupling and the condenser C1. If the valve oscillates during this operation reduce the filament current or the "B" voltage. (Note: The test for oscillation is to touch the plate terminal. A loud click in the phones denotes that the set is oscillating, a faint one or none at all that it is not. But the experimenter will soon get to know by the sound of the signals or X's when his set is oscillating. Spark signals sound louder but lose their musical tone become mushy and are hard to distinguish from static.) Now increase the capacity of C3, gradusualy. The effect of this is to increase the regenerative coupling, consequently the signals will get louder and louder till they suddenly become distorted and the valve oscillates. If this does not happen or if the signals rise to a maximum without oscillation and then die away again try more filament current or higher plate voltage, or try different valves at the loose coupler. The successful operation of this circuit depends entirely on so arranging the values of filament current, coupling at L and capacity at the condensers that the slighest increase of either C, or C3 causes oscillation. This is an extremely critical adjustment and considerable experimentation and practice may be necessary before you arrive at it. The hands of the operator must not be brought near the apparatus of course. Make the adjustments with a long wooden or ebonite rod. This critical condition is used in receiving spark station or speech (modulated C.W.) or interrupted C.W. at greatest amplification without distortion. If now the condenser is taken past the critical point the valve oscillates, spark signals are amplified to a still greater extent but lose their characteristic note, while, if modulated or interrupted C.W. were being received, the carrier wave will become loudly audible as a high pitched whistle. In tuning for music or speech this carrier wave is always sought first and tuned to its loudest, then the self oscillation of the valve is stopped by reducing the coupling or filament current. The modulation will then be heard.

This circuit offers great scope for the operator's skill in tuning. It is very selective and very sensitive when adjusted to the critical point.

C.M.

FOR FRENCH FARMERS

The Eiffel Tower radio station at Paris is preparing to send out telegraphic weather reports and forecasts three times daily. A suggestion has been made that radio receiving sets be installed at central points in the various country communes and that the information thus received be signalled to the farmers by a code of sound signals from the church bells.

For example, no signal if no change in the weather is forecasted; three strokes of the bell if rain is expected; six strokes for frost; and ten strokes for wind or hail storms.

TRANS-PACIFIC TESTS.

THE WAY TO SUCCESS.

A very ambitious scheme has been suggested by the Victorian Division of the Wireless Institute of Australia. It is in the form of a test from Californian amateurs, across the Pacific to the Australian amateurs. Transmitting by divers means (spark ICW & CW) from stations on the west coast of America, with 1 kilowatt at power. It is to be hoped that the signals will be detected in Australia. There is, however, the fact that the whole project is bristling with disappointmnt, made all the more possible by the fact that the majority of those possessing receiving sets (licensed and unlicensed) have not studied radio reception, especially from the long distance stations, with multi radio-frequency amplifiers. There is no doubt whatsoever that at least five stages, if not more, of R.F. amplification will be required. This then raises the question: "How many experimenters can handle such apparatus." We venture to state only a few, in this State at least. What will the remainder do? Will they assist those few either financially or otherwise, or will they endeavour to receive the covarted signals, and so interfere with those who have a reasonable chance of success? If the interference as experienced in the past few months is any criterion, then no doubt there will be a few "narks" who will try and do the impossible, so far as they are concerned. The suggestion put forward at the meeting held last Wednesday, 6th December, under the auspices of the Waverley Club, is a very good one, and that was "that only certain stations be allowed to compete in the test, and the remainder should assist in every way possible in making that station the most efficient."

Another factor, and probably just as important as the one mentioned above, is that of "short wave reception." To date, about 600 metres has been about the lowest wave-length worked with any degree of efficiency, and although America has handled short waves for some time now, the receiving is the most difficult part of the task.

This is another reason why the actual competitors should be trusted and tried experimenters, so as to give every measure of possible success to the test.

We would like to impress on all those interested that this scheme is not going to be easy of achievement, rather will it be one flooded with difficulties, and it will only be by **"united effort"** that success will result.

We take this opportunity of congratulating the Waverley Club on taking the "Test" matter up, even if it is a little belated.

The opportunity is here for the amateurs and experimenters to prove that Australia is not in the rearguard of radio activities.

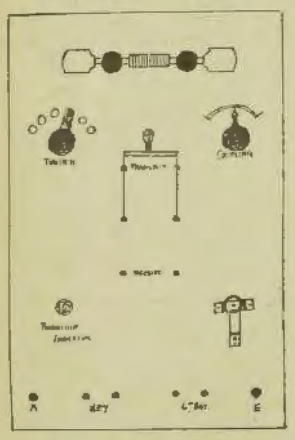
The idea is suggested that the Controller might be willing to sanction the suspension of all licenses during the actual test periods, as this will minimise the possibility of interference. The advance of the science is in the hands of the experimenters, and the Controller of Wireless, so by co-operation success may be achieved.

Go ahead and win. "Wireless Weekly" wishes you all good luck.

MAKE YOUR OWN.

AN AMATEUR SPARK TRANSMITTER.

The coming of the Radio regulations permitting transmitting brings with it the desire to extend our experimental activities in that direction. There are two types of transmitters at present available to us, the damped and undamped, the undamped or Valve transmitter is undoubtedly the set De Luxe, but most of us are destined to follow the dictation of our pocket and not our fancies and fall back on the good old damped spark transmitter. It is often pointed out that spark sets are more easily to operate than the Valve but such is far from being true.



Our Radio Regulations definitely state that .2 is the greatest permissable decrement and to construct a set using a spark coil with fixed gap, which set some of us will have to be content to possess, and still remain within the law, requires more skill in construction and operation than does the enviable C. W. Transmitter. Pure C. W., as we believe, having no decrement and consequently no Radio Laws to abide with in that direction.

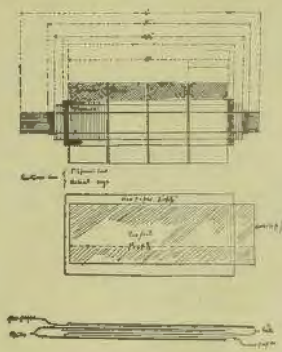
A .2 decrement means that the aerial circuit must be capable of sustaining 23 complete oscillations, per given spark discharge and it is very evident that efficient quenching of the spark gap and low circuit resistance must prevail in order to accomplish this result. In practice this is obtained manly by very accurate tuning, which necessitates extreme loose coupling between closed and aerial circuit, by keeping aerial resistance low i.e. good earth or counterpoise and good insulation throughout.

A set that can be constructed by an experimenter of average skill, is herein described which with a little patience should be capable of transmitting over a range of some 20 miles, using a moderately high aerial and a single valve receiving set.

As a departure from the old isolated method of assembling, a panel set of very neat and efficient design as herein, would be more to the liking of the modern Radio Experimenter.

THE PANEL is of polished ebonite sheet 14 x 8 x ¼ and supported on a wooden base.

THE SPARK COIL is perhaps the most vital part of the set and is of a size known as one inch is here shown in diagram, with interrupter, condenser etc. The core is 6 inches long and is composed of a bundle of soft iron wire about 22 gauge taped tightly together and wrapped with 3 layers of empire cloth. Over this is wound the primary coil which is 127 turns, 18 gauged cc wire. The core and primary are now impregnated with parafine wax and after being wrapped with 6 layers of empire cloth is ready to receive the secondary winding. The secondary is wound in four sections, each 1 inch wide and when mounted, are separated from one



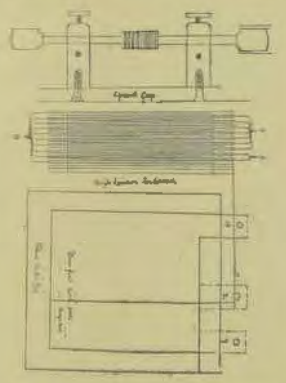
another by 3 empire cloth washers. Total weight of wire required for secondary being ¾lb., 38 gauge dsc. The wire is run through molten wax during the process of winding. 800 square inches of tin foil will be required to make up the primary condenser which must be sufficiently large to prevent sparking at the interrupter contracts. The construction of the condenser is very simply (see sketch) being built up of alternate sheets of wax paper and tin foil and then pressing, after having been previously heated in an oven, between pieces of thin wood.

The coil and condenser are now placed in a small wooden box 5 x 2 x 4 inside measurement and sealed therein with molten waxx, leaving ¼ inch of core protruding from one end, this projection for the purpose of extending through the panel. The primary and secondary leads are made to terminals on side and top of the box.

The interrupter can be made to any design desired or can be purchased, the latter method being,

perhaps the cheapest in the long run.

The HIGH TENSION CONDENSER next occupies our attention, same being built up of alternate sheets of glass, 8 x 8 x 3/32 and brass foil, 6 x 6. 20 glass plates will be required and should be a good quality window glass, free fro bubbles, etc. The brass foil i that usually supplied by Wireless supply Houses for that purpo The sketch showing the construction, is self explanatory. The 10 common ends are made to 1 minal while on the other side 2 connections are made, one having 7 plates and the other 2. For shorter wave lengths than 150 metres 7 plates will be sufficient while for wave lengths up to 200 metres the additional 2 plates are included. The capacity of this condenser is approximately .008 m.f. which capacity is most efficient for the short wave work to which we are confined. The assembling of the condenser is as follows: take each glass plate and secure to it with thin fish glue a



sheet of foil, cut as per sketch. When dry smear liberally with vaseline and pack up alternate sheets, the last two special lugs being spaced from the remainder. The whole is now placed in a wooden box, 8 x 9 x 2¾ inside measure which has been previously impregnated with hot paraffine wax the connections being made to an ebonite top fitted to the box.

THE SPARK GAP is perhaps cheaper to purchase, specially when both efficiency and appearance are desired, nevertheless, the gap can be constructed as per above sketch, the electrodes being of zinc which metal lends itself very readily to the dissipation of heat and is therefore very suitable for the purpose, especially if flanged, as here shown.

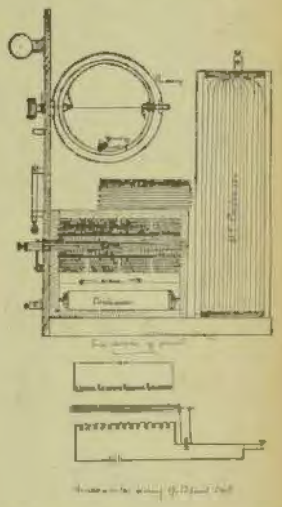
THE OSCILLATION TRANSFORMER. For the purpose of transferring energy from a closed to an aerial circuit, an oscillation transformer is employed, this transformer must be capable of extreme loose coupling and cannot, therefore be of the conductive essary, the primary or closed circ type. Two separate coils are necessary, the primary being constructed of ¾ brass strip or same can be cut from 22 gauge sheet, the length of 6 feet will be required and the coil is constructed as follows:— Cut the strip into two pieces, each being 24 7/12 inches long, and for the purpose of mounting measure off and drill 1/8 inch hole from one end as follows:— 1, 2, 13, 7/12, 14, 1/12, 26, 11/12, 27, 5/12, 33, 10/12 and 34, 4/12. Treat the other length in a similar manner, then clean up and in order to facilitate mounting, draw the strip back and forth several times around a bottle, or other round object, this will give the necessary even spiral bend to the strip. Now procure 2 pieces of ebonite, 4 x 1 x ¼ and drill holes in one to correspond with those on the strip and mount same thereto with small ¾ screws. The second piece of ebonite, which is merely a support for the rotor, is fixed to the other side of the helix in a similar manner, but using only one screw per turn to secure same.

THE AERIAL TUNING INDUCTANCE is the next consideration, and is constructed by winding alternate turns of 16 gauge d.c.c. wire and white string on an ebonite tube 3½ inches in diameter x 3 inches long, the winding is tapped at every second turn, leads being brought off to a 6 point switch on the panel.

THE RADIATION INDICATOR is an essential part of the outfit as, by its means, we are enabled to get an approximate idea of when reasonance occurs between closed and aerial circuits. The construction of same is not as intricate as is generally believed, it being merely a small flash light bulb shunted in such a way so as not to introduce excessive resistance into the aerial circuit.

The shunt is usually in the form of a radio frequency inductance being about 10 turns 18 gauge insulated wire, on a 1 inch former.

A/D. P. D. T. switch is provided to change over from transmit to receive and the assembling of the various other parts of apparatus on the panel will be no doubt apparent on reference to the above sketch.



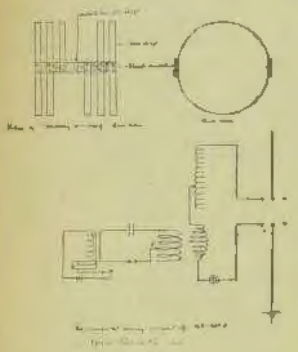
It is as well to bear in mind, that in the wiring up of the closed circuit all leads must be kept as short as possible, ¾ strip being recommended for the purpose, the remainder of the wiring may be done with 14 gauge bare copper wire which when correctly spaced and neatly bent makes a very efficient and practical job.

The set operates on a 6 volt accumulator or dry cell battery, the former being preferred and will consume 3.5 amps, giving a standard rating of about 20 watts.

When everything is ready for a test a wave meter should be obtained and the closed circuit set into oscillation. By means of the variable clip (J) the inductance should be varied until resonance

is obtained with the desired calibration on the wave meter. The aerial circuit should then be tuned to approximately the same wave length. Now increase the coupling between both circuits and note brilliancy of indicator lamp, continue to tighten the coupling until maximum brilliancy occurs when the coupling should be slightly decreased and fine adjustment made in both primary and secondary circuits, noting any rise or fall in the aerial current while so doing.

When, now with the coupling reasonably loose, i.e. rotor at about 45 degrees and no further increase of radiation is possible, listen in on the wave meter and if possible determine the characteristic of the radiated wave. If signals are audible on two differ-



ent setting of the condenser, it is then evident that 2 waves are being radiated and the coupling must consequently be further reduced, irrespectively of any decrease in radiation. Continue to loosen off the coupling until the two waves verge into one, which will be then termed a pure wave and one having a low decrement as demanded by our licences.

It might be as well here to state that it is not always the set that radiates the most amps that gets the distance, but the one that radiates a pure wave free from excessive damping, irrespective of the aerial current, of course, within reason. In conclusion the writer desires to mention that any enquiries in connection with this article address to the Editor of the "Wireless Weekly" will be promptly answered.

TRANSCONTINENTAL RADIO CAR MAKES FIRST TRIP.

An automobile driving along the countryside or through the crowded thoroughfares of busy city life, amplifying radio news and concerts clearly audible a block away, is a rather stunning sight even in this day of the unusual. This has been the experience of the people along the route of a specially equipped radio car that has recently completed an overland trip from Detroit to San Francisco in less than one month. In spite of apprehension as to the effect of vibrations in the automobile, it was found that the apparatus was able to pick up and hold broadcast messages and programmes of any of the various wave lengths of the eastern sending stations ,with perfect reproduction, whether the car was travelling fast or slow. There was apparently no damage to any of the delicate equipment, although steady and rapid driving was necessary throughout the trip to maintain a schedule prearranged to the minute. Supplies were carried in another car.

PRIZES.

Transpacific Tests.

Mr. M. Perry informs us that he has already received promises of prizes from the following firms:—

Messrs. Austral Electric Co.; Electricity House; F. E. O'Sullivan, Electrical Utilities; Harry Wiles; Burgen Electric Co.; Radio Company; "Wireless Weekly"; Mr. Malcolm Perry; Colville Moore; Sea, Land and Air, and Miss Wallace.

Have you seen Mr. Basil Cooke's new aerial for the Radio College? It is an L type, single wire aerial, 150 feet long, running from the top of the Wentworth Hotel to Foster House, with a 60 foot lead in. He estimates the highest point at 100 feet from the ground.

A TECHNICAL PAGE

WAVES AND WAVE MOTION.

There are many terms which are frequently used by wireless amateurs, and but poorly understood to the beginner, the terms connected with waves and wave motion are wearisome, and this article aims at the elucidation of a few points in the terminology used by the experimenter.

The popular idea of a wave motion is an undulatory motion accompanied by an advancing motion. This is not entirely correct, particularly in the case of electrical waves. Physics recognises two types of wave, longitudinal and transverse waves. In a longitudinal wave, the movement of the particles is in the direction of the wave. This is only possible in an elastic medium, which allows a compression, and expansion movement, as the air or gasses.

Imagine a spring, some feet in length, coiled as a helix, and supported at several places by thin threads. A top at one end of the coil will produce a movement which will be transferred throughout the whole length of the coil by a compression and expansion movement. This illustrates the idea of a longitudinal wave. It is believed that sound is propogated by means of longitudinal waves or waves of compression.

We know that sound will not travel in a vacuum. If we place an electric bell in a vacuum we cannot hear the sound, though we see the hammer striking the gong. The waves, then, by which light is propogated are able to travel in a vacuum, and are thus very different from sound waves. Lights and electrical energy travel in waves in which the direction of the movement of the particles is at right angles to the wave direction. These waves are called transverse waves. Correctly speaking, it is wrong to speak of "light waves" and "electrical waves," these terms should be substituted by "waves produced by light energy," and "waves produced by electrical energy."

To illustrate transverse waves, draw a circle of any convenient radius, and imagine a body Z moving round the circumference with a constant velocity.

Fig. 1.

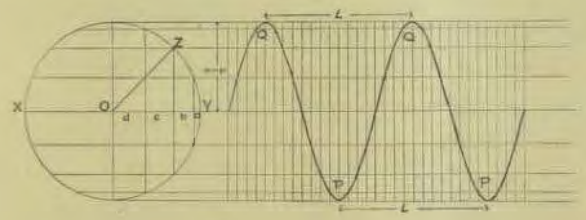


Fig 1

Mark off on the circle any number (say, 16) of equal parts. The times taken for Z to go through each part will be equal. Draw a diameter XY and drop perpendiculars on it, from X in the 16 positions. Then the time taken for Z to go through each division on the circle is represented also by a space on the diameter. It will be seen that "a" is less than "b" and "c" etc., and since the time taken to travel through each is constant the velocity at "a" must be less than "b" and greatest at "o." This type of motion when a particle moves along a straight line between two points, having a greatest velocity at the centre and the least velocity at the extremes, is called simple harmonic motion.

We see that the acceleration of the point along XY is increasing when the body aproaches "o," and is decreasing when it moss away from "o", and that the body will be at rest for a fraction of time at "X" and "Y." A simple illustration of S.H.M. is the spiral spring (a spring balance). The velocity is greatest when the swing is at the central point, and least when at the extremes. A simple pendulum and a child's swing also illustrate this point, but are not true examples of S.H.M.

Now to link up with wave motion. Continue the diameter of the "circle of reference," and mark off 16 equal parts, say ¼in. apart, and erect perpendiculars from these points. From each of the divisions on the circle of reference, draw lines parallel to the diameter.

Then plot the points as shown in the diagram (Fig. 1). This gives a diagrammatic representation of transverse wave motion. In the figures two complete waves are drawn. Understand that in transverse wave motion the particle vibrates at right angles to the direction of the wave; it does not require a medium which will compress, and is thus enabled to travel through a vacuum or conveniently the "other." The "light wave" and the "electrical wave" travel at the same velocity—186,000 miles per sec., while "sound waves" travel at a mere 1,100 ft. per sec.

Now for some terms connected with waves. The time taken for a particle to make a complete movement from X to Y and return is called the period (or T.) of the waves. The greatest displacement of the particle is called the amplitude.

WAVES AND WAVE MOTION.

P is the trough and Q the crest of the wave. Evidently a complete wave contains one crest and one trough. The length of a wave is the distance from crest to crest or from trough to trough, or from a point in one wave to the corresponding point in the next wave. We might diverge here to explain that the strength of the signals received in W/T is not due to the length of the wave, but to the amplitude. A bell gives a certain note when tapped with a small blow, when struck with a greater force the same sound (producing a wave of length equal to the first) is heard, but much louder on account of the increased amplitude, due to the greater force. That is the reason why we hear VIS louder on 600.M. than 2 C.M. on 1400 M. The number of complete wave movements in one second is called the frequency. If there are N Wave movements in one second then

$$T = \frac{1}{n}$$

If the wave length is L, it at once follows that the velocity is the product of the frequency of the period

$$V = Ln.$$

The velocity of "electrical waves" being known, it can be seen that the length of the wave used can be determined by a knowledge of the frequency.

$$L = \frac{v}{n}$$

In order to use the above formula for finding frequencies, the units must be the same. Wave length is measured in the metric system, e.g., 600 metres. 1,400 metres, etc. The velocity of light measured in metric units is 299,860,000 metres per sec.

In a later article, we shall deal with beats and their formation.

APPARATUS.

The Regulations prescribe that an applicant for an experimental license must satisfy the Controller of Wireless that he can operate and understand the controls associated with his set, and further that he can operate at twelve words per minute sending and receiving, also instruction No. 4 states that the use of valve receivers employing regenerative circuits capable of energizing the aerial is discouraged, owing to risk of interference with other stations, and it is hoped that careful attention will be given to circuits and operation and, thereby render more stringent regulations unnecessary.

Applicants who propose using valve receivers at places within five miles radius of a commercial or defence station will not, except in special cases, be permitted to utilize regenerative circuits, and must be capable of receiving Morse signals at a speed of twelve words per minute. Should the applicant not be able to comply with this operating requirement he should arrange for a person to be in attendance during operation of the set who is capable of receiving such signals. Certificates of such capability will be accepted from the secretary of a wireless institute, officer in charge of a radio station, postmaster, or instructor in a telegraphy school, or school of army signalling.

In order to provide for this necessity the Burgin Radio College has instituted classes of instruction in the pratical and theoretical operation of apparatus and also buzzer practice. Each full course extends over a period of 12 weeks, 3 nights per week for 2½ hours per night. There are other courses to provide for persons who cannot attend more than one night per week, and a full progressive course, which is really a modification of the full course, only that it will take much longer to graduate. Then there is also provision for those only requiring either the Morse practice or the lectures. A transmitting course extends a further three months.

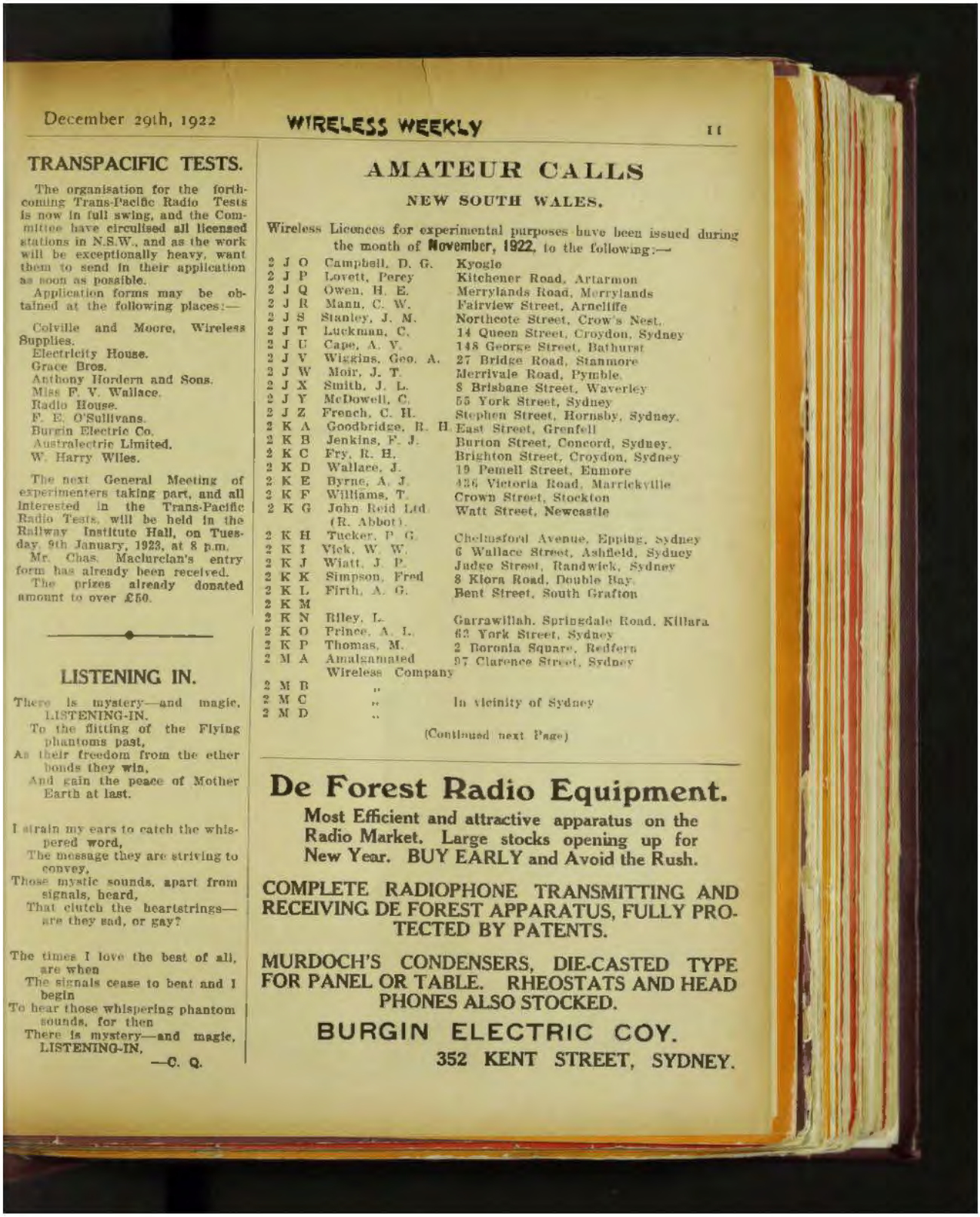
The amateur experimenters will probably find it very hard to gain the requisite knowledge in such a short space of time outside a college, and as this particular college is under Messrs. O. F. Mingay & Tom Perry (Late R.A.N.), these two experts should be able to provide for all the wants of the experimenters.

The classes of the Burgin Radio College are held at Rawson Chambers (2nd floor) Pitt Street, near Railway, on Monday, Wednesday and Friday evenings, and the principal, Mr. Mingay, who will supply all particulars, can be communicated with, C/o. The Burgin Electric Co., 352 Kent Street, Sydney.

TESTING YOUR RECEIVERS.

The test commonly used in the early days for receivers was made by means of the handiest and weakest of batteries—a penny and a two-shilling piece, between which a bit of moist paper was placed. The end of one wire from the phones was connected to the "copper," and then the silver coin touched lightly (and repeatedly) with the end of the other wire.

Nowadays a similar test is made with a single piece of sheet aluminium which should be damp. Simply connect one wire of the phone to one end of the aluminium plate, and then touch the plate with the other wire, when, if the phone is properly adjusted, each contact will cause a click in the phones.



TRANSPACIFIC TESTS.

The organisation for the forthcoming Trans-Pacific Radio Tests is now in full swing, and the Committee have circulised all licensed stations in N.S.W., and as the work will be exceptionally heavy, want them to send in their application as soon as possible.

Application forms may be obtained at the following places:—

Colville and Moore, Wireless Supplies.
Electricity House.
Grace Bros.
Anthony Hordern and Sons.
Miss F. V. Wallace.
Radio House.
F. E. O'Sullivans.
Burgin Electric Co.
Australectric Limited.
W. Harry Wiles.

The next General Meeting of experimenters taking part, and all interested in the Trans-Pacific Radio Tests, will be held in the Railway Institute Hall, on Tuesday, 9th January, 1923, at 8 p.m.

Mr. Chas. Maclurcian's entry form has already been received.

The prizes already donated amount to over £50.

LISTENING IN.

There is mystery—and magic,
LISTENING-IN.
To the flitting of the Flying phantoms past,
As their freedom from the ether bonds they win,
And gain the peace of Mother Earth at last.

I strain my ears to catch the whispered word,
The message they are striving to convey,
Those mystic sounds, apart from signals, heard,
That clutch the heartstrings—are they sad, or gay?

The times I love the best of all, are when
The signals cease to beat and I begin
To hear those whispering phantom sounds, for then
There is mystery—and magic,
LISTENING-IN.

—C. Q.

AMATEUR CALLS

NEW SOUTH WALES.

Wireless Licences for experimental purposes have been issued during the month of **November, 1922**, to the following:—

2 J O	Campbell, D. G.	Kyogle
2 J P	Lovett, Percy	Kitchener Road, Artarmon
2 J Q	Owen, H. E.	Merrylands Road, Merrylands
2 J R	Mann, C. W.	Fairview Street, Arncliffe
2 J S	Stanley, J. M.	Northcote Street, Crow's Nest.
2 J T	Luckman, C.	14 Queen Street, Croydon, Sydney
2 J U	Cape, A. V.	148 George Street, Bathurst
2 J V	Wiggins, Geo. A.	27 Bridge Road, Stanmore
2 J W	Moir, J. T.	Merrivale Road, Pymble.
2 J X	Smith, J. L.	8 Brisbane Street, Waverley
2 J Y	McDowell, C.	55 York Street, Sydney
2 J Z	French, C. H.	Stephen Street, Hornsby, Sydney.
2 K A	Goodbridge, R. H.	East Street, Grenfell
2 K B	Jenkins, F. J.	Burton Street, Concord, Sydney.
2 K C	Fry, R. H.	Brighton Street, Croydon, Sydney
2 K D	Wallace, J.	19 Pemell Street, Enmore
2 K E	Byrne, A. J.	436 Victoria Road, Marrickville
2 K F	Williams, T.	Crown Street, Stockton
2 K G	John Reid Ltd (R. Abbot).	Watt Street, Newcastle
2 K H	Tucker, P. G.	Chelmsford Avenue, Epping, Sydney
2 K I	Vick, W. W.	6 Wallace Street, Ashfield, Sydney
2 K J	Wiatt, J. P.	Judge Street, Randwick, Sydney
2 K K	Simpson, Fred	8 Klora Road, Double Bay.
2 K L	Firth, A. G.	Bent Street, South Grafton
2 K M		
2 K N	Riley, L.	Garrawillah, Springdale Road, Killara
2 K O	Prince, A. L.	62 York Street, Sydney
2 K P	Thomas, M.	2 Boronia Square, Redfern
2 M A	Amalgamated Wireless Company	97 Clarence Street, Sydney
2 M B	"	
2 M C	"	In vicinity of Sydney
2 M D	"	

(Continued next Page)

TRANSMITTING AND RECEIVING.

2 B B	Crocker, E. B.	14 Roseby Street, Marrickville
2 C A	Bonwill, E. W.	Cowra
2 C Q	Barlow, E.	Faulkner Street, Armidale
2 H Y	Bongers, G. S.	"Marmora," Rawson Street, Rockdale
2 K C	Fry, R. H.	Brighton Street, Croydon, Sydney

The undermentioned licences have been cancelled:—

2 D A	Slight, A. B.	Moreton Street, Parramatta
2 E F	Sullivan, J.	"Montrose," Connemarra Street, Bexley
2 E I	Firminger, R. M.	Barham
2 E Y	Grinter, T. R.	Lockhart
2 F B	Chaleur, P.	269 Edgecliff Road, Woollahra
2 F D	White, S. G.	"Kelso," Third Street, Canterbury

The following has removed to address indicated:—

2 C L	Caletti, G.	C/o P. L. Stonwall, 83 King St., Newtown

VICTORIA.

RECEIVING ONLY.

3 I I	Miles, G. T.	Highfield Road, East Camberwell
3 I J	Mickle, D. J.	Koo Wee Rup
3 I K	Wilkinson, L. C.	11 Garden Street, Essendon
3 I L	Jaynes, A. H.	53 Orlando Street, Hampton
3 I M	McCormick, C. Mc.	19 Canterbury Road, Camberwell
3 I N	Cohen, Geof.	110 Wattletree Road, Malvern
3 I O	Kinnear, H.	St. Kilda Road, Melbourne
3 I P	Helller, E. C. W.	26 Reynards St., Coburg.
3 I Q	Knight, P.	18 Fisher St., East Malvern.
3 I R	Seacombe, A. E. T.	7 St. Vincent Place, Albert Park
3 I S	Reid, H. R.	101 High Street, Prahran
3 I T	Doubleday, L. G.	527 Barkly Street, West Footscray
3 M A	Amalgamated Wireless Company	522 Little Collins Street, Melbourne
3 M B	"	Koo Wee Rup
3 M C	"	Canterbury
3 M D	"	
3 M E	"	In vicinity of Melbourne
3 M F	"	

TRANSMITTING AND RECEIVING.

3 A M	Dohrmann, G. S.	2 Hopetoun Avenue, Canterbury.

The following licences have been cancelled.—

3 B O	Court, T. P.	
3 C E	Randle, C. B.	
3 C D	Brown, F. G. H.	
3 C S	Acott, W. F.	

The following has removed to address indicated:—

3 H Y	Moore, C. L.	C/o Mrs. Dawson, Ritchie St., Leongatha

TASMANIA.

RECEIVING ONLY.

7 A W	Schell, H. I.	West Burnie
7 A X	Buring, R.	76 Lord Street, Sandy Bay, Hobart
7 A Y	Chatterton, F.	34 Mellifont Street, West Hobart
7 A Z	Peterson, R. C.	91 Lansdowne Crescent, West Hobart

TRANSMITTING AND RECEIVING.

7 A A	W. T. Watkins	146 Warwick Street, Hobart

The following has removed to address indicated:—

7 A M	Purdon, C. V.	Napoleon Street, Battery Point, Hobart

WESTERN AUSTRALIA.

TRANSMITTING AND RECEIVING.

6 B H	Burrows, F. H.	9 John Street, Claremont

STATION CALLS.

SHIPS STATIONS. GREAT BRITAIN

Umgeni BLV, Umhloti GCDJ, Umta GON, Umkuzi GCXN, Umona BLW, Umtali ERI, Umsinga GDBF, Umtala GCDF, Umvolosi GCWT, Umvuma ZQR, Umzinto ERF, Umzumbi EVF, Unda GDCP, Unio ZPX, Union City GCWB, Upada GOO, Upminster XHM, Urbino GBWP, Urlana GOP, Ursus YYR, Uskmouth GCWV, Uruguayo GCSQ.

Valacia ZKV, Valdura YPT, Velemead XKW, Valette BDU, Varela MSR, Valiant GCPV, Vancouver .ERY, .Vandyck GFNC, Vanellus GDVW, Vardulia YXS, Varsova ZGN, Varyin XIR, Vasari GMZ, Vasco GBYK, Vasconia ENA, Vasna ZHE, Vauban MJW, Vaux, GDNL, Vedic ZNG, Vellavia, YYM, Venetia GDNP, Venetian YIB, Vennachar ZHK, Venice OEE.

Vennonit EYI; Venosta GDFT; Ventura de Larrinaga ELB; Venus BFF; Venusia EWB; Vera YJU; Vera Kathleen ZDX; Verentia XMG; Vestalia LTY; Vestris MJZ; Vigo ZVT; Victoria GUP; Victoria MWD; Viking MCD; Victoria and Albert GFUR; Viking MVQ; Victoria de Larrinaga EMF; Vindelia MXD; Victorian Transport XEN; Vikingstar GDLT; Virawa ZSR; Virgil XQI; Virgilia GXB; Virginian MGN; Visigoth BDV; Vita MZV; Vitellia BAR; Vitruvia GYS; Vittoria GCWR; Vogtland GDFR; Volga ZIN; Vologda CHN; Volsella XIA; Voltaire GFND; Volumnia GRM; Volute EJY; Voroney ZLM; Vulture GDTN.

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