WIRELESS WEEKLY

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

l. 2. April 6, 1923. No. 14

A Talk with Wireless Weekly.

Large Numbers Entertained

Wireless Weekly's offer of free Wireless Music has met with phenomenal success. Every day Radio College Reception Room has been crowded with people eager to hear and learn something about Wireless.

We feel delighted to think that we have been able to entertain so many and at the same time bring before the public, especially the country public the possibilities of Wireless. Those country people who have already attended and heard the telephony have all been anxious to know whether it would be possible to instal a set in their distant homes and so have the same entertainment there as we have been giving them in the city. Wheu answering them in the affirmative, our only difficulty has been that we have been unable to give them a definite date as to when Broadcasting Proper will commence.

Wireless dealers all have the same complaint, they cannot give their customers a definite date.

Amalgamated Wireless Ltd., who from reports hold all the Patents, seem to be the stumbling block that is going to make Australia the last in the field with Broadcasting.

It is hoped that all differences will be swept aside by the Postmaster General at the conference he is to hold on the 9th inst.

Amateurs are again warned regarding licenses and interference. The authorities are aware of the fact that a great number of Amateur Experimenters do not hold licenses and no doubt they will make examples of the first batch of culprits brought to book.

Howling valves are still causing a lot of interference with commercial stations as well as interfering with Amateurs who are testing with one another on low power. Now this allowing of valves to howl is principally caused by lack of knowledge, i.e., persons using valves not having a license to experiment with them. We appeal to all our readers to get a copy of the Regulations, and abide by them

MANDOLIN ORCHESTRA BY WIRELESS.

Last Tuesday week Mr. King's Mandolin Orchestra travelled from Bondi to Ryde to transmit selections by wireless at Mr. Colville's station.

Though this experiment was new to Mr. Colville, i.e., to transmit selections by a whole orchestra, it met with great success, and numerous reports have reached him from distant suburbs.

Great thanks are due to Mr. King and his orchestra for having given their services.

SOLDERED CONNECTIONS HELP RADIO SETS.

WESTERN ELECTRIC GIVES HINTS TO RADIO FANS.

Everyone who has tinkered with a radio set has had experience with that most elusive trouble—the loose connection. Where many wires must be connected, some to other wires, some to binding posts of many kinds, the greatest care must be taken to see that every joint is tight and if possible soldered. Radio fans may well take a tip from the practice of the Western Electric Company, whose workmen make millions of soldered connections every year in building mammoth telephone switchboards and in all sorts of apparatus work. In fact, the only connections that are not soldered are those that must be opened as a matter of routine, as in replacing worn-out cords or batteries.

A good electrical joint must first of all be strong enough to stand the strains of handling, etc., to which it will be subjected. When two wires are joined, they should always be twisted together for mechanical strength. A wire should be twisted around some part of a fixed terminal. Where a flat screw or nut is turned down on the wire, the latter should pass nearly around the screw, but not cross itself. This allows the screw or nut to seat itself evenly. If two or more wires are to be clamped under the same screw, a washer should be put between each wire, or the wires should be twisted together before being bent around the screw.

Avoid the kind of binding post through which a wire passes and which clamps the wire under the tip of a screw.

The ideal connection, however, is one made on a flat metal lug, which has a notch in one or both sides, through which the wire is looped. This transmits a pull on the wire directly to the lug, and the solder is not strained. Solder is not a strong metal; a wire held by it alone can be pulled loose, and repeated bending will soon make it crystalise and give way.

Before starting to work with a soldering copper, file the tip of it to a smooth surface on all sides, then heat it, being careful to keep the tip in the flame. When heated in air, copper rapidly takes on a black coating of oxide. When hot enough to melt solder, give the tip a final rub with the file, then quickly rub it in a little sal-ammoniac powder or soldering paste, in which are a few drops of solder. The paste will dissolve the oxide on the copper, and the solder will amalgamate with the clean copper, just as water will wet a clean board but not a greasy one.

The solder on the copper will now act as a ready means of carrying heat from the body of the copper to the work. This can easily be seen by touching a piece of cold solder first to the black surface of the copper, then to the tinned tip; it will melt more quickly on the bright surface.

The copper must be hot—not just enough to melt the solder, but hot enough to heat the parts so that the solder will adhere to them.

For all electrical work, where copper and brass are to be soldered, only resin should be used. Any paste or liquid will inevitably corrode the metals, and it is a difficult job to get all the paste off after the joint is made. For this reason, Western Electric installers use only resin-core solder wire. This is a tube of solder filled with resin, and no cleaning up is necessary afterward.

Anything to be soldered must be "tinned," that is, covered with a coating of solder. If you use tinned copper wires, and if the lugs have been tinned by the manufacturer, you need not bother much about cleaning. If not, they must be scraped or sand-papered clean, then tinned. On heavy work, such as a lead to a ground rod, tin the parts before putting them together. An iron pipe may be tinned by scraping, heating, and applying salammoniac and solder together. For copper and brass, you should use resin, usually in the form of resin-cored solder.

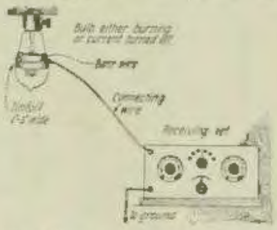
To connect a wire to a lug, loop the wire once only around the neck of the lug, heat the joint with the copper, and touch it with the solder. Only a drop is necessary. Take the copper quickly away and keep the wire motionless until the solder cools. If the solder is disturbed while the joint is cooling, it will crystalise, giving a dull surface and a weak joint. If you wrap the wire several times around a small lug, you will infallibly break the lug when you try to remove the wire.

Sometimes you may have to solder wires where no copper can be obtained. For heat, the flame of a candle is sufficient. The soot that forms on the wires will do no harm. Rub the resin-core wire on the hot joint and it will melt and flow around the wires.

Never tape up an unsoldered joint if you want it to be permanent. Many tapes contain sulphur in the rubber compound. This will form a film of copper sulphide which will work its way around all the wires and form a high resistance in the circuit. If any considerable current is carried, the joint will heat up and the sulphide will form all the faster. In radio antennas the minute voltage will not overcome a high-resistance joint. Solder, and be sure!

UNIQUE INDOOR AERIAL.

Does your landlord object to your constructing an aerial? If so, the following simple system will be found very effective. As a matter of fact the writer has used the same on a little crystal set in his home very successfully. A piece of tinfoil is first fastened around an incandescent bulb, and then some bare wire is wound around the tinfoil so as to hold it in place and to make connection to the outfit. The other end of this wire is connected to the aerial binding post of the panel. The



The aerial here shown was found to be almost as effective as a condenser placed in series with the lighting circuit.

bulb is now screwed into the lamp socket and the "aerial" is ready for use. It will work whether the lamp is turned on or off. The usual ground connection is of course made. If no tinfoil is at hand wrapping the wire around the lamp socket several times will answer. The tuning of the set will be different than if an outdoor antenna is used.

Contributed by Rudolf F. Kuhn.

Wasteful Aerial Resistance and its Reduction

Most amateurs who have installed, or are contemplating installing a transmitting outfit, spend practically all their time designing and constructing the set itself, and developing the set to the highest point of efficiency and perfection, writes L. R. Felder, in "The Wireless Age." But when it comes to time they got wise to the fact that no matter how efficient their generating station may be, they cannot get any decent results by pumping juice into a radiating system that is full of leaks. Just as you've got to know how to design your power transformer and get all you can out of it, so you've also got to know

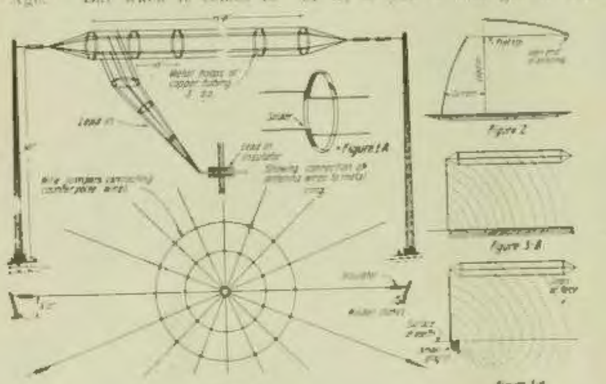


Figure 1
Figure 3A

the aerial system they swing their wires in the easiest place, attach their ground lead to that good old stand-by, the external water pipe, and then expect that the Post Office will work overtime delivering letters to them from stations all over the country, telling them how QSA their signals come in. It is about how to design your aerial and ground system. And unless you understand just what determines the resistance and radiating powers of your aerial, you will not be able to design the aerial system properly.

Now, let me see just how we are able to reduce the resistance of the aerial and so increase the range of the transmitter. The resistance of an aerial is composed essentially of the following:—

(1) Ohmic resistance, namely of the aerial wires, ground and ground leads, lead-in wires, connection joints, etc.

(2) Resistance due to imperfect dielectrics in the electric field surrounding the aerial.

(3) Radiation resistance of the aerial.

The above three components add up to make the total aerial resistance. Of these three the first two components are wasteful, that is, electric energy is wasted in the form of heat due to them. The last component is the useful component, the greater this is the greater will the radiated energy be. Most amateurs sweat blood trying to push the needle of their radiation ammeter off the scale. They cannot seem to get into their craniums that it is not so much more current that they want as it is more radiated energy, ten amperes in one aerial may not carry as far as five of these amperes in another aerial. What good are the amateur's ten amperes if nine of them are wasted in the resistance of the first two components before mentioned, while only one of these amperes is useful in radiating energy? What the amateur should first sweat over, therefore, is to reduce the first two components to the lowest minimum possible, and to increase the last components.

THE OHMIC RESISTANCE OF THE AERIAL.

In the first place the aerial wires should have a maximum of surface because on account of the skin effect, the current travels on the surface of the wire. This can be secured by the use of large diameter wire or flat copper strip, but as these are rather inconvenient for aerials, stranded wire should be used, the best being seven strands of No. 18 phosphor bronze wire. This stranded wire has been found to be far superior to a solid conductor, having the same surface area, as far as resistance of wire goes at high frequencies.

Now, when it comes to the particular disposition of these wires, a very important factor enters, namely, the so-called "edge effect," which is somewhat similar to the skin effect in conductors. When a flat topped aerial is used, having more than two conductors, as for example, a four-wire inverted L, there are two outside conductors and two inside conductors, or more, depending upon the number of turns. Just as in a solid wire, the current tends to flow on the outside surface of the wire, so in the case of the aerial having multiple wires, the current tends to crowd to the outside wires, thus the distribution of current in the aerial wires is non-uniform, the outside wires carrying more than their share. As a result of the non-uniform current distribution the resistance of the aerial is increased. Consequently this form of aerial is not recommended. This effect can be avoided if the aerial is constructed so that all its wires are on the outside, and the only type of aerial in which this is possible is the cage aerial. All the wires, as shown in Fig. 1, are elements of a cylinder, and are equally distant from the centre, thus insuring uniform current distribution, hence lower resistance than the other types of aerials. For the same reason the lead-in of the aerial should also be of the cage type, but the writer has found the best form of lead-in to be of the particular type shown in Fig. 1, namely, a tapering cage. This particular form of lead-in offers the lowest resistance of any type of lead-in, and secondly, which is just as important, offers a reduced capacity. For best results it is desirable that the aerial capacity be confined to the top portion of the aerial. Since the capacity of the cage type is directly proportional to the diameter of the cage, it is apparent that the lead-in has its maximum capacity at the top, and its minimum at the bottom, which is what is wanted. This type of lead-in, therefore, offers

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The wireless weekly : the hundred per cent Australian radio journal

MAKE YOUR OWN

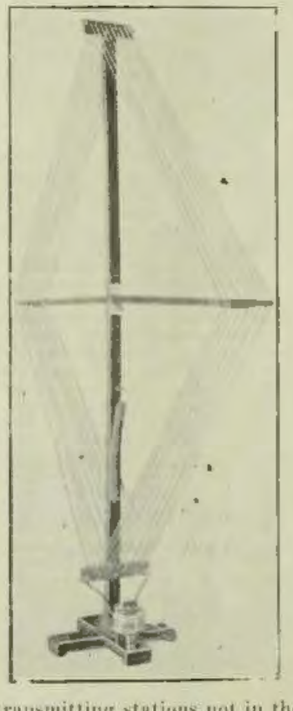
Frame Aerials in Radio Reception

A CONSIDERATION OF SOME OF THEIR PROPERTIES, WITH DATA FOR CONSTRUCTION.

Because the frame or loop aerial is a rather poor collector of energy from electro-magnetic waves as compared with the ordinary elevated type of aerial, its use has been very restricted until the advent of the thermionic valve and its development as an amplifier. Now, however, the frame aerial finds favour in many applications and may be equally as good for radio reception as elevated aerials, provided that additional amplification is available, whilst in addition, the frame aerial has many important advantages over other types.

One of the special advantages of the frame aerial is its directional properties. For the benefit of those not familiar with the theory of directional reception with frame aerials, it may be mentioned that reception is strongest when the frame is in the same plane as the direction of the station being received, and that if the frame is rotated through 90 degrees, it will be noticed that the strength of the incoming signal is at a minimum since the frame is least sensitive in this position. A further movement through 90 degrees, or 180 degrees from the original position, brings back the strength again to maximum, since the frame is again in the plane of the direction of the station being received.

On account of these directional properties it is possible to use a frame aerial as a means of reducing or entirely eliminating interference from



transmitting stations not in the same plane as the station which it is desired to receive. Thus, for instance, if a receiving station is in the vicinity of a powerful transmitter which normally causes interference, it may be possible, by employing a frame aerial, to eliminate this interference where reception of stations in a direction at right angles to the interfering station is concerned.

Similarly the frame aerail is now extensively used in the reception of commercial trans-Atlantic signals, partly on account of the directional properties assisting in eliminating interference from other high power stations but largely because, as compared with elevated aerials, the frame aerial is less sensitive to atmospheric interference, which is one of the most serious problems of long distance commercial working.

Fig. 1 shows a photograph of a frame aerial of portable type, with the tuning condenser mounted on the base.

In designing a frame aerial for amateur and experimental purposes, some consideration should be given to the type of circuit to be employed with it. Theoretically it is desirable that the whole of the inductance of the tuning circuit should be included in the frame itself, in order that the maximum voltage may be obtained across the variable condenser in parallel with the frame aerial inductance, which is provided for tuning. This condenser should have a maximum value preferably not exceeding 0.001 mfds.

One of the most important papers on the subject of frame aerials and frame aerial design has been published in the

"Journal of the Franklin Institute," and is due to A. S. Blatterman. In this paper, in considering the design of frame aerials, attention is especially drawn to the following points:

(1) Best size of loop and number of turns for given wave length.

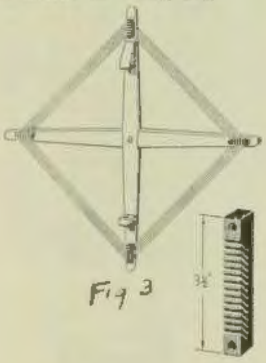
(2) Effect of spacing the turns.

(3) The size and kind of wire.

(4) Insulation and its effect.

(5) Suitable value of the tuning condenser.

(6) Effect of proximity of the frame to walls, etc.



(7) Effect of dead-end turns in the frame inductance.

Brief conclusions are given below to consideration of these points:—

(1) Blatterman has shown that there is a best size of loop and number of turns for reception on a definite wavelength, and that for short wavelengths large frames of few turns are most suitable, and smaller frames, with a large number of turns for larger waves, whilst for the very long wavelengths it again becomes desirable to increase the size of the frame and reduce the number of turns.

(2) The spacing of the turns has been shown to be a matter of considerable importance. If the turns are wound close together the inductance value is increased, but at the same time the resistance goes up. The most suitable spacing is where the resistance is kept as low as possible without a loss in the inductance value.

(3) The size of the wire used does not, of course, have any effect on the wavelength range, and the important point in choosing the wire is that it should have a low resistance. Wire of Nos. 22 to 14 gauge is suitable, whilst standard electric lighting flex is especially efficient and has the advantage that it is convenient to wind and being well insulated, the turns can be arranged to touch if desired.

(4) If the frame is closely wound, then it is essential that the wire should be insulated, but with suitable spacing, bare wire may be employed.

(5) The tuning condenser used in conjunction with frame aerials should preferably not exceed a maximum value of 0.001 mfds.

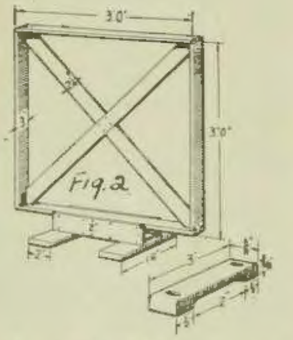
(6) In use, a frame aerial should be kept at some distance from the walls of buildings, since proximity to such masses raises the effective resistance of the frame.

(7) It is preferable not to tap out the turns of a frame aerial inductance, since this method introduces dead-end turns on some adjustments. It is therefore better, if possible, to design the frame so that it covers the required range of wavelength without tappings.

The mechanical construction of a frame to carry the wires for a frame aerial is a matter which leaves much scope for individual ingenuity. There are several points to be remembered in designing the frame. The limitations of size, depending on the space available for installing it, is an important factor, and it must be remembered that sufficient space must be allowed to permit the free rotation of the frame without fouling other apparatus, etc. It must be easy to rotate the frame, which should be held in rigidly secured bearings, in order that it shall not be capable of swinging or swaying, as otherwise the strength of signals would be continually varying.

In making use of reaction with a frame aerial, different methods of procedure are available. A part of the inductance may be distinct from the frame and the reaction coil of the plate circuit coupled to it, or the reaction coil may form part of the frame itself. In this case it is best to arrange a second frame, either hinged to the side of the main frame or pivoted within it. Figs. 2 and 3 are suggestions for the design of frame, to either of which reaction frames may be added. In Fig. 3 a suggestion is made for ebonite slots to receive the wire with which the frame is wound, and in this case bare wire, either stranded or of substantial diameter, may be used in place of insulated wire, since the slotted ebonite carriers will serve to separate the turns.

In Fig. 3 the frame is wound as a helix, whilst in Fig. 2 the winding would take the more usual form of a solenoid. In Fig. 3 the method of rotating the frame would be by mounting it on a rod, for which purpose a guiding bracket and an upper bearing are provided, as shown. The frame shown in Fig. 2 is not arranged to rotate freely, but would be required to be moved round to stand in the desired position.



A good deal of data regarding the number of turns required for different wavelength ranges has been published. The chart, Fig. 4, published in the "Journal of the Franklin Institute," gives data on the best dimensions and number of turns for wavelengths up to 10,000 metres. Suppose that it is desired to design a frame for reception on 2,500 metres. From the chart we find the following as possible combinations:—

Size of Frame.	Turns.	Spacing.
4 feet	50	¼ inch
6 feet	40	7-16 inch
10 feet	23	¾ inch

If now we refer to the curves on the upper half of the chart we can find the "reception factor" which indicates which of these combinations is the most efficient on this wavelength:—

Size of Frame.	Reception Factor.
4 feet	6,400
6 feet	9,300
10 feet	8,600

From this is will be seen that the highest reception factor is with the 6 ft. frame, and therefore this is the most suitable for use on 2,500 metres with the spacing given.

An interesting fact in connection with the design of loop aerials for definite wavelengths is that, where the same length of wire is used the inductance will give the same fundamental wavelength, irrespective of the size of frame, if suitable spacing is arranged. In illustration of this the following table is given, which appeared in a radio pamphlet, published by the U.S. Signal Corps.

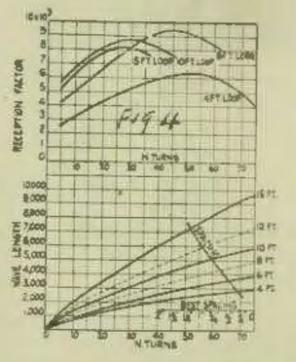
Length of Side (feet).	Turns.	Spacing (inches).	Inductance (mhys).	Capacity (mfds).	Fundamental Wave-length (metres).
8	3	[illegible]	96	75	160
6	4	[illegible]	124	66	170
[illegible]	6	[illegible]	154	55	174
3	8	1-8	193	49	183

Since a 4 ft. frame is a convenient size for general purposes, the following table of wavelength ranges obtainable with tuning condensers of different values may be of value.

Spacing of turns, ¼ inch. The wire used may be No. 22 D.C.C.

No. of Turns.	Value of Parallel Condenser. .00005	.0001	.0005
1	—	65	128
3	130	155	290
6	230	380	500
12	430	490	920
24	760	880	1,600
48	1,550	1,775	3,150
72	2,200	2,650	4,800
120	3,930	4,500	7,900
240	7,600	9,000	15,650

No. of Turns.	Value of Parallel Condenser. .001	.002	.003
1	178	250	310
3	400	550	675
6	710	1,000	1,200
12	1,250	1,700	2,050
24	2,100	3,000	3,600
48	4,300	6,000	7,000
72	6,400	8,800	11,000
120	10,000	14,700	17,700
240	20,500	27,200	32,900



Where it is desired to make use of ordinary electric lighting flex, the following data may be of value for reception on short wavelengths. In this case the condenser employed has a maximum value of 0.001 mfds., and the turns are wound without spacing.

No. of Turns.	Size of Frame.	Approximate Wavelength Range (metres).
4	4 ft. sq.	200 to 650
6	3 ft. sq.	250 to 750
9	2 ft. sq.	330 to 850

The photograph (Fig. 5), is included as of interest. This illustrates a frame aerial in use at the Observatory, Paris, for the reception of weather reports transmitted locally.

—H.S.P.

Wasteful Aerial Resistance and its Reduction

Continued from page 5

both resistance and capacity advantages. As far as connection joints and splices go, it need hardly be said that all joints should be thoroughly soldered. An unsoldered joint will corrode in time, and may increase the aerial resistance by several ohms.

One of the most prolific sources of wasted energy is in the ground resistance, and this is largely due to poor design of the ground system.

The importance of the ground will at once be evident when the amateur realises that the current density is a maximum at the ground. The distribution of current in the aerial is generally of the form shown in Fig. 2, showing that at the ground it is a maximum. Since the heating effect is proportional to the product of resistance by the square of the current, it is evident that this resistance should be a minimum. Now, there is one important reason why most ground systems as built by amateurs have very high resistances; and that there is very little surface area to their grounds, as a result the total current is confined to small area, thus increasing the current density at that point, and hence increasing the resistance to large values. In Fig. 3 (a) is shown the path which the electric lines of force from aerial to earth take. It will be seen that the lines of force from the aerial spread out a considerable distance over the earth, and that these lines of force travel to the ground through the earth. Now, if a small ground is used, as in Fig. 3 (a), the lines of force concentrate around this small ground, resulting in great current density in limited area, hence there is a great loss in heat. If, however, a large surface ground is utilised, as shown in Fig. 3 (b), the lines of force are more uniformly distributed over this ground, and there is smaller current-density, resulting in less loss and lower resistance. It is therefore best to provide a ground covering a large area. Since the electric lines of force come from aerial to ground, the ground should be placed as far as possible directly under the aerial.

There is one type of ground system which yields a minimum resistance, and which is preferable to the above type of direct ground, and this is the counterpoise ground. This is a system where either a large metal plate or a network of wires is placed over the ground and insulated from the ground, as shown in Fig. 1. The direction of the electric lines of force is now as shown. The advantage of this type of ground is that the lines of force flow directly from aerial to counterpoise, and due to the large area presented by the counterpoise, a more uniform distribution of current is obtained. This type of ground is often simpler to construct than a real direct ground, and should be given more attention by the amateur. Measurements taken on a certain particular aerial employing first a direct ground and then a counterpoise, showed a reduction in aerial resistance from 10 ohms at 600 metres, to 4 ohms at 600 metres. There is such a tremendous saving in resistance by the use of the counterpoise that the large companies use this type of ground, and have thereby been able to reduce their aerial resistance to such low values as one to two ohms.

In the actual construction of this counterpoise ground, the following must be considered. In the first place the aerial of the counterpoise should be as large as possible, and should be as nearly as possible directly under the aerial, and should extend for some distance around the aerial. The writer has found that it is more convenient to employ a network of wires for the counterpoise rather than a solid sheet, as this is too expensive and cumbersome to handle. The counterpoise should be placed about three to four feet above the surface of the ground, and should be the same distance above the ground at all points. As many wires as possible should be used, but a good average number is about 20 wires. At frequent intervals these counterpoise wires should be connected together by jumpers, as shown in Fig. 1. It must be well understood that the supports for the counterpoise wires must be well insulated from the ground, and that if wood supports are used they should be well seasoned. Not only that, but on account of rain the wires should be insulated by means of good, non-hydroscopic insulators. The wire leading to the counterpoise from the ground terminal on the transmitter should be composed of a few strips of wide copper strip, since the current is at its greatest value at the ground.

RESISTANCE DUE TO IMPERFECT DIELECTRIC.

This factor in the resistance of the aerial is very largely overlooked by nearly all amateurs. The aerial is a very large condenser, one plate of which is the aerial proper, the other plate being the earth or counterpoise. Consequently for minimum resistance the dielectric of this condenser should be as perfect as possible. Much of the increase in aerial resistance is therefore due to the presence of material in the surrounding space around the aerial which are poor dielectrics. Thus trees, buildings, etc., are a great

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Wireless De Luxe.

"Here's to the girl who's leaving us soon, to waste her time on a honey-moon," quoth a tall, brown eyed girl to a number of young ladies seated round the room, and raising aloft her cup of tea, she made a bow to a little dark haired, rosy checked girl, who was certainly the centre of attraction. "Oh! Pixie!" cried a plump little damsel sitting beside her, "just listen to that! Unwind, Thora, somebody, she'll carry on that doggerel for hours if you don't." "All right," said Thora, "I won't regale you with my gift, or in my car give you a lift, but, Pixie, dear, do tell us when you hope to see this Best of Men." "Well," laughed Pixie, "I expect Douglas early to-morrow morning, the boat gets in late to-night, but the passengers disembark to-morrow. Jimmy had them by wireless only this morning." "By the bye, how's Jimmy getting on with his experiments lately?" asked Nancy Charteris, "last time I saw him he was awfully busy." "Buying the ring?" This question from Thora, who loved to tease. "He's getting on pretty well," answered Pixie, trying not to laugh. She was very interested in her elder brother's experiments, as well she might be, for he had already made a name for himself in the wireless world, being in charge of a large station, and was at that time trying with very fair success, the latest discovery, that of controlling a boat by wireless—truly a wonderful discovery, and one that had yet to prove its utility. Jimmy had been in touch with the S.S. "Larkspur," on which Pixie's fiancee, as wireless operator, was returning from England, where he also had been studying the science.

The house had held a merry gathering of some of Pixie's old school friends, during the afternoon, viewing the trousseau, and, of course, most of the talk had been of her approaching marriage, for Douglas Meares was a favourite as well as Pixie, and many and varied were the presents, ranging from beautiful linen, silverware and crockery, to a little black kitten, much treasured by the little boy next door, who insisted on the great sacrifice of parting with his pet for "Dear little Miss Pixie's wedding-moon." Pixie and her two brothers dined alone, as their father, Mr. Harring, was out of town on business; Mrs. Harring had died when Pixie was quite a little girl, and after leaving school Pixie had acted as housekeeper for her father and brothers, Jimmy and Leslie, and a dearer little daughter, sister or housekeeper, according to them, couldn't be found. There had been an anxious time when Jimmy and Leslie were away at the front, though they had come through without any serious injury. Douglas had been in the same battalion, too, and the trio, dear to Pixie and her father, had at last come safely home, and Pixie was thinking how free from anxiety was this second return of Doug's., no submarines this time, and troubles from floating mines had been almost eliminated.

Pixie was trying to put the word "almost" out of her mind when her brother came into the room. "I'm sorry, little girl," he said, "but I think I had better tell you, I have just had an S.O.S. call from Doug. The ship has struck a floating mine; he gave me the position, but hasn't answered since. A rescue steamer is on the way out now, and I'm sending my wireless boat, too, if you'd like to come." But he got no further, for Pixie was already at his side. "Oh, Jimmy, you must get them," she said. "I'll come." But he got no further, away." On the way downstairs Jimmy explained that the vessel had made extra good time, and was only a few miles out. She had struck the mine about nine o'clock, and was sinking slowly. "If she can only last afloat for an hour or so, we can reach her yet," he said. A little later the girl was standing beside the anxious-faced man working to save the lives of "those in peril on the sea." Guiding his boat by a chart to the latitude and longitude given, Jimmy wirelessed the rescue steamer to watch out for it, and caught a faint repeated S.O.S. from the doomed vessel. Then, "Passengers in lift-boats—crew only left—sinking fast." Fifteen minutes later came a message from the rescue steamer, "Passengers picked up. Heavy sea running. Searching for crew."

Two hours later, the rescuers and rescued were safe in harbour, but the crew were missing. Jimmy seemed to have lost control of his boat, but there was still one hope, she was fitted with a motor engine, and if the wireless went wrong she could be driven. It was past midnight when a message came to the weary brother and sister, a message that was worth waiting for: "Got her going;

came just in time; will be in soon; all aboard. Douglas." A little later Pixie almost forgot the terrible hours of waiting, when she felt two strong arms round her and heard Doug's, voice saying, "What! still up? Floating mines are dashed silly things to leave about, eh, Pixie, mine?" Afterwards he explained how suddenly everything had happened. "Had we struck amidships," he said, "nothing would have saved us. We got the passengers off all right, but the wind was rising, and one of the boats sank, so the crew was left without any means of escape, but to swim! Then your boat came up. Lord it was eerie! Straight for us she came, and we clambouned aboard to find her empty! We just had time to get clear of the poor old 'Larkspur' before she turned over. Then the captain took charge of the boat, and I pottered with the wireless till I got that message to you. The other steamer would have been much too late to have been of any use to us. By Jove, Jimmy, if it hadn't been for that boat of yours we'ed all be tucked in Davy Jones' locker by this time. I can't tell you what I feel, old chap, I——" But his handclasp told Jimmy all that he wanted to say.

Among all the congratulations that Jimmy received, he deemed none so precious as his little sister's shining eyes, and her softly spoken, "Oh, Jimmy, Jimmy, dear, I think you're wonderful," as she kissed him "Goodnight."

MR. MACLURCAN'S WAVE-LENGTH.

Amateurs should note that Mr. Chas. Maclurcan (2CM) is now using a wave-length of 1300 metres.

Amateur Calls

VICTORIA

Amateur Licenses issued during month of January, 1923.

R.—Denotes Receiving Only.
T.—Denotes Transmitting and Receiving.

Call Sign	Name	Address
3 K X	Marshall, W.	209 The Parade, Ascot Vale. R.
3 K Y	Hickox, G. F.	Elgar Road, Box Hill. R.
3 K Z	Stewart, J. C.	Stephen Street, Campbell's Creek. R.
3 L A	Gibson, C.	40 Nicholson Street, Essendon. R.
3 L B	Crago, T. H.	"Thelma," 20 Willansby Avenue, North Brighton. R.
3 L C	Hargrave, H. C.	22 Wynnstay Grove, Armadale. R.
3 L D	Neven, A. T.	Werona Post Office, via Smeaton. R.
3 L E	McDonald, I. St. C.	39 Crimea Street, St. Kilda. R.
3 L F	Routledge, R. D.	State Savings Bank, Fitzroy Street, St. Kilda West. R.
3 L G	Chauvel, Ian H. K.	33 Murphy Street, South Yarra. R.
3 L H	Surridge, H.	78 St. Andrew Street, Brighton. R.
3 L I	Sandon, R. W.	226 High Street, Northcote. R.
3 L J	Reed, Joseph	80 Bellair Street, Kensington. R.
3 L K	Price, C. E.	18 Fawkner Street, South Yarra. R.
3 L L	Musgrave, A.	10 Stewart Street, Windsor. R.
3 L M	Masters, B. J.	16 Sutherland Road, Armadale. R.
3 L N	Muir, S. G.	33 Kemp Street, Northcote. R.
3 L O	Moore, L. J.	Park Street, Seymour. R.
3 L P	King, A. W. V.	"Sadieville," Rennie Street, Thornbury. R.
3 L R	Golding, R. A.	"Cloyne," Chapel Street, East St. Kilda. R.
3 L S	Busch, R. T.	30 Wordsworth Street, Essendon. R.
3 L T	Wragge, C. D.	117 Cochrane Street, Gardenvale. R.
3 L U	Black, A. V.	121 Kent Street, Flemington. R.
3 L V	Wragge, K. S.	"Woodlands," Leslie Road, Essendon. R.
3 L X	Wisewould, R.	Pakenham Upper. R.
3 L Y	Thompson, W. V.	146 Ormond Road, Elwood. R.
3 L Z	Scarlett, H. W.	361 Hotham Street, Elsternwick. R.
3 M G	Hicowe, F. H.	57 Carlisle Crescent, Oakleigh. R.
3 M H	Whitelaw, W. H.	Railway Station, Lara. R.
3 M I	Alsop, H. L.	28 Molesworth Street, Kew. R.
3 M J	Cardiff, F. H.	93 Childers Street, East Kew. R.
3 M K	McMillan, K.	26 Oak Street, Hawthorn. R.
3 M L	Stemper, C. M.	80 Chapman Street, North Melbourne. R.
3 M M	Robinson, C. A.	12 Wellington Road, Box Hill. R.
3 M N	Gray, S. T.	44 Llaneast Street, Malvern. R.
3 M O	Glenister, N.	39 Alfred Crescent, North Fitzroy. R.
3 M P	Hosken, S. V.	42 Melville Street, Hawthorn. R.
3 M Q	Carbines, F. L.	3 Heather Street, South Melbourne. R.
3 M R	Boom, R. R.	89 Osborne Street, South Yarra. R.
3 M S	Graham, J. E.	170 Toorak Road, South Yarra. R.
3 M T	Downie, F. W.	824 Lygon Street, North Carlton. R.
3 M U	Brockenshire, M. L.	109 Ramsden Street, Clifton Hill. R.
3 M V	Cohen, H. J.	10 Staniland Avenue, Malvern. R.
3 M W	Curran, J. F.	Brisbane Street, Berwick. R.
3 M X	Brockhoff, J. S.	48 Queen's Road, Melbourne. R.
3 M Y	Rogers, V. E.	5 Stirling Street, Kew. R.
3 M Z	Witt, S. H.	"Radnor," Trumper Street, Camberwell. R.
3 N A	Fendley, L. C.	23 Loch Avenue, East St. Kilda. R.
3 N B	Chivers, C. W.	21 Beaconsfield Road, Upper Hawthorn. R.
3 N C	Law-Smith, P. G.	Camperdown. R.
3 N D	Smart, R. B.	Langhein Street, Sunshine. R.
3 N E	Stirling, H. L.	204 Lava Street, Warrnambool. R.
3 N F	Small, R. H.	6 Glen Eira Road, Elsternwick. R.
3 N G	Cantor, S. J.	Asylum Reserve, Kew. R.
3 N H	Acton, N. T. L. J. D.	1 Holyrood Street, Hampton. R.
3 N I	Boddington, N. A.	85 Fitzroy Street, St. Kilda. R.

Continued from Page 9

disadvantage. But often these cannot be done away with. A more prolific source of danger in this respect is found in the insulation often used by amateurs. They do not realise that an insulator for an aerial must fulfill two important functions: First, it must insulate; and second, it must be a good dielectric, having low losses. They recognise the first, but entirely lose sight of the second. A good insulator is not necessarily a good dielectric. They should use only standard recognised insulators for their aerial. A good many of the composition products now on the market have extremely poor dielectric qualities, and should be avoided. Material such as electrose and glazed porcelain are satisfactory. Never use unglazed porcelain, fibre or wood, as these absorb moisture.

In the construction of the cage aerial, which has been here recommended, rings should be employed along the length of the cage to attach the aerial wires to. It is not advisable to use any insulating material for these rings, such as wood, fibre, or any other insulating for that matter, as the less insulating material you have in the electric field, the less loss will there be. The writer uses metal rings of copper tubing, to which the aerial wires are soldered.

RADIATION RESISTANCE OF THE AERIAL.

By following out the suggestions mentioned under the first two headings, the wasteful resistance of the aerial may be reduced considerably, and the output of your transmitter increased, in this way increasing your radiation. However, by proper design of the set, a direct increase in the useful radiation resistance of the aerial may be secured. The radiation resistance of the aerial is directly proportional to the effective height of the aerial, that is the height of the centre of capacity of the aerial. Thus by installing the aerial so that it is as high as possible, you will secure an increase in the radiation resistance. One other point that most amateurs do not seem to be aware of. There is one particular wave-length for each aerial at which the aerial will radiate best, i.e., at which the radiating resistance is a maximum. That wave-length is the fundamental wave-length of the aerial. At this wave-length your aerial radiates most energy. It should, therefore, be the aim of amateurs to build their aerials so that the fundamental is as near 200 metres as possible. Of course, if the aerial has a natural wave-length of 200 metres, it must be loaded up with enough coil to permit coupling to the secondary, which immediately increases the wave-length. This should be compensated for by means of a series condenser. All other things being equal, an aerial which radiates at its fundamental will carry further than one which does not.

Fig. 1 shows the details of the aerial as described herein, which gives excellent results. A six-wire aerial is used, made of seven strands of No. 18 phosphor bronze wire. The length of the aerial cage is about 75 feet, the diameter of the cage being five feet. Every 15 feet a metal ring of copper tubing is used to attach the wires. The wires are wound around the metal rings twice, and then soldered, as shown in the details. The lead-in is likewise a cage, but tapered, with similar spacing rings, which are of reduced size on account of the taper. Electrose insulators I use at the end of the aerial, and also for the lead-in. The counterpoise is supported by wooden stakes, but at each stake, small electrose insulators are employed to keep the wires away from the stakes.

Finally, a last word with reference again to the insulation employed on the aerial. Insulation cannot be too strongly stressed, and it is suggested that the insulation on existing stations be looked over, and it will probably be found that improvements can be made.

DON'TS.

Don't try to transmit without a license.

Don't forget that tube sets are far more efficient than crystal sets.

Don't handle the crystals of your set.

Don't try to get a fine adjustment while touching the detector with bare hands.

Don't fail to make good connections.

Don't forget to scrape off the insulation and have wires bright before making connections.

Don't cover joints with adhesive tape; use "spaghetti" or varnish cambric tubing wherever possible.

Don't oil any portion of a set.

Don't blame your set until you are sure it is not your fault that something is wrong.

Don't be discouraged if the first galena crystal you try is not very sensitive. Try a number of pieces.

Don't connect the lighting switch to an inside ground.

Don't use iron for an aerial.

Don't forget to keep the aerial and lead-in insulated from all other objects.

Don't forget that a good ground is necessary.

Don't try to use your instruments just before, just after, or during a thunder storm.

Don't rush blindly at the set and turn knobs and handles hit or miss if anything goes wrong. Be calm and patient and go slowly. Haste makes waste in radio as in all things.

MOUNTING FOR LOOP AERIAL

A unique method of mounting a loop aerial, so that it is steady yet at the same time may be freely rotated, is shown in the diagram here given.

All the material necessary is one dozen nickel-plated chair leg knobs which can be purchased in any hardware store for 24 cents and 2 ordinary shelf brackets—2 for 5 cents. All other things that are used can be found in any home.

Any kind of a loop or any type of winding can be employed, the amateur usually preferring his own style. I will therefore deal solely with the construction of the mounting. The exact measurements are shown in the illustration.

The base Fig. 2, is constructed of ¾-inch pine 10 inches square. Legs 1 by 1 by ¾ of an inch are attached to the corners to allow for variation of the length of the bolt. A 3/8-inch hole is drilled in the exact centre of the base.

The turntable Fig. 3, is the same size as the base. Find the exact centre and draw a circle with a radius of 4 inches. Fasten the knobs at equal distances on this circle. Now bore another 3/8-inch hole in the centre of the turntable.

Fasten the shelf brackets on opposite sides of the support A. Drill another 3/8-inch hole, K, in the end of the support deep enough to afford ample support for the frame, yet avoiding the hole for the outside wire of the loop, J. It must be understood that the loop is not depending upon the bolt for its support. Now pass the bolt through the base, turntable and the hole in the end of the support and adjust the nut so that the turntable knobs sit flush with the base.

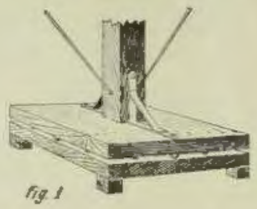

fig 1

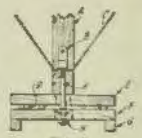

Fig 2

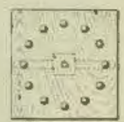

Fig 3

Contributed by C. F. Bohlig.

SHIPS YOU SHOULD HEAR THIS WEEK.

DURHAM	XIB
HATIPARA	BHH
MONTORO	GDJC
PORT PIRIE	ZSV
PORT STEPHENS	ZSU
RUNIC	MWC
VENTURA	WHL
WAIHEMO	GDBQ
BARADINE	GFBN
CARINA	VZM
MORELLA	GBKJ
ORVIETO	MOJ
THEMISTOCLES	MGM
ECHUCA	VZBG

HAVE YOU A LICENSE FOR THAT SET?

Wireless amateurs are warned that they must hold a license before they can use a wireless set. With the increasing number of experimenters, a very strict watch is being kept for breaches of the Wireless Act.

LEICHHARDT AND DISTRICT RADIO SOCIETY

The membership of the Leichhardt and District Radio Society continues to grow, and several new faces were noticed at the usual weekly meeting held on Tuesday, March 27th.

The Society has received an offer of the use of more convenient and commodious premises for the carrying on of its business, and it is probable that the offer will be accepted. Members are requested to watch these columns for a further announcement with regard to this matter.

In the meantime weekly meetings are held every Tuesday night at Victory Hall rear of Methodist Church, Johnston St., Annandale, and any inquiries regarding the Society's activities will be willingly answered by the Hon. Secretary, Mr. W. J. Zoch, 145 Booth St., Annandale.

WESTERN SUBURBS AMATEUR WIRELESS ASSOCIATION.

General Meeting held 7th February, 1923.

Owing to the numerous number of junior members about the club, it was decided to consider the introduction of a junior section. This section it was proposed to have a lower fee and provide the information suitable for the juveniles and school boys who work on pocket money of a few pence.

To the grief of the Club also was the resignation of the Hon. Sec. of Mr. W. B. Martin, was read and accepted.

Mr. Martin, although not long with the club, proved very proficient as a secretary, and his leaving the district compelled him to resign. The Club regret the loss of their secretary and hope for him a very successful career in the wireless cause elsewhere.

In conclusion, a new member was elected, and Mr. Phil Renshaw, Hon. Sec. Wireless Institute, was entertained, and later in the evening talked to the club of the many queries of wireless. Also during the talk with Mr. Renshaw the affiliation of clubs was discussed at length.

The Club wish to make it quite clear to amateurs that they are ever willing to help the cause when required to do so—to club members or not.

Correspondence to Hon. Secretary pro tem, H. Atkinson, Pine and Cumberland Rds., Auburn.

CROYDON RADIO SCHOOL.

Mr. Chas. Slade, of Lang Street, Croydon, who holds first-class operator's certificate, was for 13 years P.O. telegraphists in the British Navy, has opened a Wireless and Morse Code School at the above address.

At present he is holding numerous evening classes in Morse Code for which he charges a normal fee for each lesson.

These classes offer a splendid opportunity to those who are passing from Crystal to Valve and wish to pass the 12 words a minute test.

AMATEURS GOING STRONG.

Listening in during the Easter holidays for Amateur transmitting. I was surprised at the number of stations I heard on telephony.

Radio College was sending sacred music on Friday night; it came in strongly, and the modulation was perfect.

Mr. Colville has also been sending over good stuff.

Mr. Crocker was going ahead every evening; I listened in on Monday evening. Burwood Radio came in stronger than any of the others. There is no difficulty in getting good amateur music any night in the week; just listen in on wave-lengths between 200 and 410 metres and you will be sure to hear at least 2 or 3 transmitting.

A WIRELESS DINNER.

Take half a dozen leaks, one pound of high frequency currents and a pint of ether. Remove the cores from the leaks, and carefully stone and insulate the high frequency currents. Strain the ether through a finely meshed grid to remove electrons. Beat well in a heterodyne receiver, and ionise for half an hour. Place in a transformer until done to an ampere turn, and serve with a garnishing of statics on a hot plate.

CORRESPONDENCE.

X.I.V.6. writes:—

In your issue dated the 23rd inst., I was surprised to hear that Miss Josie Melville was the first theatrical star to entertain the Australian public by Radio phone. Speaking of personal experiences I can call to mind the spending of an afternoon listening in at Westernport, Vic., to a concert conducted from His Majesty's Theatre, Melbourne, a distance of over 40 miles away. On this occasion Miss Maude Fane sang several items, assisted by several other artists. Mr. Fisk, of the Amalgamated Wireless, conducted the wireless transmission, on about 950 metres. The music was excellent, and could be heard several yards away from the model. The model used was a French eight valve resistance capacity coupled amplifier with the last valve employed as a note-magnifier. VIM at this time (I am speaking of 12 months ago) used to broadcast some excellent music and speech, really the best I have heard in Australia. He was reputed to have been heard by VPD Suva. This is about an Australian record for telephony. Even at the best of times we could only hear VPD at about strength 4, but VIM was really a success at the time, and under very good conditions, or on a freak night he may have been heard at Suva. Personally, I think the operator at Suva must have strained his eardrums a great deal to hear VIM.

We have great pleasure in listening in at Mr. Maclurcan's concerts. He is good. 2BB is also very good and we received his speech and music at maximum and his modulation was excellent, when he was in full swing. At times he went off on account of his valve becoming too hot apparently but we are very pleased to hear him and consider him a great asset for dispelling dull care. He asked for a ring, but we are unable to ring from where we are lying. Y2738 is the number, I think. 2FA was a great success on Monday evening on 410 metres, but was jumbled for a time by 2BB testing on 200 metres. It's hard to say whether 2BB's tuning was long or whether our amplifier was the culprit, as it is anything but selective on waves below 600 metres. We use a seven valve Marconi amplifier with a 8 valve as detector and naturally these concerts can be heard several feet away from the phones. VKO and VIS are great users of unnecessary power, especially the latter, but VIS must play with something, hence his continual calling of ships out of range on maximum power. We hear him very plainly here, more plainly than the concerts in fact. Well, I will quit for the present. Hoping to hear more of you.

QUESTIONS

Accompanied by the coupon below will receive a prompt reply. Please understand that 2 questions only can be answered with each coupon.—Editor.

Question Coupon
To Information Editor
AVAILABLE TILL 10-4-23
NAME ____________
Address ____________
FOR 2 QUESTIONS ONLY

For Sale or Exchange

"Every little helps," said the H.T., as it jumped across the filament.

WELLINGTON BROADCASTING NIGHTS.

The following "Broadcasting Nights" is published in the New Zealand "Broadcasting News."

Australia seems to be the very last. If New Zealand with her smaller population, can make broadcasting, why cannot it be done here.

"Monday night.—De Forest Company.

"Tuesday night.—Federal Company.

"Wednesday night.—Federal Company.

"Thursday night.—Federal Company.

"Friday night.—De Forest Company.

"All the above concerts are broadcasted on 270 metres, starting at 7.30 p.m., finishing between 9.30 and 10 p.m."

Seen at the Wireless Revue—Valve legs.

Song of the lost signal—"Come Back to Erin."

Why did the valve oscillate? Because it had got the "ague."

* * *

He who oscillates is "cussed."

* * *

Waves of a feather jam together.

* * *

Why did the valve "howl?" Because an electron passed round the plate, and found it 2 M. T.

* * *

Radio Greetings.—"Hallo, Old Grid!"

Published by W. J. Maclardy, "Truro," Powell Street, Neutral Bay, at the offices of W. M. Maclardy, 241 Castlereagh Street, Sydney.