



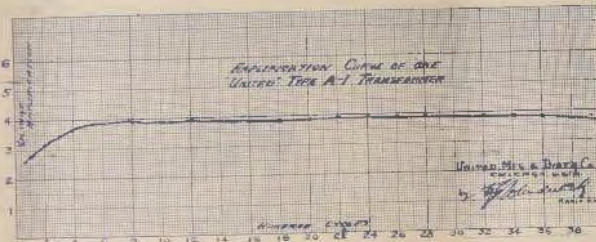
UNITED.....



Transformers

UNITED
Type A-1 Ratio 5 to 1

UNITED
Type A-2 Ratio 3 1/2 to 1



Let Us Once and for All Times Settle This Question of Audio Amplification

Transformers, in order to give perfect audio amplification must have a characteristic curve as near to a straight line as possible.

United Audio Transformers have just such a curve as can be seen from the above chart.

A perfect audio transformer necessitates the best of core and winding design and construction.

In the United the best of core iron is used, a proper air gap is another reason for their perfect performance, and the winding construction and impedance further combine to make it the absolute best.

The winding ratio and shielding present other items necessary to a perfect transformer.

The Good United Transformers have solved both questions in an admirable manner.

Last, but really first, a perfect audio transformer must give perfect practical results.

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Ask your dealers to show you these transformers, and other United efficient Radio parts. Variable Condenser, plain and vernier

Try them and convince yourself. Results speak louder than advertisements.

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Dealers' Winter orders for Signal, United, Remler and other parts should be placed soon in order to give us an opportunity to protect dealers' requirements. Our sales are now many times larger than expected. Please advise us.

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Manufacturers of Radiovox Sets
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28 CLARENCE ST., SYDNEY

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OFFICIAL ORGAN OF THE AUSTRALASIAN RADIO RELAY LEAGUE.

Vol. 3.

February 22, 1924.

No. 20

Country Transmitting Sets.

A glance at the long list of experimental licenses granted to date shows the wonderful growth of the number of transmitting stations, mainly in the cities.

The old days when 2CM and 2JM and one or two other well-known experimenters were the only ones on the

air, are gone forever, and we are entering upon a new era.

The spread of transmitting stations in the country districts has been disappointingly slow. Many of the country towns have their Radio Clubs, and the aim of every progressive club should be to operate its own transmitter.

Broadcasting has undoubtedly done much to popularise wireless and coupling with that the vast increase in experimental activities in the cities, we may confidently expect that 1924 will show a big number of "T" call signs allotted to the country.

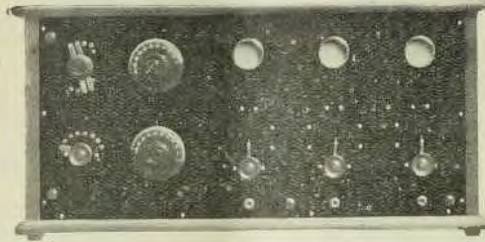
Roster for Week ending 27th February, 1924

	7.30 to 8.0	8.0 to 8.30	8.30 to 9.0	9 to 9.30	9.30 to 10
Thur, Feb. 21	2 RA 2 GR	2 IJ 2 JM	2 AR ZG 2 AR	2 UW	2 YI 2 ZZ
Friday, 22	2 IJ 2 GR	"	"	2 ZN "	" "
Saturday, 23	2 RA 2 GR	2 IJ "	"	" "	" "
Sunday, .. 24	2 RA 2 GR	2 IJ "	"	" "	" "
Mon., 25	2 RA 2 GR	2 IJ "	"	" "	" "
Tues., 26	2 IJ "	"	"	2 ZN "	" "
Wednes., ...27	2 RA 2 GR	2 IJ "	2 VX	2 UW	" "

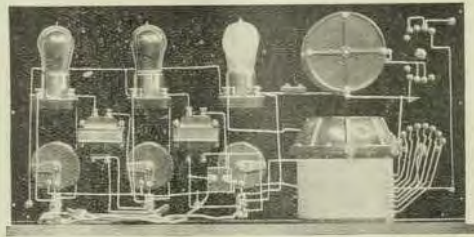
2 DS works with 2 CM as 2 CDM Testing on Trans-Pacific Test Set

WIRELESS WEEKLY CUP COMPETITION

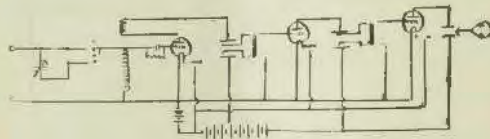
EXAMPLE SET



1. Completed Set.



2. Interior of Set



3. Circuit Diagram

THREE VALVE EXPERIMENTAL SET.

This set consists of 24 x 12 Bakelite Panel; a vario-coupler, with a wave length range from 200 to 1500 metres; a .001 mfd. variable condenset, with vernier adjustment; series parallel switch, switch and studs for varying the wave length; one 6 ohm. rheostat, and two 30 ohm. rheostats; jacks and plugs to enable the use of one, two or three valves; 2 Jefferson transformers; one UV-200 radiotron valve and two UV-201A radiotron valves; 3 bezels, set in panel; 2-40v. Ever-ready high tension batteries are placed inside cabinet, the connection being made with flex and Morse clips; all insulation throughout is of the best Bakelite.

COUNTRY COMPETITORS

Reports from Radio Clubs and dealers in Wireless Apparatus indicate that several sets for the Wireless Weekly Cup Competition are in course of construction. Enquiries from a number of places in Victoria and N.S.W. have been received. Country radio enthusiasts appear to have made an early start. The closing date for entries will be announced later.

Intending competitors will be well advised to send their nominations early.

Photos of sets should be printed on glossy paper and the diagrams of the circuit should be drawn in ink. The circuit of the set must be shown.

The diagrams need not be elaborate, but should show clearly the wiring and all necessary details.

What is Required.

- 1. One photo, not less than 4in. by 3in., showing the set complete.
- 2. One photo, not less than 4in. by 3in., showing the wiring of the set.
- 3. An ink diagram not less than 4in. by 3in., showing the circuit and wiring.
- 4. A small paragraph of not more than 100 words describing the set.
- 5. The nomination form shown here, witnessed by a member of the committee of a radio club or any trader advertising in Wireless Weekly, or a local J.P.
- 6. Entries should be addressed to the Editor, Wireless Weekly, 33 Regent St., Sydney, N.S.W., and marked "Wireless Weekly Cup Competition" in the bottom left hand corner.

Great interest and enthusiasm is being shown in this competition, and the number of enquiries received from other States shows that much importance is attached to the result.

It will be not merely the general appearance of a set that will be judged, but also the method of wiring, placing of the various parts, and the efficiency of the circuit submitted. In fact, the winning set will be as nearly perfect as is possible, so it is up to every competitor to put absolutely the best work into his outfit.

NOMINATION FORM

I _____ of _____ desire to enter my _____ set in Wireless Weekly Cup Competition. I agree to abide by the conditions set down by the proprietors, and I solemnly declare that I am a wireless amateur as defined in page 2 of W.W. No. 15, Vol. 3, of January 18, 1924.

(Signed) _____

Witness _____

WIRELESS TRAGEDY

The Moore Fund

The response to the appeal for funds to assist the widow and children of the late Mr. Moore, although meeting with a fair amount of success is by no means as ready as might be expected. There are more than three thousand licensed experimenters in New South Wales alone. If each of these forwarded along a few pence only the sum which would be raised would be a very substantial and very satisfactory one.

This is your opportunity to demonstrate in a practical manner a statement which you have been making for months past to the effect that the experimental movement really comprises a band of brothers.

The fund which has been inaugurated by Wireless Weekly in aid of the dependents of the late Mr. Moore has been well supported, but perhaps not to so great an extent as might be expected. There are thousands of wireless amateurs in the State and to these an appeal is again made for help.

Mr. Moore's death has left his wife and two kiddies in need of help. We are all proud of the wireless movement in Australia, we look upon ourselves as a body of men above the general average. Let us show by our practical sympathy that we are a solid and a sympathetic body of men.

The funds raised will be handled by a Board of Trustees consisting of Messrs. F. Basil Cooke, Phil Renshaw, and J. W. Robinson. These gentlemen will see that the money is properly disbursed.

No amount need be considered too small. Whatever your donations may be, send it along at once to either Wireless Weekly, 33 Regent St., Redfern, or to Mr. Phil Renshaw, Box 3120, G.P.O., Sydney.

The whole of the wireless apparatus belonging to the late Mr. Moore is on sale at the shop of Miss Wallace, Royal Arcade, Sydney, where all experimenters are recommended to call and see whether there they cannot find something they require and thereby help his dependents.

The aerial which is at present standing at the late Mr. Moore's residence, Haberfield, is still for sale. Will any amateur in need of a first-class outfit, and is unable to make a cash



The Late Mr. F. L. Moore

contribution towards the fund, make a generous offer? By doing so they will be rendering a great service to the trustees in winding up the estate.

Contributions to date:

Proprietors Wireless Weekly	£5 0 0
United Distributing	10 10 0
Mr. Quaife	0 10 0
Wireless Weekly Staff	1 3 6

P. Renshaw	3 3 0
Mr. Jones	0 10 6
G. Taylor	1 1 0
J. W. Robinson	1 1 0
F. Basil Cooke	1 1 0
O. Sandel	1 1 0
Mr. Allsop	0 10 6
Mr. Saunders	0 10 6
Robert H. Doyle	1 1 0
Miss Day	0 10 6
A. F. Price	0 10 6
R. C. Marsden	1 1 0
A. Dare	0 10 6
M. McIntosh	0 10 6
Colville Moore	1 1 0
— Herker	0 5 0
— Sanders	0 1 0
Concord Radio Club	0 10 6
V. J. M. Darby	0 12 6
Wireless Institute	5 5 0
J. Usher	0 5 0
D. T. Hitchen	5 0 0
R. W. Faulkes	0 2 6
G. A. Taylor	1 1 0
A. Dixon	1 1 0
J. Lendlaw	1 1 0
C. Storm	0 15 0
H. Carter	0 5 0
A. Larkin	1 0 0
E. Mason	0 5 0
N. Ambrose	0 3 0
J. G. Prichard	1 0 0
Keith Davis	0 5 0
C. Leaver	0 5 0
R. Seach	0 2 6
Campsie and District Radio Club	0 15 0
A. E. Henry	0 5 0
Total	£51 11 0

Where the Amateur Is Drifting.

(By Malcolm Perry.)

If you were engaged in a business and wanted to form a sound opinion as to whether your business was developing in the right direction, you would naturally seek the advice of your customers, and the intention of this short article is not to tell the amateur in what direction he should confine his experiments, but to make him think for himself; for, after all, children do not go to school to learn dead languages and higher mathematics that they may be useful to them in after life, but to train the brain to argue and reason for itself.

And so, having been actively associated with the wireless movement from the year 1905, practically the commercial beginning of wireless, I am now able at times, to look backward and see what the amateur has accomplished, and in what direction his experiments can be of most use to mankind.

First of all, let me state that even with the great progress that wireless has made, its greatest blessing at the present moment is still the same as it was in 1905, that of saving life at sea, but a new blessing is just looming on the horizon and that is broadcasting, which will give every man, woman and child free education, and reasonable amusement; and if broadcasting is developed in this direction, it will become a commercial necessity. I have prefaced this article with these few remarks because I want to show the amateur the commercial reasons for his experiments. For example, many experimenters have spent a considerable time in endeavouring to perfect recording devices for wireless signals, but do they know that over ten years ago all recording devices on land and line telegraphs were cut out. Recording devices, however, for high speed reception would be a valuable asset, as this would enable more traffic to be put through and every amateur knows that each wireless station can only send out on one wave length at a time, whereas quadruplex telegraphy can be carried out on a single land line wire, thereby increasing its carrying capacity.

Again, it is very interesting to see the number of multi valve sets that experimenters construct, which, whilst

producing marvellous results at times, only produce these results when ether conditions are favourable. I think it is a generally accepted theory that if you cannot get audible signals in the detecting valve, that all the amplification on the face of the earth is useless. Therefore, those experimenters taking up the study of wireless should perfect themselves in the use of one valve before tackling multi-valve sets, and may I go a bit further by suggesting that they give the crystal a good try out before taking up the valve.

Does the present day experimenter know that every member of the Wireless Institute in the year 1913, was getting commercial signals from Melbourne, Adelaide, N. Zealand, Hobart, Brisbane, Townsville, Port Moresby, Macquarie Island, and sometimes Perth, using a crystal detector, and yet quite a number of experimenters have to go for their lives to get these stations using a single regenerative valve. It was an every night occurrence to listen to ships half way across the Australian Bight, and those experimenters operating before the war will remember the two way traffic between the old station on the Hotel Australia and ships in the Australian Bight. So after all, have we progressed? We only have to refer to old newspapers to see the records that were put up by ships using the Marconi system, with magnetic detectors, and here it is interesting to mention that I have met several operators who still favour the magnetic detector for ordinary commercial traffic. So, perhaps, after all, some of the earlier gear which the valve expert despises, may be found to have its uses. Take for example the spark transmission of amateurs in the year 1912. Using only lin. motor car ignition coils, distance up to 50 miles was obtained, using crystal receivers, and yet every amateur's idea is to use a valve transmitter, and why? Simply because everybody else uses them, and he wants to get the greatest distance possible. But is this necessary. Is it necessary for an ordinary ship station to be able to communicate direct all round the world? No, its function is to communicate with the nearest ship and land stations. Certainly, I know that regulations do

not favour the spark transmitter, but isn't there any amount of room in Australia for thousands of spark transmitters without causing interference to anyone, and look at the low cost of a small spark station, and how easy it is to operate. Wouldn't it be a great blessing to Australia if every man on the land in lonely parts, was equipped with a small transmitter and receiver, so that he could communicate with his neighbour five miles away.

In the years 1912-1924 the majority of Sydney experimenters used buzzers to communicate with one another, and the buzzers only cost 3/6 a time. The Australian Radio Relay League is gradually feeling its feet, but does not at the present moment receive much public support, but it will have all Australia behind it when the general public know that it is organising a body of highly trained men with transmitting and receiving stations all over Australia. What a wonderful asset they would be to Australia in time of war, anyway, where did all the wireless men come from to fill the jobs as operators on troop ships, at the outbreak of war? Surely they came from the ranks of amateurs.

I could go on writing for hours about the wonderful possibilities of the amateur movement, and how they can become a great national asset as they have in America, who realises their value, but I set out in the commencement of this article to endeavour to make the amateur think for himself, and I trust I have succeeded.

★
J. L. SCOTT
★

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Sydney

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Parts.

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STATIC: Radio's Greatest Problem.

The tremendous obstacle to reliable radio communication offered by static has been recognised from the early beginnings of the art. Every radio engineer and scientist of note has made some effort to solve this problem. While long distances may be bridged by relatively small amounts of power, as may be witnessed by amateur trans-Atlantic transmission and reception, yet this cannot be accomplished consistently every day and night in the year on account of static, and everyday consistent transmission is essential to a good communication system. In order to overcome the effects of static and secure a favourable signal-to-static ratio it is necessary to increase the power at the transmitter to enormous magnitudes, 200 to 500 kw. The cost of such installations and power as compared to a few kw, is the price that must be paid for the existence of static. Of course, very powerful amplifiers could be used at the receiving end to amplify the weak signals from a low power station. But the unfortunate part of such a system is that static is equally amplified, with the result that nothing is gained. The only way the ill effects of static may be overcome is to use brute force and ride over it with a power greater than its own, which means powerful transmitters. In order that maximum use may be made of the power of the transmitter it must be radiated most efficiently. This means high towers and large antenna structures, which make up the major cost of the transmitter. Thus it is at once seen that if static could be eliminated the tremendous cost of building and maintaining transoceanic transmitters would be reduced to small sums. The weak signals of the low power transmitters could be sufficiently amplified at the receiving end. Cost of messages would be reduced considerably, fairly constant communication would be maintained and the cables would meet an active and aggressive competition.

This problem is the bugbear of radio. More money has been spent in the search for the solution than on any other problem in radio. The man who solves it will go down in radio history as the saviour of radio. Many solutions have been offered in the course of time, and it is of great in-

terest to go over these solutions to see what progress has been made toward the solution of the problem, and to see in what direction modern research is leading.

Before touching the advanced solutions it is important to understand just what static is, how it is produced, and the explanations advanced by leading scientists as to its origin. It is an atmospheric disturbance which must be electrical in its nature, since it produces on a radio receiver the same general effect as an electromagnetic wave, namely it gives rise to electrical oscillations in the receiving system, which oscillations are converted into sound. But the sounds produced are of such erratic and irregular nature that they interfere with the reception of signals. These atmospheric disturbances are due to electrical discharges in the atmosphere, as, for example, between clouds. In order that electrical discharges should be possible there must be a source of electricity in the atmosphere, and according to one of the most prominent theories this source is the sun. It is now well known that hot bodies give off electrons, the vacuum tube filament being an excellent illustration of this

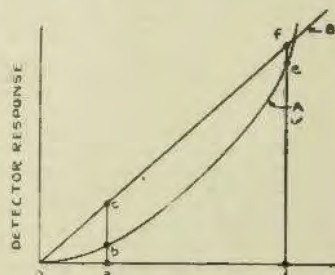


Fig 1 Detector Response Curves

fact. The sun, therefore, emits enormous numbers of electrons, since its temperature is so great. Due to the loss of these electrons, the sun must be at a great positive potential. The great positive potential of the sun and the emitted electrons constitute the source of atmospheric electricity which results in static.

There are two types of static which give most of the trouble. These are called "clicks" and "grinders," and are expressive of the nature of the disturbance. Clicks are widely separated disturbances which are of sufficiently strong intensity to interfere with reception. The grinders consist of all sorts of continuous noises of a grinding and grating nature which cause most of the trouble. The difficulty of weeding out static will be apparent from an elementary consideration of what happens in the antenna circuit.

When an atmospheric discharge takes place, as for example between two clouds, it acts as an electrical impulse on the antenna and sets the antenna oscillating at its own natural frequency, and these vibrations are transmitted and rectified in the receiver, and give the bothersome noises known as static. But this is also what happens when a signal wave strikes the antenna, the antenna, being tuned to the signal wave, vibrates at its natural period and gives signal. Thus it is seen that the behaviour of static with respect to an antenna is identical to the behaviour of a signal wave with respect to an antenna. This is the reason it is so difficult to separate static from the incoming signal. If an attempt is made to amplify the signal so that it will be more intense than static we run into the difficulty of having to amplify the static in the same proportion and therefore gaining nothing. If, on the other hand, an attempt is made to weaken the intensity of static we run into the other difficulty of weakening the incoming signals in the same proportion, and hence again gaining nothing, both these difficulties arising because signals and static affect an antenna in the same way. It is for this reason that many of the panaceas for static elimination have failed. For, when they have either weakened or eliminated static they have likewise weakened and eliminated the signals. This statement applies to most of the earlier methods, such as loose-coupled receivers, Marconi's balanced detector, and audio-frequency compensation. Let us now see what have been the progressive steps which have led us to our present position in which static seems to be attacked by methods which show promise of its demise.

Other methods have had the effect not so much of eliminating static, as of increasing the signals, so that the ratio of signal to static increased, thus making reception possible through static. Of these, one of the most practicable is the method of heterodyne reception. Most methods of detection take place on the square law basis, that is, their response is proportional to the square of the applied signal voltage. But these detectors are not very sensitive to weak signals, and as a result the ratio of static to signal is large and the signal is generally lost in the static. The heterodyne method, on the other hand, is not a square law detecting method, but its response is proportional to the first power of the incoming signal. But, due to the effect of the local heterodyne oscillator, it is extremely sensitive to weak incoming signals, as a result of which it gives a very powerful response to weak signals, while its response to strong static is equal or less than that of the square law detector. As a result the ratio of signal to static is considerably greater, and reception is possible. Here the ill affects of static are overcome, not by elimination, but by increasing the advantageous affects of the signal itself. The manner in which this is done is more evident

from a consideration of the response curves of both types of detectors, as in Fig. 1. Curve A shows how a square law detector such as a straight vacuum tube with a grid condenser and leak, or a crystal, responds to signals of different intensities. Curve B shows how the heterodyne detector responds. Oa represents the value of a weak incoming signal. The square law detector gives a response equal to ab , while for the same signal excitation the heterodyne detector gives the response ac , several times louder. On the other hand we have a large static impulse exciting these detectors, the intensity of the static excitation being represented by Od . The response of the square law detector is given by de , while that of the heterodyne detector is given by df , which is not much greater than that of the square law detector. It is at once evident that the ratio of signal to static in the case of the heterodyne detector is much greater than in the other case. This means has therefore been valuable in reducing the harmful effects of static, though it has not eliminated static. Another reason why this method has proved so beneficial in counteracting static is that by properly adjusting the heterodyne note the operator can more easily read through the static. He can arrange to receive a musical 500-cycle note, or 1000 or 2000-cycle note, or whatever note will give best results, by the simple expedient of varying the beat frequency. This method of reception is one of the best yet available.

other direction. Thus signals from the direction in which it pointed were received more efficiently, and at the same time static from other directions, though not eliminated, was reduced, thus giving a very favourable ratio.

Another form of antenna which was very effective along the same lines is the loop aerial. The loop aerial has very marked directional characteristics, as shown in Fig. 2. It will therefore eliminate signals coming from directions in the angle AOB . Thus, by using a loop, static from these directions is likewise eliminated. Pickard has found that the use of a number of these loops gives still greater improvement in directional reception,

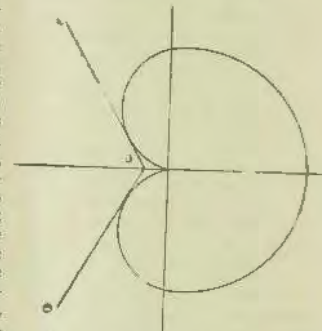


Fig. 2. Directional Characteristics of Single Loop

thereby still further improving the signal-to-static ratio. The loop aerial has the added advantage that it is possible to orient the loop very easily to pick out the station it is desired to hear. For its dimensions are relatively small, and it is mounted so that it can easily be rotated by a handle. It is for this reason that it is so largely used as a direction finder and radio compass.

Most of the important work, until recently, on the elimination of static was done with the loop and low horizontal antennas. Fairly good results were obtained by the various investigators, but not good enough. The next step was the utilisation of a number of these means together. Work was done with a number of loops working in conjunction, and also with loops and open wire antennas working in conjunction. The net result of such methods is to increase still more the directional properties of the system, thereby eliminating to a greater ex-

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Some of the most promising methods are those involving the use of an aerial differing from the usual vertical antenna, which receive equally well in all directions. Thus, although it may be receiving signals from a transmitter due north, it may at the same time be receiving static from all directions. Obviously such a system gives a poor signal-to-static ratio. The step was therefore taken to reverse the process by receiving static from but one direction, and at the same time to receive the signal best in the desired direction. As a result of eliminating all the other static except that coming from the signalling direction the signal-to-static ratio was increased many times. This is accomplished by the use of different types of antenna. The very first of these was the Marconi horizontal antenna, which was found to have marked directional characteristics, it received better in the direction along its length than along any

lent static from other directions, and thus increasing the signal-to-static ratio. This is shown graphically in Fig. 3, which was originally given by Pickard. The dotted curve shows the directional properties of a single-loop antenna. The dash-and-dot curve shows the directional properties of two

loop collectors working in conjunction, which is seen to be better than the single loop. The full line curve shows that for three-loop aeriols, which is seen to be the most directive. By such arrangements whatever static does come in is confined to a small angle.

one loop would be impeded by the signal sooner than the other. These voltages would therefore be different and out of phase, but, since they were likewise sent through the differential transformer, they would not neutralise each other, since they were out of phase and were unequal. They would, however, add up and give a resultant signal. Thus it is possible to obtain a signal voltage, while eliminating the effect of static. Although the theory of vertical propagation of static has not been definitely proved, yet it is possible to obtain the effect here described. However, the arrangement of apparatus required for such a system is extremely complex and sensitive, and it is often difficult to obtain the necessary balance and adjustment of apparatus to effectively balance out static.

One of the most recent methods advanced is the use of the so-called Rice-Beverage wave antenna. This is a modification of the Marconi horizontal antenna. It is a single wire, or sometimes two wires, whose length is of the order of the wave length to be received

One of the most prominent systems of static reduction based on the working of a number of wave collectors together is that due to Weagant. He based his investigations on the theory that static originated from some point overhead. On this basis he devised an ingenious system for eliminating its effect. Since static came from above, it would strike two loops at the same distance, no matter how far apart they were separated. Also since these loops were impulsed simultaneously by the static excitation the static voltages set up in these loops would be exactly equal. Thus by combining these two voltages in a differentially-wound transformer so that their voltages opposed these two static voltages could be made to neutralise each other. On the other hand signal waves are known to be propagated horizontally, hence

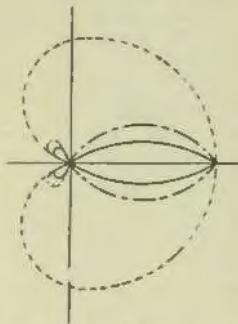


Fig. 3. Directional Characteristics of One, Two and Three Loops

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Therefore we are offering to beginners a very fine crystal receiving set, equipped with 2 sets of 2000-ohm head phones for a price actually less than you can buy an ordinary set with one set of head phones.

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Besides the two sets of phones, you get a special Multi-point Detector, which does away with all the troublesome delay and feeling around for a contact with the ordinary style of out whisker detector.

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will give you practically all of the enjoyment of an expensive bulb set with a loud speaker. In fact, it has one big advantage over the expensive sets, in that you will only get a fraction as much interference. Moreover, authorities on radio are agreed that the reproduction qualities of a good crystal set are far superior to any bulb set for local concerts, i.e., within a radius of 25 miles.

The Receiving Set.

The Penberthy Crystal Receiving Set is simply operated, durable, and has a splendid appearance. The case is made of heavy gauge steel beautifully finished in black enamel. It is of two-slider type, making very accurate tuning possible. These sliders are controlled by graduated dials, a feature found only in the most expensive type of receiving sets. All the parts are carefully made utilizing the best materials and workmanship.

There is nothing that can easily get out of order or wear out.


The Head Phones.

The true index of power of an electro magnetic device depends on the number of ampere turns embodied in the windings.


With this as a premise it is evident that by using a round two pole construction instead of the standard two pole rectangular cross section construction on Radio Phones that a greater number of turns can be used in much less space and at the same time, retain an equal ohmic resistance.

The coils of the two pole phones are of the spool type, and are wound with No. 42 enamelled copper wire, on our own specially designed automatic winding machines, which insures absolute uniformity in the number of turns, evenness, etc. This feature, with the "Empire" fabric insulation in the bottom of the case makes grounding of the case or coils impossible. The result is that this type of phone will withstand an extremely high voltage and eliminate all danger to the operator.

The magnets, like all of the material used in this phone are the best obtainable, and the strength of each is thoroughly tested by means of a permeometer.



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As the strength of all phones depends to a large extent on the strength of the permanent magnet, we have adopted the so-called consequent pole type, which are built up in laminations.

The final test for tone or audibility is made against a master phone and in this way each set is correctly matched at a frequency of 800 cycles.

These phones are accurately wound to 2000 ohms resistance, and, therefore, when comparing with other phones, it is very essential that they be compared with the same resistance phones. If connected with a phone of less resistance, the 2000 ohm will naturally seem weaker on account of the greater flow of current going to the receiver of less resistance. Therefore, unless the phone sets are of the same resistance, do not connect them together for comparison purposes.

FOR SALE.— $\frac{1}{4}$ K.W. Transformer, with Split Secondaries, H.T. Tapped, 350v. to 600v. L.T. Tapped, 6v, 10v, and 50v., also Closed Core Choke. Offers: G. Blanchard, 62 Bligh Street, Newtown. Tel. L1483.

African High Power Station.

The Wireless Telegraph Company of South Africa (Ltd.) has been recently organised to provide international telegraphic service for the Dominion. The principal high-power station is to be located at Klipheavel Station, Cape Province, about 30 miles by rail from Cape Town, according to advices to the Department of Commerce. The site comprises about 1,000 morgen (2,110 acres) of farm land, and is so located as to be about ten miles distant from any mountains. It is estimated that the station will be in operation in about 18 months. The power of the new station will be 750 kilowatts, and it is probable that it will operate on a wave length of about 16,000 metres.

The aerials will be supported by 16 towers 800 feet in height, arranged in the form of a circle, having a diameter of $1\frac{1}{2}$ miles. Beneath this circle an earth screen will be supported on 250

towers 40 feet in height. The use of the earth screen was determined as the result of experiments carried on at the Marconi station at Carnarvon, Wales.

This South African installation, together with the stations planned for Canada, Australia, and India, and the existing stations in England and Egypt, will form an Empire wireless system, each one being designed to communicate directly with the mother country or with any of the other Dominions.

Dr. A. M. Low, writing in the South Wales News, says: "I have already used a television machine of a crude sort. Placed 'looking' at a field, and with the twin apparatus one mile distant, the machine, piercing all obstacles, revealed the figures of men walking in that field. The vision, however, was so dim and vague that one could not distinguish such details as features or whether a cap or hat was worn by the individual."

ANNOUNCEMENT

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Wholesale Only**

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NEWS IN BRIEF

The following is a copy of a letter received by Mr. L. Schultz, "Waraba," Burns Bay Rd., Lane Cove, from the Chief Manager, Telegraphs and Wireless.

"With reference to your communication of the 26th January, regarding the call sign used by you in connection with your licensed station, I desire to inform you that the call sign 2LO has been re-allotted to you and any annoyance and inconvenience which you may have been occasioned by its transfer to Farmer and Co., Ltd. is regretted."

The U.S.A. is rich in broadcasting stations. According to figures issued by the government, the number of broadcasting licenses issued is 826, but for various reasons many of the licenses are not now active. About 25 per cent. of the stations have been closed for financial reasons, whilst 16 per cent. were never operated. About 15 per cent. had to close down owing to competition, and another 15 per cent. because the results were unsatisfactory from the public point of view.

BOOKS ON WIRELESS

Detector and Amplifier Units: How to Make. Price, 3/3, posted.

All About Aerials and Their Construction; with 12 Blue Prints. Price, 3/3 posted.

Short-Wave Regenerative Receiver; How to Make. Price, 3/3 posted.

Radio Formulae and Diagrams for Radio Students. Price, 3/3 posted.

N.S.W. Bookstall Co. Ltd

276 George Street, City

The value of wireless in enabling farmers to take advantage of weather forecasts in connection with their crops has been amply demonstrated, particularly in America. Now wireless is to be brought to the aid of financial speculation. The Nagasaki Perfectional Marine Products Bureau of Japan is considering the installation of radio sets on the fishing fleets, and the catch will be reported, so that the owners may realise on it long before the vessels reach port.

The general results of tests conducted by the U.S. Bureau of Standards, in co-operation with the American Radio Relay League, substantiates the theory that the causes of fading are intimately associated with the conditions at the Heaviside surface, which is a conducting surface some sixty miles above the earth. Daytime transmission is largely carried on by means of waves moving along the ground, while night transmission, especially for great distances and short waves, is by means of waves transmitted along the Heaviside surface. Waves at night are thus free from the absorption encountered in the daytime, but are subject to great variations caused by irregularities of the ionised air at or near the Heaviside surface. These variations probably account for fading. The results of these tests are embodied in Scientific Paper No. 476 of the Bureau of Standards.

The United States Signal Corps recently announced from Santa Catalina Island (Cal.) a remarkable exchange of wireless messages from the McMillan Arctic expedition. Capt. Donald McMillan, in the schooner Bowdoin, left America in June to study ice movements in the polar regions. His ship at the time the messages were sent was only 11 degrees from the North Pole, and for a few minutes she was in direct communication with Santa Catalina, a distance of about 3,700 miles. "Winter here," reported the Bowdoin's operator. "Weather below zero, very heavy snow, sun up few minutes to-day for last time. All well."

The power and normal range of the transmission apparatus on the Bowdoin are not stated, but the sending of a ship's message over so great a distance is a remarkable achievement, and almost certainly could only have been possible under "freak" conditions. For instance, the extremely powerful continuous wave set installed on the White Star liner, Majestic, has a range of about 1000 miles.

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Bakelite for panels, per sq. in.	1	
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Tinned Copper, per stick		3

All makes of Valves in stock. Write or call for our complete price list

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Neutralising the Neurodyne.

By "The Little American."

Of the many experimenters constructing neurodyne receivers or having constructed them, complain of not being able to neutralise the R.F. transformers to keep the valves from oscillating. It is well to consider the function of the neurodyne circuit in order to understand just what is accomplished when we adjust it for capacity neutralisation.

A method was devised by Prof. Hazeltine, of neutralising the capacity existing between the filament or cathode and the plate or anode of the valve. It is the presence of these coupling capacities in an ordinary tuned radio frequency amplifier circuit that causes the circuit to regenerate and oscillate when the tuned amplifier circuits are in resonance, unless a pro-

vision is made for controlling the grid potential of the valves, and this method tends to lose the efficiency. In the neurodyne the coupling capacities are made to counteract each other and each individual valve circuit is balanced against another valve circuit.

In order to reach a condition where no signals can be heard in the phones, because of passing through coupling capacities existing in the circuit the electro magnetic coupling between the neuro-formers is approximately zero. This effect is to make one part of the circuit capacity balance against another nearly equal part of the circuit and valve capacity, so as to neutralise the effect of the parasitic feedback capacities of the entire circuit.

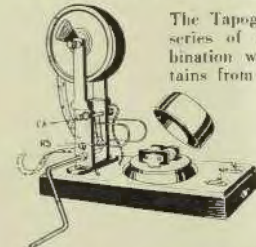
In adjusting the neutralising capac-

ities it is necessary to tune the set to a very powerful signal. A wave meter is very good using the buzzer for the signal. A paper is inserted in the socket of the stage to be adjusted, to cover the filament connections, but leaving the plate and grid free. Then the valve is inserted and the signal is still heard. This is done for the first stage and second stage separately, adjusting each condenser until the signal is no longer heard. I have often found it possible to adjust these condensers without going to this trouble by simply setting them at the greatest capacity which would not cause the set to oscillate. These condensers have an action similar to a potentiometer in the original radio frequency circuit except for the fact that they never need be changed for the different wave lengths or signal strengths. If the valves are ever changed from the ones by which the condensers are adjusted, the capacities will need re-adjusting.

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the "NEW" way.*

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will definitely teach you the Morse code at home, in your own time, with the least possible expense. No need for you to spend weeks and months decoding the indifferent sending of another amateur or in attending classes of instruction.



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MR. WIRELESS AMATEUR, get this outfit at once. Do not be content to listen to broadcasting only. Tap the world's wireless messages and experience the thrills of catching messages from ships at sea, Australian, Coastal, American and Continental stations.

TELEGRAPHISTS and OPERATORS, begin right by learning to receive perfectly-timed signals in your spare time at home.

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RADIOCULOUS

"Boys," said an Irish sergeant one day to a party of recruits he was drilling. "I want yez to undherstand that I'm wan iv the best fellas in the world. Do ye all believe that?"

"Yes, sergeant," answered all the members of the squad.

"That's all right. I'm a rale good fella except whin I'm on duty, an' whin I'm on duty I'm a baste. Isn't that right?"

"Yes," faintly answered the squad. "That all right, too. An' now jist remember, boys, I'm always on duty."—Pearson's Weekly (London).

The near-sighted man and his wife were inspecting the latest art exhibition with critical care.

"That's the ugliest portrait I've ever seen," he cried angrily, striving vainly for a better view of the abomination.

"Come away, you fool!" replied his wife. "You are looking at yourself in a mirror."—Bison.

Judge—"Do you believe in divorce?"

Liza—"Yes, suh, I does."

Rastus—"How comes you believes in divorce, woman?"

Liza—"Well, it's this way, Judge, I sorta feels we need somethin' to keep us women in circulation!"—Froth.

Snoot Gulch, a metropolis of the great open spaces, had at one time supported a small church but the population had slowly dwindled until it was impossible longer to collect enough money to pay the parson's salary. The parson, therefore, doffed the cloth and established a lunch-room near the station. One Sunday night a travelling man who regularly passed through Snoot Gulch, dropped in at the lunch-room and ordered supper. After having waited for more than half an hour without being offered more than a glass of water, he called to the former parson.

"Yes?" replied that gentleman. "I was just wondering, parson, said the travelling man, "if you had cut out the Sunday evening service."—Judge.

The correspondent of a large business concern had been invited out to dinner by a friend. At the table the host asked him to say grace. It was a new experience, but he was not to be found wanting.

"Dear Lord," he began, "we thank Thee for all Thy favors of recent date. Permit us to express our heartfelt thanks. We trust that we may continue to merit Your confidence and that we shall receive many more blessings from You in the future. Amen."—Store News.

"Ohhhhh! Lemuel, vat you tink? I was arrested for speedink to-day."

"Vat, you? Vy, you haf no oar, haf you?"

"No, not that. Speedink on the sidewalk."—Sun Dodger.

"Oh, Dickie!" exclaimed his sister, "Who taught you to swear like that?"

"Taught me to swear? Why, it's me that teaches the other guys."—Denver Parrakeet.

Irate Father—"I called Jimmy four times and as he would not get up I turned down the covers and gave him a sound spanking."

Wife—"That means we'll be hunting a new cook."

"How's that?"

"Jimmy stayed with the Jones boys last night and the cook slept in his bed."—Book of Smiles.

Two dear old ladies were enjoying a musical recital. "What is this piece, my dear, is it not a sonata from Beethoven," said one of the other.

"Oh, no, dear, I don't think so. I think it is an Aria from Mozart, but I see there is a card at the front announcing the number and I will go and ascertain."

Returning, she said, "My dear, I regret that we are both mistaken. It must be some new composer, for the card says, 'Refrain from spitting.'"—Scoots.

The Mississippi banker asked a man who was trying to borrow money: "How much have you in the way of immediate liquid assets?"

To which the customer cautiously replied: "About a case and a half."—Southern Lawyer and Banker.

A young man called at the house of a celebrated diagnostician and asked to see the doctor.

"Have you an appointment?" the office nurse asked.

"No, I haven't," the young man replied.

The nurse consulted the doctor's appointment list. "I think I can let you see the doctor after the next patient leaves," she added, "so please go inside that room and take your clothes off."

"Take my clothes off!" the young man exclaimed, "what for?"

"The doctor has made it an absolute rule not to see anybody unless that is done," the nurse said firmly.

"But I don't want to take my clothes off," the young man insisted.

"Then I'm sorry, but you can't see the doctor," the nurse said.

"Well, if that's the case, I'm game," the young man said.

A few moments later the doctor entered the room and found the young man awaiting him, stark naked. "Well, sir," the doctor said, "what seems to be your trouble?"

"Doctor," the young man replied, "I called to see if you would renew your wife's subscription to the Ladies' Home Journal."

Q. 8774: Will the proximity of a neighbour's still make my transmission damped or undamped?

Damped.

Q. 8775: Can I hook up a curling iron and a hair mattress so as to get undamped waves?

Suit yourself.

Q. 8776: Which would be better as a variometer, a small coat-hanger wound with galvanised zinc or three spider-web coils and a rheostat?

Yes.

Q. 8777: Why is a cabinet?

Yes. It may be placed in shunt or in parallel. Forty turns is enough.

Q. 8778: How long does it take a radio wave to reach Mars?

About as long as getting ten miles on the N.Y., N.H. and H. Express.

*Marrickville and District
Radio Club.*

This progressive club has been in existence for over fifteen months, and has come through many trying times. To-day it is very well organised, but to do this three elections were necessary.

In November, 1922, Mr. Reg. Ellis and a few enthusiasts founded the club. The first meeting place was in a little shed in a lane at the rear of Park Road, Marrickville.

Mr. Ellis was the first secretary. In this poky little shed did the club meet every Monday night. Buzzer practice was earnestly indulged in, and a few lectures by club members were listened to.

Soon the club outgrew its premises, and new rooms were sought and found in Perry Street, Marrickville. And these rooms seemed sumptuous indeed. Gone were the dull aches and pains which had been the penalty of attending at the old shed. For the seating accommodation there was very poor. The Chairman, Mr. Scott, was always to be found perched on a lathe, while Secretary Ellis had his quarters on the drilling machine. Were they enthusiasts? Did they show the right spirit? It was that self same spirit which has held Marrickville Club together and put it in the position which it enjoys to-day. However, let us get back to the Perry Street Congregational Church Hall.

On the opening night, Mr. Lavington J. Glyde, of the A.G.E. Co., Ltd., interested the members with a very good lecture on "Crystal Sets and How to Tune Them." This lecture put a very good foundation of the principles of radio into the minds of every member, and was augmented by Mr. A. J. Connolly, on "High Frequency Currents." Other very interesting lectures were received, but somehow things were not going right.

In order to overcome difficulties a no-confidence motion was moved and carried, and new officers were elected. Once again Mr. Reg. Ellis was elected secretary, but Mr. R. C. Trimmington held the office of president. This working arrangement carried on for a few months, and seemed to do well. Shortly after this, in view of the necessity to erect masts for the aerial, a little encounter with the church authorities (the owners of the hall) upset all arrangements. The church people seemed to think it was *infra dig* to allow an aerial on church premises, and in spite of the fact the publicity officer, Mr. W. L. Hamilton, endeavoured to alter their views, permission was not granted. So once again we had to move. Re-organisation was once again mooted and agreed to, and the new premises, the School of Arts, Illawarra Road, found Mr. W. L. Hamilton as president, and Mr. A. W. Hemming as secretary. Mr. E. B. Crocker (2BB) was again our patron. Backed by an excellent committee, this team is still going strong.

Many eminent radio men have lectured to the club, including Messrs. F. Basil Cooke, J. W. Robinson, E. B. Crocker, Malcolm Perry, Ray Evans, R. Thompson and Mr. C. A. Gorman, and many others have expressed the wish to meet the members.

The transmitting licence has been approved of, and shortly it is hoped to be on the air.

New members are joining every night, and in view of the fact that experimental licence holders only are available for membership, this is something to be proud of.

On Saturday, the 2nd inst., a launch picnic on the harbour was arranged, and a most enjoyable time was spent.

During the whole of the trip music was supplied from a loud speaker, and on Rodd Island afternoon tea was partaken of and members' sports were indulged in. Mr. H. W. Weston won the club's championship race, Messrs. Pucker and Hemming coming second and third respectively.

Group taken at Rodd Island



Mr. W. L. Hamilton.

The ladies' race was won by Miss Allworth. The starters of these races, Messrs. Trimmington and Hamilton, run off, so as to be in things, and resulted in a dead heat. Altogether a very happy party returned to Fort Macquarie at 6 p.m.



Members of the Club.

FOOLED : By Old Timer.

Keith really should have known better, but then again 1914 to 1918 was responsible for some quite impossible situations.

'Twas this way, Keith was told off to "listen in" at the butt end of a long single wire aerial, tune in to 2000 meters, and have a look-see for the Nurnberg and Scharnhorst then roaming around the Pacific. Keith listened for many weary nights with

"Nuthin' Doin'" till one fine night he heard faint but clear that well known 500 cycle note so typical of the Telefunken outfit.

Feverishly telling those sitting along with him to "can the cackle," he swung every variable condenser on the receiver throughout its range, and varied every available inductance between zero and maximum. Still they came in faint but clear. To Keith's amazement, he got "em any old where" between 3 metres to 30,000. Keith couldn't make it out, and told us so. Neither could we because those German ships were well tuned. This went on for 5 minutes, till Keith made a grab at something, and the signals stopped. Then a howl of laughter broke out. Keith had spent 5 minutes trying to "tune in" a mosquito.

Loose-Coupler set, ebonite panel, crystal detector, etc. 25/-; also re-wound phones, 2/6 each. Saturday afternoon, L. C. Davies, 449 Glebe Rd., Glebe Point.

FOR SALE—Twenty Yard Aerial, complete with fifteen feet masts and Telephone Head Set. Apply, Frank Smith, Box 2234, G.P.O., or City 9148.

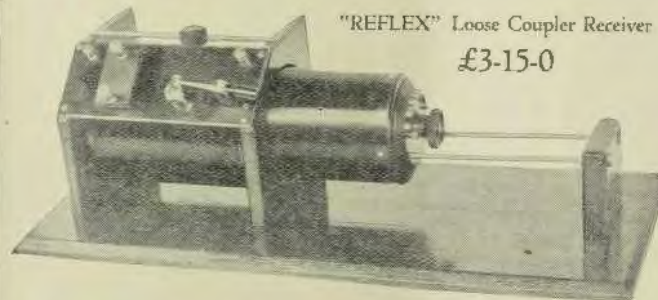
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RADIO HOUSE
619 George Street, Sydney





The Leichhardt and District Radio Society

On Tuesday, February 5th, Mr. F. Thompson lectured on "Aerial and Earth Systems," before the 67th general meeting of members of the Leichhardt and District Radio Society held at the above club-room, 176 Johnston Street, Annandale.

Mr. Thompson's audience was a large one, and his lecture long and interesting. At its conclusion, the usual batch of questions came to light, and the lecturer was kept busy replying to these for some time.

On Tuesday next, the second lecture of the syllabus will be delivered, when Mr. F. Lett will talk on "Tuning Elements." This subject promises to be a particularly interesting and instructive one, and a good attendance of

members is anticipated. The society also extends to all non member experimenters an invitation to be present on this occasion, as it is anxious to let others see the good work which is being done by it in its district.

Inquiries regarding the activities of the society should be addressed to the Hon. Secretary, Mr. W. J. Zech, 145 Booth Street, Annandale.

Newcastle District Radio Club

The usual fortnightly meeting of the above club was held at the Club Rooms, 25 Winship St., Hamilton, on Wednesday, 13th inst., the President, Mr. Seward occupying the chair.

It was decided to apply for permission to operate a receiving set and loud speaker at the forthcoming Newcastle Show (music to be transmitted from the Club's experimental station) in order to bring before the people of the district the activities of the Club and the progress of wireless in general.

Four new members were elected. After the usual business proceedings had terminated, Mr. L. F. Filmer gave a short address on crystal detectors, and the circuits to which they could

be adapted. After according the lecturer a vote of thanks, the meeting closed with the usual general discussion.

The club continues to achieve great success with its experimental radiophone transmitter. A report has been received from Mr. Spencer Nolan, of Double Bay, to the effect that on a recent Sunday morning he had succeeded in working a loud speaker off us using four valves.

On Tuesday, 5th instant, a very interesting and highly successful experiment was carried out in that instead of transmitting the usual gramophone records, the renditions of "real, live artists" were transmitted. The artists assembled in Mr. Denny's residence in whose grounds the club station is situated and a temporary telephone line was rigged from the station thereto. The usual solid back microphone was used but by means of a specially adapted horn it was not necessary for the singers to hold the "mic" right up to their mouth, as is usually the case, but to just stand beside the piano and sing as if they were at a private evening. Orchestral selections were also transmitted very clearly, and local experimenters unanimously voted it as the best experimental transmission they have ever heard.

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A great deal of interest is now being taken in the famous "Harkness" Circuit. It is simple to operate and very effective, combining the purity of crystal reception with the loudness of the Valve. Mr. Cooke's advice about this Circuit is at your disposal.

The following material is required:

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No. 26 Covered Wire, 4oz. Spools	0	1	3
2—0005mf. Variable Condensers, Gilfil-			
lian, each	1	6	0
Argente Crystals, 2/-, 3/- and	0	3	6
Standard A.F. Transformer	1	5	0
90 Volt. B. Battery	1	5	0
Filament Control Jack	0	6	0
1 Valve Socket	0	6	6

D A V I D J O N E S'
Radio Department, 22 York Street, Sydney

Illawarra Radio Club.

The 41st meeting of the club, held on the 12th inst., drew a good attendance of members and visitors, and another new member was elected. After general business had been dealt with, a very interesting lecture was given by Mr. S. Atkinson, on "Inductance Coils." He began from the time when coils of the solenoid single layer type were mostly in use, which, for long wave reception, necessitated coils of huge dimensions as compared with those in use at the present day. An outline was given of the development of inductance coils from the early types to those in modern use, and the description of the evolution of coil design and construction over this period through its various stages of development was most interesting. The lecturer illustrated the various improvements introduced from time to time, and the multifarious styles of winding which had been resorted to in the endeavour to produce a coil of compact compass and with a maximum inductance value for a given number of turns with a relatively low distributed capacity.

The forms of inductances dealt with particularly were various types of

solenoids, multi-layer coils, including the different methods of bank, sectional and air-spaced winding, the Morcroft coil, Burndey coil, different types of basket, lattice and spider-web coils, also the honeycomb, dualateral and Giblin-Remler types, etc. A comparison of inductance and capacity values in the various types was given, as well as constructional details, and the advantages of certain types over others for certain classes of work, were pointed out.

The lecture was full of practical points, which were very helpful to members. At the conclusion a hearty vote of thanks was accorded Mr. Atkinson, who responded and said he was willing to help members to the best of his ability at any time.

The next meeting of the club will be held at the club-room, 75 Montgomery Street, Kogarah, on Tuesday, 26th February, at 8 p.m. Code practice, 7.30 to 8. There will also be a lecture. All interested are cordially invited to attend.

A comprehensive syllabus of lectures, working over the whole range of experimental wireless, from the elementary to the advanced stages, is now being arranged, and will shortly be put into operation, and the instruction

which will thus be provided will be of great value to junior and senior experimenters alike.

Prospective members should therefore see the advantage of joining up now, and thus gaining the advantage of the whole series of lectures. Intending members and others interested are asked to get into communication with the Hon. Secretary, Mr. W. D. Graham, 44 Cameron Street, Rockdale.

An article entitled "How To Keep Below Ten Watts," by C. D. MacLurcan, will appear in "Wireless Weekly" next week.

TO RADIO CLUBS

Wireless Weekly will be glad to publish reports of meetings held by all Radio Clubs.

We would like copy to reach us before Friday in each week in order to ensure its publication in the ensuing issue.

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Market Reports

The following are some gems from Mr. C. MacLurean's farewell transmission on Sunday evening last.

Sussex Street remained stationary. I'm very glad to hear it, because last time I was down that way it was moving round in circles—I'd been to a dinner—but I'll spare you the details.

Eggs cleared well—you bet your life they did—I've seen one egg properly ripened clear a whole room full—but don't be led astray by a clear egg. Many a calm exterior hides a revolutionary soul.

Treacle was scarce owing to adverse reports from the Great Cobar treacle mine. But a fresh vein is expected to show up shortly. Also, the miners complain that they are insufficiently paid—but they're on a sweet thing, anyway.

Cheese showed no movement. You'll be pleased to hear this, as I've seen many cheeses that moved quite fast—the fastest is, I think, the Gorgonzola—I timed a piece once across a 4ft. table. It took 4½ minutes, then it climbed down the leg of the table and escaped out the back door.

Onions were greatly affected. This is an affecting fruit. I've been so affected at times by an onion that I finally burst out sobbing.

Blue Peas were buoyant in tone. The optimism of the blue pea I've noticed is in direct ratio to the square of its colour—the bluer it is the more buoyant it becomes.

Oils were firmly held. The best way to hold an oil is to rub sand on your hands and grip the oil firmly by the tail. Roughened pliers will also be found very effective.

Lard was very depressed. Not surprised at this as things have been very unsettled lately in Greece.

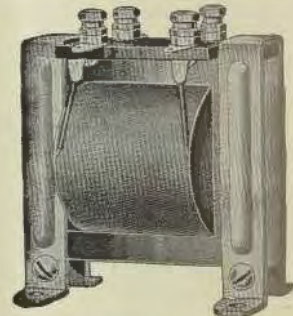
Pumpkins fell heavily—there were no casualties, but I think there should be some "safety-first" notices put up, or someone will get hurt one of these days.

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