

WIRELESS WEEKLY

September 14, 1923.

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The Colville-Moore Wireless Supplies

10 Rowe Street, Sydney



OFFICIAL ORGAN OF THE AUSTRALASIAN RADIO RELAY LEAGUE.

Vol. 2.

September 14, 1923.

No. 37

WHAT IS RESTRICTION OF TRADE ?

IS THE GOVERNMENT GOING TO ALLOW A COMPANY IN WHICH THEY HOLD A MAJORITY VOTE TO CREATE WHAT WE CONSIDER IS A BAREFACED MONOPOLY ?

"The Licensee will sell only such valves as are manufactured or supplied by the company or by other manufacturers or suppliers licensed by the company, etc."

The above is an extract from a document the wireless trader is asked to sign before he can safely sell a wireless set containing a valve.

VALVES ARE BEING MADE IN AUSTRALIA BY AUSTRALIANS (and can, we believe, be sold cheaper than the imported article), but

these particular valves cannot be sold by the bona fide trader, should he sign the document above referred to. If this is not a restriction of trade, we don't know what is.

IS THE FEDERAL GOVERNMENT GOING TO SANCTION SUCH AN UNSCRUPULOUS ACTION ?

Mr. Gibson, the Postmaster-General, said at the recent Conference, that the public must be looked after. Is he then going to allow an essential part of the Wireless Industry in Australia to be wiped out ?

If such an unjust action is legally allowable, then the sooner our laws are amended the better for the community.

Roster for Week ending 12th Sept., 1923

	7.30 to 8.0	8.0 to 8.30	8.30 to 9.0	9.0 to 9.30	9.30 to 10
Thursday, 13	2 GR			2 ZG	
Friday, 14	2 WV	2 KC	2 GR		
Saturday, 15..	2 GR		2 KC	2 ZG	
Sunday, 16 ..	7 to 8 2 GR				9 to 10 2 KC
Monday, 17 ..	2 GR	2 WV	2 KC	2 ZG	
Tuesday, 18 ..		2 GR			
Wednes., 19..	2 ZG	2 WV	2 GR		

Owing to a number of stations altering their wave length to the 250 band they are not yet ready to transmit at regular periods, and will not appear in the roster at present, but can be heard testing every evening.

Impressions of an Artist During his First Radio Concert.

By Leon Alfred Dutherford, in "Radio Broadcast."

What were my impressions when I sang, for the first time, over the Radiophone? What were they not? I ranged the gamut of human emotions, from helplessness to exultation.

Concert singers are all familiar with the complaint known to phonograph record makers as "horn fever," which means a bad case of nerves. That was it with me. It was a blue funk of the deepest indigo. If my knees had had cymbals attached to them, I should have been a whole brass band. Ask any movie actor who has faced the camera for the first time.

It has been my privilege to appear before 7,000 people of the New York Hippodrome, the Chautauqua Assembly Grounds, and the Chicago Auditorium, and I thought I was fairly intimate with mob psychology, but when I realised that there were 400,000 wireless outfits sold in this country, and that possibly ten per cent. of them were being tuned on me, the roof of my mouth puckered up, my tongue felt paralysed, and my lips were blanched. Caesar may have had his thousands, but I was to have my tens of thousands! The thought went to my head, my feet, and my stomach at one and the same time.

There was I, alone in the wireless studio, except for an unassuming and impersonal accompanist and the radio representative, standing over there at the side, a model of decorum (not a bit interested in my expressed *mal de mer*), attending strictly to his knitting, said knitting being the care of some electric light bulbs. In front of me was a skinny arm, or skeletonised frame, and from that frame there hung the transmitter. It was a silly-looking little instrument, about the size and shape of a ten-cent, baked-bean can. When I realised that that wretched little tin can was all that stood between me and the world, his wife and his family, there was an acute palpitation around the heart, and a dry blottery feeling in the mouth. I could think of nothing but that line of Henley's from "Invictus," which all baritones love to burble, "Out of the Night that Covers Me," except that I was far from being "the captain of my fate" and "the master of my soul." In

my mind I visualised a life-size map of the United States, and in every town, every hamlet, every crossroads, there was nothing but ears. And all of these countless thousands of ears were cocked and pointed in my direction. I could see sticking out from behind library tables, book-cases and sideboards; the handles were ears, the glass knobs were ears, and they were waiting for me. Then came a comforting and cheering thought: one that brought a little gulp to my throat and a foolish bit of moistness around my eyes, and it was this: if there were ears on every sideboard and library table, then by the same token there must be people in hospitals, the bed-ridden folk at home, tubercular patients in sanitariums, old men and women in institutions, and little children in cripples' wards. They, too, must be waiting and tuning in to catch stupid, simple me. It was with a sigh of relief that I thought of these people.

This all happened while that meticulously polite attendant fiddled around with his electric light bulbs. I tell you, it is a great mistake for a radio attendant to leave a professional singer alone to look around just before he is to sing. It is like wheeling a patient who is only half under the ether into the ante-chamber of an operating room, while the doctor is putting on his operating robe or thumbing the edge of his knives. One of these days the patient is going to get up and walk off, and one of these days when the radio gentleman looks up, he will find his singer has jumped out of the window. An amateur may be led to the slaughter unawares, but when you lead a professional to the dark water, you should keep an eye on your horse and bridle.

While waiting for 8.30 I looked the "studio" over. It was a room of about twenty feet square, and it was perfectly clear that no woman had had a hand in its design. It was furnished for utility, not beauty. Chairs were pushed in a row against the wall which was hung with thousands of yards of yellow burlap. All the potato sacks in the city must have been draped from that ceiling. "Our acoustical engineer designed that," said the attendant, "to deaden all

sound." I would have judged it the work of the office boy. To think that all this had been "conceived and dedicated" by a pedigreed gentleman with four years behind him in some technical institution! Education is certainly a wonderful thing. It looked exactly like a jute factory, although the smell was lacking.

Later I was to find that the bur-lap did precisely what was expected of it: namely, keep out extraneous sounds.

Over in the corner was what appeared to be a telephone switch-board—minus the gum-chewing central. At the side was a handsome grand piano. The room was certainly nothing to write home to one's mother about, although an undoubtedly it was practical and efficient. Quiet reigned over all.

Presently the attendant stopped leaning over his insubstantial bulbs and looked up and said, "Err, it is 8.30. Shall we begin?" He then stepped over to the transmitter and announced in a voice so beautifully modulated that it was almost what actors call "Shakespearean," that "Mr. Dutherford will begin the evening's concert with 'Vesti la giubba,' from 'I. Pagliacci.'" He then led me to within three feet of the transmitter, told me to withdraw my head far crescendi, and to step nearer for *diminuendi*—and abandoned me to the beyondness of the behindness of the nothingness.

I sang the aria to the tiny tin can. When I had finished, the room seemed dead. The piano had stopped reverberating and there was not the slightest sound.

So that was that. Nothing more to it. I asked the courteous attendant if the people "way off" in Council Bluffs, Idaho, had heard that aria. He replied that to the best of his knowledge he "fancied they had."

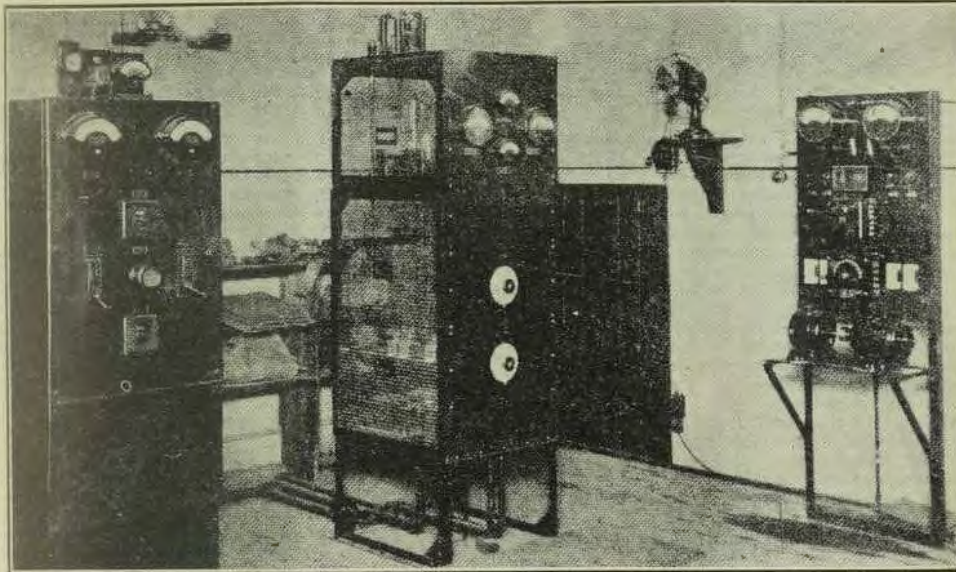
The attendant then went over to the transmitter and announced that I would sing two songs, Bizet's "Angus, Dol," and Verdi's "Celeste Aida," from the opera, "Aida." This I then proceeded to do. At the end, there was the same dull, empty silence. I would have given anything for even a pathetic patter of applause. It was my moment and

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The Operating Room of a Broadcast Station.



Such a Station will be Operating at Sydney in a few weeks

drink, my board bill. But no—not a sound, not a flutter of a programme. I felt like a bell tinkling in a vacuum—you know the example we used to have in high school in physics. I swore to myself that of all the stupid experiences, singing through a tin can was the most stupid. While I was catching my breath, the telephone jangled. The attendant picked up the receiver, and said, "Yes, I will try." He then came over to me with the information that "A family up in Logan's Ferry, forty miles away, had just 'phoned in to ask if you wouldn't please repeat that last song again. They said it was the finest thing they had ever heard." So there was my applause—my encore! Oh, garcon, that was a moment of exaltation! Would I repeat that song? No power on earth, unless the electric juice gave out, could prevent me. That telephone call was better than a salvo of applause, all the clagues in the world couldn't make the noise that one 'phone ring did

in my head. When someone takes the trouble to 'phone in from forty miles away, it means that you scored a hit, that you shot a bull's eye. No dead-heads in that audience. No "paper" in that house. These people knew what they wanted. Talk about flattery, satisfaction, appealing to one's vanity—it was all rolled up in one telephone call.

I stepped over to the dinky transmitter, and this time it looked as large as the Union Station. I repeated the "Aida" song. Later on in the evening, when I sang "Deep River" and "Swing Low, Sweet Chariot," the 'phone rang again and asked me to repeat both of them, and then someone called up to enquire if the singer wouldn't sing "Annie Laurie." I knew that all the "press agent stuff" and the three-sheetings were as nothing. These people didn't know whether I was blonde or brunette, whether I wore my hair parted in the middle, side, or in fact if I had any at all;

or whether I won people through my "attractive personality" and all the other ridiculous prattle of the profession. Furthermore, they didn't give a tinker's prefaation. What they liked was the singing, and they wanted more of it. You may believe that they got it.

When unseen and unknown people clamour to hear you sing, it is far more to be desired than the roaring applause in the concert hall. I felt like the Boy Scout, who had "done his good deed daily," and had shaken hands with the President.

I never thought much of Benjamin Franklin and his kite-and-key episode, but when I think what he did for mankind by discovering something for little boys and grown men to capture and train, even if they don't know what it is I genuflect; and when I think of what Westinghouse and Wireless have done and are doing for this country, I orientate. It's your old antenna, to your Uncle Dudley, that wireless is the invention of the age.

PRINCIPLES OF RADIO TELEPHONY.

By A. MACHSON.

Herewith is presented an exceptionally clear explanation of what is meant by the modulation of a transmitting station, with a detailed consideration of the Heising system. It concludes with an analysis of why relatively broad tuning gives distortionless reception.

The problem of radio telephony differs from that of telegraphy in one very important particular. In the case of radio telegraphy in order that the receiver may be actuated so that the ear can hear the signal it is only necessary that the transmitted radio waves be interrupted at an audible rate, say 500 to 1000 times per second. In the case of telephony, however, the transmitted radio waves must be moulded to conform to the actual speech waves in order that the ear shall hear the signal as recognisable speech. It is at once clear that the problem of telephony is ever so much more complex than that of telegraphy. In Fig. 1 are represented the radio waves as emitted by a wireless transmitter. For telegraphy these waves need only be interrupted periodically as shown in Fig. 2, to be heard at the receiver. But for telephony these waves must be shaped according to the complex speech waves shown in Fig. 3 in order to be heard as articulate and recognisable speech.

The modification of the emitted radio waves according to speech is called "modulation." The methods by which this modulation is effected are numerous. But since the ultimate result is the same regardless of which system of modulation is employed, we will, in outlining the fundamental principles of radio telephony, consider the simplest system of modulation. Later in the discussion we will take up in detail one of the most important systems.

For the present, therefore, we will consider the microphone transmitter placed directly in the antenna, as in Fig. 4. The action of the transmitter in this case may be described as follows: The diaphragm of the microphone, when no speech is transmitted, is motionless. In this condition the microphone has its normal resistance and the antenna current will therefore have a definite normal value. Now, assume that the microphone is spoken into. The microphone diaphragm upon which the speech waves are impressed follows every variation of

speech and moves back and forth in unison with the speech waves. In this way a variation of the resistance of the microphone is effected, this variation being in accordance with the speech. Since the microphone resistance is in the antenna, variations in the resistance will produce corresponding variations in the

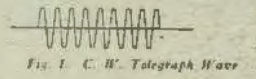


Fig. 1. C. W. Telegraph Wave

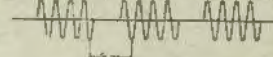


Fig. 2. Interrupted C. W. Telegraph Wave

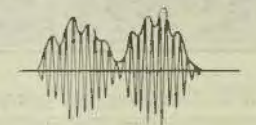


Fig. 3. Speech Modulated C. W. Wave

antenna current. That is, a rise in the microphone resistance will produce a fall in the amplitude of antenna current. In other words, a speech wave of the form of Fig. 3a will result in corresponding movements of the microphone diaphragm, which results in corresponding variations in antenna resistance producing a radiated current of the form of Fig. 3b. This radiated current has a varying amplitude conforming identically with the speech wave of Fig. 3a. In this manner the modification or modulation of the r. f. wave in accordance with speech is effected.

Since modulation is effected by varying the amplitude of the radiated wave the greatest or best effect will be obtained when a given speech intensity produces the maximum change in the amplitude of the radiated current. When this maximum change in amplitude is obtained we say that we have complete modulation.

This is the aim of all systems of radio telephony.

Let us see what change in antenna current amplitude is required for complete modulation. In the first place what must be the value of the microphone resistance to secure most favourable output? This can be demonstrated in a simple and elementary manner as follows: Suppose the antenna resistance is 12 ohms total, including inductance coils. Suppose the microphone resistance is only 1 ohm, normally. Then normally the total antenna resistance will be the sum of those two, or 13 ohms. Now assume that the microphone resistance varies the maximum possible, namely from 1 to zero. It cannot ever become lower than zero. Hence the antenna resistance varies from 13 ohms to 12 ohms, thus producing only about 8 per cent. variation in the resistance. Hence the antenna current amplitude will also only vary by 8 per cent, which is very small variation. Hence we see that if the microphone resistance is very low compared to the antenna resistance there will be hardly any variation in the current amplitude and hence there will be very small modulation. On the other hand, suppose the microphone resistance is 48 ohms, normally, thus making a total resistance in the antenna of 60 ohms. In this case most of the antenna energy will be consumed by the microphone as heat, leaving only a very small percentage to be radiated. Thus if the antenna resistance is very small compared to the microphone resistance even if complete modulation is had, there will be so little energy left for radiation since the high resistance microphone absorbs most of it, that very little effect will be produced. Thus we see that the microphone resistance must not be too low or too high compared to the antenna resistance. Now experiment and mathematical analysis show that maximum results will be obtained if the microphone had a normal resistance equal to that of the antenna.

September 14, 1923.

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In discussing the question of what change is required in antenna current amplitude for maximum or complete modulation, we will therefore assume that the microphone resistance equals the antenna resistance and call the resistance R . The total antenna resistance is therefore $2R$, and the antenna current will be some value, i , when the set is not modulating. Assume now that the set is modulating. Complete modulation requires maximum possible change in antenna current and this can only be accomplished if a maximum change takes place in the microphone resistance R . For maxi-

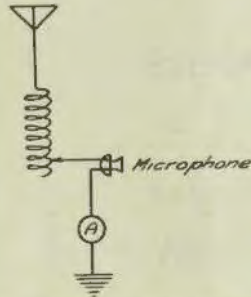


Fig. 4. Simple Microphone Transmitter

mum change the microphone resistance R at the most can decrease to zero and increase to infinity. In the first case when the microphone resistance decreases from R to zero, the total antenna resistance will decrease from $2R$ to R , hence the antenna current will rise to twice its normal value, namely from i to $2i$. In the second case when the microphone resistance increases from R to infinity the antenna current must decrease to zero. For complete modulation, then, the amplitude of the antenna current must drop to zero from its normal value and rise to twice its normal value, as in Fig. 6.

It is obvious that this change in microphone resistance to zero and infinity, to secure complete modulation, is not possible. The best that can happen is that the resistance of the microphone alternates between some value less than R , but not zero, and some value greater than R , but not infinity. Hence modulation with this system can never be complete. In general practice engineers are content to secure, with the system, a percentage of modula-

tion between 50 per cent. and 75 per cent. Naturally, for a given power of the radio frequency transmitter complete modulation will result in a much greater range than incomplete modulation. Consequently other methods of modulation have been developed which are capable of giving complete modulation. Regardless of what the system of modulation is, the principle of radio telephony is always the same. Namely, speech is transmitted by the radiophone by modifying or varying the amplitude of the radiated wave in such manner that the amplitude variations coincide and are proportional to the speech variations.

There are two serious disadvantages in any system of radio telephony which modulates incompletely. The first is that since the variations in antenna current amplitude is not its maximum, the possible available full power of the set is not utilised, resulting in diminished transmission range. The second disadvantage is that if there is any distortion of speech in the set this distortion will be comparatively greater when modulation is incomplete than when it is complete. The desirability, therefore, of systems which modulate completely becomes evident.

One of the best circuits in this connection is the Heising modulation system. This is probably the most used circuit of all. Its operation is therefore well worth master-

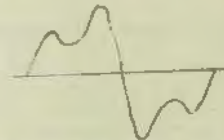


Fig. 5a. Form of Speech Wave

ing, and we will consider it in detail. The circuit connections for this system are shown in Fig. 7. The circuit applies solely to tube sets, and requires an oscillator tube O , and a modulator tube M , both tubes being of equal power. If there are more oscillator tubes in parallel, then an equal number of modulator tubes must be supplied.

It will be immediately noted that the modulator and oscillator tube are fed by the same generator through two choke coils $L1$ and $L2$. $L1$ is a radio frequency choke coil

and $L2$ is an audio frequency choke coil, both of very high inductances. Since the radio frequency choke coil is connected between the plate of the oscillator valve and the plate of the modulator valve, it will be understood that no radio frequency

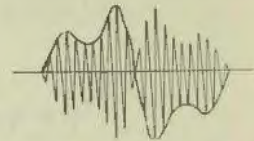


Fig. 5b. Corresponding Form of CW Wave

currents from the oscillator circuit can pass over into the modulator circuit due to the choking action of $L1$, which is used precisely for this purpose. The reactance of this choke coil is generally very much higher than the resistance of the plate circuit of the modulator tube.

The function of the audio frequency choke coil $L2$ is to assist in the modulation action of the system. This is accomplished in the following way: When the microphone is spoken into, the speech voltage generated across the secondary of the telephone transformer T is impressed on the grid of the modulator tube. Since this voltage is alternating, the resistance of the plate circuit of the modulator tube will vary correspondingly. Thus when the voltage is positive the resistance decreases, and when negative it increases. Consequently the plate current into the modulator tube will vary. However the presence of the high reactance choke coil $L2$ prevents much change in the total plate current supply. Hence any variation in the modulator plate current must be accompanied by an opposite variation in the plate current of the oscillator tube. Thus suppose the speech voltage makes the grid of the modulator highly positive. As a result the modulator plate circuit resistance decreases and the plate current into the modulator tube must increase. Since the total plate current supply is kept approximately constant by the choke coils, this increase in modulator plate current must be accompanied by an equivalent decrease in the oscillator plate current. The opposite takes place when the modulator grid becomes highly negative. Experiment shows that there is a slight variation in the plate current supply

when speech is applied. This small audio frequency variation when it takes place in the audio choke coil L2 results in the generation of a very high audio frequency potential across the terminals of L2, corres-

original impressed speech will be radiated.

This modulation system is capable of giving complete modulation, which requires that maximum change take place in the antenna current

generator to the oscillator valve. When this is the case, shown in Fig. 8, the plate voltage on the oscillator tube is reduced to zero on the negative cycle of the speech wave, since the resultant plate voltage equals the sum of the d.c. plus the a.c. speech voltages. On the positive cycle the plate voltage rises to twice the d.c. value of voltage for complete modulation. This speech voltage can be secured by properly designing the telephone transformer T, Fig. 7, so that enough voltage is applied to the modulator grid to produce sufficient change in the plate resistance of the modulator valve, and by designing the choke L2 so that the resultant change in current through it will produce the neces-

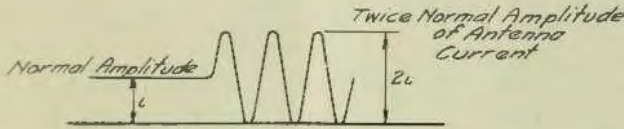


Fig. 6. Variation of Antenna Current Amplitude with Change in Microphone Resistance

ponding to the speech. The speech voltage generated in the plate circuit across L2, is equal to

$$\text{Voltage} = 6.28 \times fL \times i$$

where f is the frequency of the speech, and L the inductance of L2, and i the variation of current through L2. Hence we see that even though i , the current variation, may be very small, by making the inductance of L2 very high, the audio voltage generated across L2 may be made very high. This audio voltage across the choke coil L2 is impressed on the plate of the oscillator tube, i.e., super-imposed on the d.c. voltage on the oscillator tube. Hence the resultant voltage on the oscillator plate will vary with the speech voltage. But the output of the oscillator tube is proportional to the voltage on the oscillator plate. Hence the output will be proportional to the speech voltage and a wave modulated according to the

amplitude. In order to accomplish this, the normal antenna current amplitude must be reduced to zero.

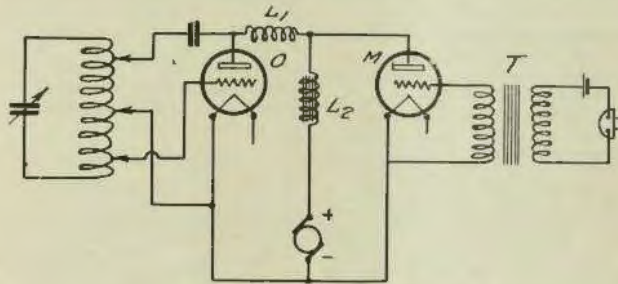


Fig. 7. Heising Modulation System

This means that the plate voltage must drop from normal to zero. Hence the maximum amplitude of the speech voltage applied to the oscillator plate must be equal to the plate d.c. voltage supplied by the

sary audio frequency voltage across L2. In other words, unlike the system of the microphone in the antenna, there is nothing inherent in this system which prevents com-

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plete modulation from being obtained.

We thus far have considered the radiophone transmitter and the modulation of the emitted waves. The radiophone set is, however, not complete without its receiving system, which will now be given its due consideration. We have seen how, by modulation, it is possible to transmit via radio frequency waves the true form of speech waves with all its inflections, variations and complexities. It is not only important that speech should be capable of transmission with a minimum of distortion, but the received speech must likewise be undistorted and received exactly as transmitted. Certain fundamental principles must therefore be considered in the design of the receiving system.

Mathematical analysis of the form of the received wave shows that the modulated current is composed of three components, one having a frequency of f of the unmodulated radio frequency, the second having a frequency of f plus F , the sum of the radio and audio frequencies, and the third having a frequency of f minus F the difference of the radio and audio frequencies. Thus the radiated modulated wave has not a single frequency, but is a band of frequencies ranging from f minus F to f plus F . This has important consequences in the design of radiophone receivers. One of the most important is that the radiophone receiver must not be a highly selective receiver. Let us see why.

Speech frequency ranges from 300 cycles to 3000 cycles per second, and in order that the received speech be a faithful copy of the transmitted speech the receiver must not destroy any of the frequencies in this range. Suppose the radio frequency is 100,000 cycles per second. That is the transmitted unmodulated wavelength is 3000 metres— f equals 100,000 cycles per second. Suppose we assume that the speech frequency averages 1000 cycles per second. F equals 1000 cycles per second. Then, from the foregoing discussion the modulated current will range in frequency from f minus F 99,000 cycles per second to f plus F 101,000 cycles per second. If the receiver is highly selective and tunes very sharply, say to 100,000 cycles per second, then the components of the received wave having a frequency of 99,000 and 101,000 cycles per second will be eliminated by the

sharp tuning, with the result that the received current will not be a faithful copy of the transmitted speech, and distortion results. In other words in order that the received current be identical with the transmitted speech, the receiver must tune equally well to the lowest and highest frequencies of the modulated wave length band, in the above cases to 99,000 and 101,000 cycles per second, and thus the most important principle, that for radiophone receivers tuning must be relatively broad.

It is obvious that the higher the audio frequency the broader the receiver tuning will have to be. For in the above case, audio frequency being 1000 cycles, the difference between lowest and highest frequencies is only 2000 cycles, or only 2 per cent. of the unmodulated radio frequency. Suppose we consider the case where the high musical tones are transmitted, where the frequency of speech is, say, 3000 cycles per second. Then

$$\begin{aligned} f - F &= 97,000 \text{ cycles per second} \\ f + F &= 103,000 \text{ cycles} \end{aligned}$$

Thus in this case there is a difference between the lowest and highest frequencies of 6000 cycles, which means a percentage deviation from the unmodulated radio frequency of 6 per cent., which obviously requires much broader tuning to get this band of wavelengths in equally well. It is for this reason that the speech of many receivers is drummy and sounds low. For due to the fact that receiver is sharply tuned to unmodulated radio frequency, it eliminates those frequencies resulting from modulation by the higher speech frequencies, and the higher speech tones are therefore absent from the received speech. In the above case, if the receiver were tuned to, say, 100,000 cycles, it would receive fairly well the frequencies which were 1000 cycles higher and lower. But due to the sharp tuning qualities of the receiver it does not receive equally well the frequencies 2000 cycles or more higher or lower than 100,000 cycles, and therefore the speech sounds drummy.

The receiver which is used for damped wave telegraphy will be capable of receiving speech. For although the speech waves are continuous, unlike damped waves which are not, the speech modulated waves have varying amplitudes which actu-

ally the telephone receiver, after being properly rectified by the detector, be it crystal or tube. The difference between the telegraph receiver and the speech receiver is that the telegraph receiver is generally made very selective, whereas, as explained above, the speech receiver requires to be broadly tuned. Hence, contrary to the accepted method of making radio telegraph receivers, the radiophone receiver is better made a high resistance, high decrement receiver. Although the speech intensity might be less than on the other highly selective type of receiver, the quality of the speech on the broadly tuned receiver will be better, clearer and more intelligible.

RADIO FREQUENCY AMPLIFICATION.

To successfully bring in the more distant stations, radio frequency amplification is found to be necessary on account of the very feeble waves not being sufficient to disturb the flow of electrons in the detector tube without previous amplification. When a reflex circuit in which one vacuum tube performs two duties, with crystal detector for rectification. Radio frequency transformers as well as radio are required. In the new pentode circuit, by increasing the efficiency at radio frequency, most of the difficulties previously experienced with this type of amplification are eliminated. The windings of the primary and secondary are equal, the primary being connected in the plate circuit of the preceding tube of the following tube. In the case of the reflex circuit the secondary may be connected through the crystal detector if such is used. Radio frequency transformers of local manufacture are on the market, comparing very favourably with those imported, and being far less costly, we would strongly advise the experimenter to try out radio frequency amplification, believing the results will be surprising to many who have not already experimented with this method of amplification.

FOR SALE.—Loose Coupler Crystal Set, Acrida, Phono, complete. Apply 16 Weedon Avenue, Paddington.

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September 14, 1923.

WIRELESS WEEKLY

9

HINTS FOR AMATEURS.

One of the most annoying features of radio reception is the trouble due to body capacity. If you have to hold your hand near the dials in order to keep a distant station tuned in, you lose most of the pleasure of receiving. And this trouble is not necessary in any set. It can be eliminated in the following way: Connect the rotary plates of the variable condenser to the ground; if the variable condenser is in the secondary circuit, connect the rotary plates to the filament side of the circuit. If the trouble is experienced with the plate variometer, connect the stator windings to the plate and the rotor windings to the "B" battery.

A small bit of sealing wax dropped on the edge of the winding of a coil will be sufficient to hold the wires from slipping. Never use shellac on the windings.

Some beginners have their sets grounded on the water pipes, some on the steam radiator system, some on the fire escapes and some on the gas fixtures. It often improves reception to use all of these together, running a wire which connects them all to the ground terminal of the set.

The gas pipe should not be used, however, owing to the danger of fire.

Many users of radio sets are not getting all they could out of them because they are not using the correct plate voltage on the detector tube. Try tuning in a weak and distant station and then changing the tap on the "B" battery until the best results are obtained.

Start out in radio by making a small crystal set or a simple single-tube receiver. By doing this you will learn what goes into a set and you will understand more clearly what you are doing when you begin to tune in with more complicated instruments.

When putting up your antenna do not forget to solder every joint; if you neglect to do so the joint will corrode and will offer great resistance to the feeble currents that are trying to flow in the antenna. Do not let your haste get the upper hand and cause you trouble in the end. The correct way to make a joint is shown in the accompanying diagram, Figure 1.

Erect your antenna as high as

possible and give your radio set a good start.

A radio set is no better than its weakest part.

The radio experimenter who builds the whole or even part of his set should provide himself with a set of tools to work with that will enable him to make a good job of the construction. The following is a list of the tools which he will find are almost indispensable:

1 pair of 6-inch electrician's wire-cutting pliers;

1 pair of 4-inch electrician's wire-cutting pliers;

1 small breast drill capable of holding a $\frac{1}{8}$ -inch drill;

1 complete set of small drills up to $\frac{1}{4}$ -inch;

1 brace and bit;

1 set of small files including round and triangular files;

1 countersink drill;

1 6-inch screwdriver with $\frac{1}{4}$ -inch spade;

1 6-inch screwdriver with $\frac{1}{8}$ -inch spade;

1 8-inch screwdriver with $\frac{1}{4}$ -inch spade;

1 electric soldering iron ($\frac{1}{2}$ pound)

1 can of soldering paste;

$\frac{1}{4}$ lb of strip solder.

1 small centre punch.

1 pair of dividers;

1 15-inch brass-edge rule;

1 6-inch square;

2 small steel clamps;

1 small hand grindstone;

1 hacksaw and medium sized blades.

If he provides himself with these tools he will never have to dig a hole in his panel with a penknife, or whittle away at a piece of tubing with rising temperature and temper.

To enable your set to receive longer waves (and this will probably be necessary with the new assignment of wave-lengths) insert a loading coil in series with the circuits that you are using or shunt them with a variable condenser.

Often the contracts underneath your vacuum tubes become corroded and the circuit is not properly completed. It is a good plan to sand-paper the ends of the contracts occasionally, thus keeping them bright and shiny.

If you use the small $1\frac{1}{2}$ -volt tubes it is extremely important to mount the sockets on a piece of

sponge rubber when more than one stage of amplification is used. If you neglect to do this you will be troubled by microphonic noises when you are tuning.

It is always a question with a beginner as to what kind of insulators to use with his receiving antenna. Suitable insulation may be obtained by using the ordinary glazed porcelain cleats shown in Figure 2. These may be purchased at any electrical store. The cost is slight, but they are just as effective as any of the more expensive kinds. They should not be used for transmitting, however, unless two or three of them are connected in series.

PEACE ONCE MORE.

The Music Publishers Association of the U.S.A. have now decided that they will no longer object to copyright music being broadcasted without fee. This includes most of the big publishers, and the Producing Managers Association has joined them in this resolution. The recent banning of copyright music by several broadcasting stations undoubtedly had much to do with this, for the publishers realised that they stood to lose a great deal by a boycott, also that radio had not decreased but slightly increased their sales. But the composers are still protesting, though they do not seem very sure of their ground.

OTHER DAYS, OTHER WAYS.

Back in 1859 an enthusiastic admirer of Wagner's music travelled all the way from Oldes Lehen to Weimar (Germany) so that he might attend the opening performance of one of Wagner's operas. Sixty-four years ago travelling was not what it is to-day, but he, Christian Shohn, was a true devotee, and found it well worth while. This year, the same opera was broadcasted from Philadelphia, U.S.A., and Shohn, now an old man, listened in to it from his own room. He thoroughly appreciated it, and was converted at once from a sceptic to a sincere radiophan.

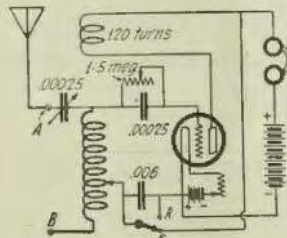
How to Keep Your Crystal Detector Free From Dust and Grease.

The greatest enemy to the sensitivity of a crystal detector is dust. The next greatest enemy is grease—especially grease from the hands of the operator. Grease and dust collect on the surface of the crystal and form a thin film which seriously affects the detector.

Trouble due to dust can be taken care of easily by enclosing the sensitive crystal in a glass case. This is generally done by the manufacturers of high grade detectors, but the cheaper detectors do not ordinarily have this feature.

In the old days when the crystal was used by almost every amateur, the enclosed detector was not known. It was up to the user, therefore, to protect his own crystal. He did it in this way: He went to the cellar or the attic and obtained a glass jar of some sort. This he took to the "wireless room" and inverted it slowly and carefully over the sensitively adjusted detector, where it served as a dust cap.

This may still be done by the



The improved and simplified Jewelling circuit is shown here. Excellent results should be obtained from this circuit.

amateur whose set is equipped with an exposed detector. When he gets

MUNICIPAL CONCERTS.

A little village, the inhabitants of which are mainly farmers, has a radio service which has reduced the hard labour of operating a receiving set to nil. In this place, Dundee, Michigan, all that is needed is a subscription form and a loud speaker. The cost is small, for a little over one dollar per month programmes

the cover in place, he will have a detector that keeps sensitive and stays in adjustment almost indefinitely.

Trouble due to the grease from the hands may be eliminated if the operator is careful not to touch the crystal. He should use a pair of surgeon's forceps or a pair of pliers for removing or replacing his crystals.

If a crystal detector has been covered with dust or grease and thus rendered insensitive, it need not be thrown away. Its original qualities may be restored merely by brushing it well with an old tooth brush that has been soaked in alcohol. Then allow the crystal to dry in some place that is free from dust.

Crystals for a detector should never be bought one small piece at a time; they should be bought by the pound or half-pound. In the long run it is cheaper to buy them this way. There are more sensitive pieces in a half-pound than in four or five "selected" boxes.

A quantity of crystal should be obtained and be broken up into pieces that will fit into the detector cup. These pieces should be placed on a piece of tin-foil which is connected to one side of the detector. The other side of the detector should be connected to a flexible wire which has a stiff piece of bare wire soldered to it.

The sensitive crystals are found in this way: a station is tuned in on the crystal already in use and then the catwhisker is removed from the detector. After that each crystal on the tin-foil is gone over with the stiff bare wire. Pieces that do not test well are broken up and tested again. This operation is continued until all the sensitive pieces have been found.

from several stations may be enjoyed. The idea originated from the President of the Farmers' Telephone Co., of Dundee, and at first the loud speakers were connected to the Central Distributing station by insulated wire along telephone poles. Results were poor, and it was fully six months later before a perfect hearing was possible. At first only

a few homes had the installation, but more and more came in with their dollars, until, as the number increased, the volume of sound became smaller and smaller and everybody grumbled. Finally the village was divided into four districts, and more powerful batteries were put in at the Central station which aided the distributing conduits and gave quite satisfying results. This little community claim to be the first to adopt this system, which they call Municipal Radio. The one station tunes in, and loud wires carry the concert, or whatever entertainment is going, to every subscriber's home. The loud speaker does the rest.

FOR TRAINED MINDS.

The prizewinner in a Chicago radio contest for "suggestions" submitted this bright thought, which he called a "Musical Memory Contest." A date was named for the night of the contest, and two weeks previously the station would broadcast classic and popular musical programmes. On contest night about twenty selections, picked at random from any previously played, would be broadcasted, and participants were to send in the names (if they could!) of these. Not a mere list, but written in either verse or story form so that they would make interesting matter to be broadcasted. The suggestion was carried out, and the prizewinner, who is seventeen, received a fine phonograph.

FREE RADIO.

On Delmar Boulevard, St. Louis, U.S.A., there is a fine new block of flats almost ready for occupation. Their enterprising owners, knowing that rentals are still high, have equipped the building with radio and advertised free reception always as inducement for their prospective tenants. There is one central receiving station with aerial outside, and every flat has its own loud speaker which can be connected or disconnected by taking out or putting in a small wall plug. The set was tested, and picked up Kansas City, Pittsburg, Waco and several other stations clearly and easily. Some tenants have had a good deal of trouble because their landlords refused permission for an aerial to be erected. Their remedy lies in a booklet for St. Louis.

ROUND THE RADIO WORLD.
M. RADIO—HYPNOTIST.

A thrilling and successful test of transmitting mental suggestion by radio was staged recently at Birmingham, Alabama (U.S.A.). Before a very large audience a young lady was induced to send herself in an easy chair in front of a local electrical emporium, where a receiving station had been installed, and be hypnotised into a long sleep by "Vishnu," a well-known adept at this. The subject placed headphones over her ears, but a loud speaker was installed so that everybody could hear the voice of Vishnu. The final instructions to "let yourself become quite rigid" were carried out to the letter and Miss Kyle was carried away in an ambulance and placed in a shop window.

THROUGH THE ETHER.

Meantime, "Vishnu," who was operating from a station some distance away, went by automobile to the spot and placed the girl upon a little cot where she was to remain in a state of coma until the following afternoon. When the twenty-four hours had elapsed and Miss Kyle was awakened, she declared that though neither nervous or afraid she found the experience a queer one, and remembered nothing except the final "Wake Up." "Vishnu" himself decided that waking his subject was the more difficult feat of the two. That hypnotism by radio is possible was clearly demonstrated, for as the "wizard" remarked, "once a subject is controlled, the sound of the human voice is all that is needed and this can be transmitted by radio."

EXTENDING B.B.C. ACTIVITIES.

On August 7, Birmingham's new broadcasting station will be opened. This has its studio in New Street, and its transmitting station in Summer Lane. Manchester B.B. Station will change its residence most probably during the same week, and its new address will be Dickenson Street. The present one is at Trafford Park. Stations are rapidly increasing in Great Britain, for, in addition to these, a relay station at Sheffield is in active construction and sites for stations at Bournemouth and Aberdeen have been already selected.

WHAT OUR SERVANTS NOW DEMAND.



The New One: Yes Mum, I'll stay if you've got wireless for picking up concerts.

THE RADIO BLOODHOUNDS.

During the latter part of July a new sport for radiophans will make its bow. From a London station a full personal description of certain (presumably) suspicious characters will be broadcasted, and a prize

given to the first person successfully tracing them. The "wanted" desperadoes will be sent out on bail from a station, and there ought to be some lively results. Radiophans will be able to prove their powers as sleuths, and Scotland Yard may get some new recruits.

Get Your Wireless Gear at Electricity House

387 GEORGE STREET (OP. STRAND), TEL. 2961 CITY.

Condenser Plates, 1/6 per doz.; Condenser Spindles, 2/9 per set; Condenser Ends, 1/9 pair; Honeycomb Coils, from 1/6; Honeycomb Mountings, 3/- each; Filament Resistances, 7/6 each; Calibrated Dials, 1/6 each; Knobs, 6d., 9d., 1/-, 2/- each; Contact Studs, 1/3 per doz.; Switcharms, from 1/6; Terminals, 6d. each; 'Phone Condensers, 1/-; Grid Condensers, 1/-; Variable Condensers, 25/-, 30/-.

Murdoch's 'Phones, 35/-; Myers' Valves, 35/-.

Catalogues, 9d. each, including wiring and other diagrams. All makes of Telephones and Valves.

Crystal Cups, 1/-; Detectors, 5/- each; Loose Couplers, 40/-;

Cabinets, Ebonite, Bakelite, and All-round Materials.

Complete Crystal Sets, from 27/6; Valve Sets from £9 to £35, 1, 2, or 3 valve; Radiotron Valves, 37/6; Vernier Rheostats, 12/6; Rheostat Knobs and Dials, Polished Bakelite, 4/-; Condenser Knobs and Dials, 4/6.

INTERVALVE TRANSFORMER, 40/-.

Closed Iron Core.

UNDER NEW MANAGEMENT.

Works Manager: Raymond McIntosh.

General Manager: J. S. Marks.

All Communications to the Firm.

Importing American Radio Wireless Equipment.

By N. M. SIMONS.

Export Manager of Air-Way Electric Appliances Corporation of Toledo, Ohio, U.S.A.

This article might be applied to the purchase of wireless and radio parts and instruments from any country of the universe and is to be regarded primarily as a guide to the radio and wireless buyer when placing his requirements for delivery of these materials from countries beyond the Commonwealth.

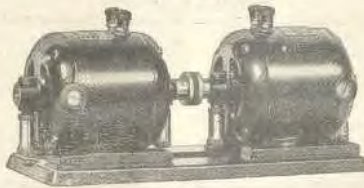
The radio and wireless merchant, wholesaler or retail dealer usually places his requisitions in the following ways:

1. Directly with the manufacturer.
2. Through an indent or commission house which usually pays the supplier for his products at the port of embarkation and at the time of shipment.

based on a guess by a manufacturer in a foreign country even if he is familiar with local conditions. This is very doubtful in view of the fact that local regulations are not yet actually formulated although at the time this article is being written, we understand that a conference is taking place at Melbourne with a view of finally determining the regulations to be established relative to radio broadcasting in the Commonwealth. This conference, we understand, is taking place between the Postmaster General's Department and the wireless and radio interests and American manufacturers are looking forward to the complete reports of this conference with great interest.

will immediately come up and can be disposed of one way or another then and there.

He has a first hand opportunity of investigating the reliability of the supplier. This is of particular importance where the subject of guaranteed materials are concerned. The buyer in this case naturally pays a commission to his indent house but does not have to transmit funds to the manufacturer or effect purchases based on approximated C.I.F. quotations. The indent merchant can always be depended on to protect his client for it is through his client that his business prospers. It should also be remembered that the activities of an indent merchant makes it an absolute necessity for him to know the trade customs in the country of exportation and importation. This does away to a large extent with fines levied by Custom's Authorities for failure to comply with existing regulations. An indent merchant should and usually always avoids excessive shipping costs. He will consolidate materials to the best advantage of the buyer. Many manufacturers, on the other hand, know these details but then again there are more than twice as many who are not familiar with the Custom's regulations and details covering transactions with the Commonwealth.



Airway Generator

3. Through a direct representative of the manufacturer or a local representative of the same.

The first method is usually slow and inefficient specially when dealing with a distant country. The average mail time from and between Sydney and New York is 27 days and then only when mails are carefully routed by specific steamers. Then again buying head phones from one manufacturer, batteries from a second, and radio instruments from a third usually means three sets of ocean bills of lading, in fact higher costs as to trucking, shipment and banking. Then there is always the possibility of misunderstanding or the neglect of details. For example many concerns without much consideration due to haste, will order simply variometers never for a moment thinking far enough ahead to specify whether a plate type or grid type variometer is required. The manufacturer or supplier guesses but no business can get very far

In dealing direct, you will often notice that manufacturers are reluctant to submit C.I.F. (cost, insurance and freight) quotations on assorted materials. This is the case because a C.I.F. price would be an approximation and when approximations are to be considered, a manufacturer or supplier always allows a small percentage over material and shipment costs to cover himself regarding details such as freights and trucking. You may be assured that the C.I.F. quotation is usually always beyond the actual C.I.F. cost especially when small and assorted items are being purchased.

The second method has many real advantageous features. The indent or commission merchant firstly has an opportunity of dealing personally and directly with the manufacturer. He has an opportunity of effecting comparisons both as to quality and price with competitive manufacturers.

If details are lacking, this subject

The final method undoubtedly is very satisfactory and a most logical way of placing business. Orders placed from samples in the hands of a representative of the manufacturer can scarcely have an opportunity of miscarriage. The representative immediately calls for details. He will always question a buyer of audio frequency transformers regarding the amplification ratio and other points of importance. There are many details in radio and wireless purchases that are often overlooked. He will call these to the attention of his prospects.

Many of these points will appear most obvious to the casual reader, yet we know of many orders being sent to this country which failed to specify the points noted herewith.

In ordering socket appliances for

example, a storage battery charger; always specify the voltage and if for alternating current (A.C.) then also specify the number of cycles or periods. And do not neglect to add



Variometer

that you wish a bayonet catch adaptor plug or else the manufacturer will supply the standard fitting which prevails in the country of origin. The manufacturers' representative who knows his line will never permit you to overlook these points. This manufacturer will know the trade customs by experience and through his representative. Such details as the formal certified in-

voices required for Australia are every-day occurrences with him. He knows it is oftentimes advisable to miss a sailing in order to take a subsequent boat which is a direct sailing and faster vessel. He knows when it is advisable to effect inland routing by freights which are slow, and when it is advisable to effect inland routing by express. These seemingly unimportant details all tend to reduce a buyer's costs and yet effect delivery at the earliest possible time. This is just what the Australian importer of radio materials requires and he should insist upon this sort of service and attention.

In ordering "B" batteries from one manufacturer, radio parts from a second and head-phones from a third; strive to have your foremost supplier in the country of exportation effect a consolidation of these materials at the port in order to ship on one ocean bill of lading. This cannot always be effected, but when possible, it always results in a very considerable saving to the buyer. For example, if you are buying steadily from one manufacturer; he usually will be glad to assist you in these details. He will either consolidate these materials at his plant

or at his warehouse in the port of exportation. This immediately does away with the costs of minimum bills of lading, duplicate trucking charges etc. Then again, one set of documents are surely easier to handle by a bank than three sets and are also far more economical. In dealing through an indent house, these consolidations are always effected unless through unavoidable reasons.



Closed Type Transformer

Care in placing orders direct or through representatives of the manufacturer, will render this same service possible. In reference to the consolidation of radio materials, we do not recommend that "A," "B" or "C" batteries be packed in the same cases with radio parts. In packing batteries, care must be taken to see that the cases are lined with moisture and waterproofed

De Forest

Ask your Radio Dealer to show you DE FOREST Radio Apparatus, the Standard of the World.

BRANDES' RECEIVERS are guaranteed the best made. Buy a pair; if you are not satisfied your money will be refunded in full.

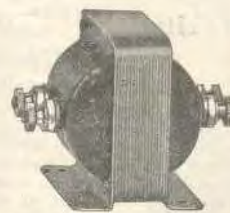
Radios, Panels, Knobs and Dials.

If your Radio Dealer has not these lines to show you, write to us for Catalogue and Price List.

International Radio Co., Ltd.

P.O. Box 2541, Sydney, N.S.W.

N.Z. Offices: 91-93 Courtenay Place, Wellington, N.Z.



Low Frequency Transformer

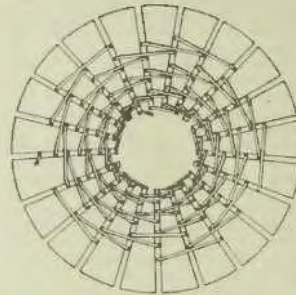
paper. Storage or "A" batteries should be shipped fully charged but dry, and acid added only when ready for actual sale. Many manufacturers of storage batteries have experimented on this point, but have long concluded that the elimination of acid in effecting distant shipments, is the only possible way of assuring proper delivery.

WAR IN THE FUTURE.

Experts confidently and cheerfully inform us that the next war will be a radio war. In battleships, machine guns, tanks, especially the latter, the new science has been called into co-operation, making deadly weapons ten times more deadly since they will be more difficult to put out of action. In the past two or three years experiments with tanks have been carefully made, and the newest development in these monsters are some without any opening for vision on the part of the operator, and some needing no operator inside at all. In the first specimens the man inside wears armoured steel from head to foot, and steers and works according to radio directions given from another, and well-hidden, tank. In the latest, though, radio, controlled from a safe distance, operates both the driving gear and the machine guns. The means are the same as were demonstrated upon the manless battleship in the recent manoeuvres.

FARMERS ARE ADOPTING IT.

A survey conducted recently by the United States Agricultural Department shows how greatly the farmers appreciate radio and how rapidly it is becoming part of their daily routine. Almost half of the replies to a broadcasted inquiry were from farmers owning receiving gear. There were also farm bureaus, grain dealers, mills, etc., which receive the



A DUALATERAL BASKET COIL.

The accompanying sketch illustrates a novel method of winding a basket coil. As usual, an odd number of pegs or slots is used, but the wire is passed round two pegs at a time. The result is a basket coil of dualateral formation which possibly still further reduces the self-capacity.

bulletins and distribute the news in various ways amongst other groups of farmers. Greatest interest was universally found to be taken in reports of the grain market, by which those who produce these commodities know the prices fetched by them at the markets. Wheat, corn, and oats are exhaustively commented upon in these reports.

HOW NOT TO DO IT.

Impetuous radio fans should take warning by the fate of a sixteen-year-old American lad, who lost his life through carelessness when fixing his aerial. In fastening his wires to the back porch of his home, he threw the ends accidentally across an overhead service line of the electric light. The ends fell down, and he tugged and twisted them this way and that to get them free. The friction wore the insulation of the electric light wire. There was a dash, and the boy's hands and arms were burned so badly by the high voltage running through his antenna wires that he died before he could be taken to hospital. Aerials should never be put up very near to electric light or power wires.

RADIO—CO-RESPONDENT.

Here's a very sad story from New York. A wholesale druggist called Mapother became badly bitten by the radio germ. He spent his days in experiments and his evenings listening-in. His wife declared he sat up half the night and spent the other half quarrelling with her when she took him to task. Because he didn't care for anything but radio, she went to court about it and told her troubles to a sympathetic judge. Now she's bringing a suit for separation and declares her husband can take himself and his radio out of her life.

Trimm "Professional" Head Set 3000 Ohms

A QUALITY PHONE AT A QUANTITY PRICE

Perfect Reproduction and Articulation at Any Range—WEIGHT ONLY 10½ OZS.

Compare these specifications with any head set on the market at any price, and see why the TRIMM "Professional" is the biggest value in the Head Set Field:—Moulded Bakelite cases and ear caps which will not warp like cheap composition; no exposed metal parts to become tarnished; Single bar Tungsten steel magnets formed to shape to insure uniform tempering and magnetising; Coils wound with maximum number of turns of No. 40 enamelled wire to full resistance of 3000 ohms; Reinforced terminals of stranded wire brought out from coil windings to solder clips; Coils covered with insulating cloth—no fine wires exposed; Arrester gap across cord terminals; Improved type head band covered with resilient tubing—comfortable, light weight, and distinctive in appearance.

Obtainable from Continental Radio and Electric Co., 165 Kent St.; Electric Utility Co., 619 George St.; Anthony Hordern & Sons, Ltd., George St.; F. E. O'Sullivan, 286 Pitt St.; Ramsay Sharp & Co., Ltd., 217 George St.; Radio Co., Ltd., 15 Loftus St.; The Colville-Moors Wireless Supplies, 10 Rowe St.; Wireless Supplies Ltd., 21 Royal Arcade; Miss F. V. Wallace, 6 Royal Arcade, and all Wireless Supply Houses.

PRICE 45/- EACH

Sole Australian Agents · O. H. O'BRIEN & NICHOLL (Sydney)

Phones: City 3302, 10593.

37 PITT STREET, SYDNEY.



WESTERN SUBURBS AMATEUR WIRELESS ASSOCIATION.

It may be interesting to know that Mr. Geo. R. Challenger and R. S. Burman, the two members of the W.S.A.W.A. who conducted the N.Z. tests for this association, were successful in getting the New Zealanders on every occasion they listened in on a single V24 valve, at a remarkable strength.

Arrangements are now almost finalised for the second annual function, to be held on 25th inst., in the Auburn Town Hall, in the form of a wireless concert, with permission of the Controller of Telegraphs and Wireless, and under temporary patent permit of the Amalgamated Wireless Ltd.

GRENFELL LEADS IN WIRELESS.

The first radio exhibition to be reported, was held at Grenfell during show week, when over 300 enthusiasts had the pleasure of listening in and having the progress of wireless explained.

The exhibition was held under the auspices of the local branch of the Returned Soldiers and Sailors' League, organised by Digger G. Proctor and Digger F. Walton.

A three valve set, fitted with a loud speaker was kindly loaned by the Radio Co., also some local made apparatus was on exhibition.

A number of text books were sold, with the object of getting a number interested to form a Radio Club. The fact of a company already advertising broadcasting at an early date has caused quite a number to become interested. Radio is going to become very popular with the men on the land, and Grenfell is fully awake to the fact. Grenfell is a town 272 miles by rail from Sydney, on the south-western slopes, it being one of the finest wheat growing districts in the State, once noted for its gold mining and soon to be

noted as a progressive wireless town.

CROYDON RADIO CLUB.

On Saturday, September 1st, the Croydon Radio Club held their usual weekly meeting at the club rooms, "Rockleigh," Lang Street, Croydon, at 7.30 p.m.

During the afternoon members assisted Mr. C. W. Slade to erect a new steel mast, and much was learned in mast construction which will be of value when members wish to erect radio masts. Mrs. Slade entertained the members to afternoon tea.

The design for the club's receiver was discussed, and a suitable one decided upon.

Members hope to be able to conduct some interesting experiments on October 1st.

The usual buzzer practice was given. The members are still keen about learning to become proficient Morse operators.

Anyone interested in the club should communicate with the Hon. Secretary, G. Maxwell Cutts, "Carwell," Highbury Street, Croydon, who will be pleased to give information in regard to the club.

PHONES

Kellog	£2	5	0	pair
Baldwin	4	18	6	"
Trimm 3000	2	2	0	"
Trimm 2200	1	12	6	"
Bestone 2200	1	12	6	"
Western Electric 4000	2	4	0	"
" " 8000	2	7	0	"
" " American	3	15	0	"
New System 2000	2	0	0	"
Manhattan 2000	1	12	6	"

RADIO HOUSE

The Quality Radio Store. Members of Broadcasters (Sydney) Limited

619 George Street, Sydney

Phone City 1487



MARRICKVILLE AND DISTRICT RADIO CLUB.

At the School of Arts Hall, in Illawarra Road, Marrickville, on Monday, 3rd inst., the weekly meeting of the above club was held.

The report from the Technical Committee was received, and it was agreed that the club's transmitting and receiving license be taken out in the name of the President, Mr. H. L. Hamilton.

Mr. S. Trimmington reaffirmed his decision to present the club with two masts, one 70 feet and one 50 feet, and advised that they would be available any time the Technical Committee required them.

The club next went into the discussion on "What constitutes a genuine experimenter." This discussion was instigated by the club's patron, Mr. E. B. Crocker. Many and varied were the definitions put forward, two humorous ones being worthy of mention.

(a) A genuine experimenter is one who on being asked for a pencil sheds from his pocket such things as cat whiskers, crystals, valve sockets, etc.

(b) A genuine experimenter is one who endeavours to operate a loud speaker from a crystal and an electric bulb.

On the 17th inst., Mr. Mingay, of Burgin Electric Company will deliver a lecture to this club on "Short Wave Non-regenerative Receivers."

Secretary A. N. Hemming, of Central Avenue, Marrickville, would like to hear from local enthusiasts. Only those holding experimental licenses are entered for.

RADIO ASSOCIATION OF SOUTH AUSTRALIA

On Monday evening last a meeting of the Radio Association of South Australia was held at the offices of Messrs. Newton MacLaren Ltd., Adelaide, to receive the report of a special committee which had been formed for the purpose of recommending a system to be adopted for broadcasting in Adelaide.

COMPLETE SINGLE VALVE SET

£11/10/0

3. At home Tuesday nights.
5. tany St., Randwick.

Just Landed!

"Radak" Apparatus

A large shipment of this highly efficient apparatus just to hand including

Variometers, Variocouplers, Variable Condensers and Complete Receiving Sets.

Ask to see them or write for particulars to

WIRELESS SUPPLIES LTD
RADIO & ELECTRICAL ENGINEERS.



Sale Sale Sale

LAST WEEK OF BARGAINS

There are still a few lots left

Head Phones at Cost

Browlie's Adjustable 2000 ohm .. 37/6 each
Western Electric 1000 ohm 35/ each

Hosts of other Goods for Amateurs

O'Sullivan's Electric Shop

296 PITT STREET, SYDNEY

September 14, 1923.

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The committee by the report they presented plainly showed that they were in earnest, for every detail of the scheme they recommended had been worked out thoroughly.

The Chairman, Mr. D. E. MacLaron, commended the committee which consisted of Messrs. L. C. Jones, G. A. Miller Randle and F. L. Williamson, on the manner in which they had carried out their duties.

After moving the adoption of the report it was decided that a license should be applied for, and when that was obtained a company would be formed to carry out broadcasting.

WESTERN SUBURBS AMATEUR WIRELESS ASSOCIATION.

During the last quarter the association has listed two new members, Mr. H. Calver, of Blaxland, and Mr. Moodie, of Auburn. Buzzer practice and lectures have now been postponed till after the association's second annual function is held. It is to take the form of a wireless concert, in the Auburn Town Hall, on 25th inst. The association being almost bankrupt, they are now considering floating a loan of about £25 to carry on, and they hope to gain something from their concert. There is still plenty of room for new members, who may apply to Geo. R. Challenger, Hon. Secretary, c/o club room, 77 Park Road, Auburn.

WAVERLEY AMATEUR RADIO CLUB.

The meeting of the Waverley Amateur Radio Club, held on the 6th September, was marked by a good attendance of members. After the minutes had been read £3 was voted towards a three valve set. The committee, consisting of Messrs. Bowman and Thomson, would begin the construction of the set immediately. The committee which was making the club's receiving set, Messrs. Howell and Bowman, reported progress, but was in doubt as to the best circuit, in view of the prohibition on regenerative circuits. Communications were received from the Australasian Relay League and the State Radio Inspector. With regard to the Relay League's letter, it was decided to inquire if the club could join as a body, an action which the chairman (Mr. Perry) emphasised would be highly advantageous to the club. Of two com-

Pan-Pacific Science Congress.

At the Pan-Pacific Science Congress held recently in Sydney, one of the most successful sections was VI b—Pacific Radio-telegraphy and Longitude by Wireless—the Chairman of which was Mr. H. F. Marriott, a representative of the British Government, and the Secretaries were Professor W. E. Cooke and Mr. F. Basil Cooke.

This section was considered by the authorities to have been one of the most successful of the whole Congress, for which success credit must be given to the energetic secretaries whose reports were thoroughly appreciated.

The section dealt with some most important papers, including "Organisation of Wireless Time Signals in the Pacific and Adjoining Countries," by Professor W. E. Cooke; "Aerial Science (Aviation and Wireless) and their Possibilities in the Pacific," by George A. Taylor, who also contributed a paper on "The Encouragement of Invention, and its Bearing upon the Peace of the World"; "The Development of Wireless in Australia," by E. T. Fisk; "The Theory of Electricity as Syntonic Molecular Vibration," by Electrical Commander F. G. Cresswell, R.A.N.; "Social and Commercial Development and Possibilities of Wireless in the Pacific," by E. T. Fisk. Amongst other papers was one by Father E. Gherzi, and some interesting notes by Dr. Braak, as well as a paper on "The Time Service in the Philippine Islands," by the R. v. Miguel Selga.

It can therefore be understood with such a variety of papers to be presented, the arrangements at the University called for careful judgment and organisation, which was well arranged by the Secretaries referred to.

It may be pointed out that Professor W. E. Cooke, who is the present Government Astronomer, is a Fellow of the Royal Astronomical Society, has had a brilliant career, being an M.A. at the Adelaide University, and was Government Astronomer and Meteorologist of Western Australia from 1896 to 1912, from which period he has been the Government Astronomer of New South Wales and Professor of Astronomy at the Sydney University.

He has written many papers on astronomical and meteorological subjects, and holds one of the highest places in the astronomical world. His son, F. Basil Cooke, who is also a Fellow of the Royal Astronomical Society, has been associated with his father in astronomical work, particularly in work connected with Radio-telegraphy and Longitude by Wireless, and has also been a very energetic worker in connection with the popularising of wireless telegraphy and telephony, having given many public addresses on the subject.

He is the managing-director of the Radio Company Limited, of Loftus Street, Sydney, and with his father well deserved the very hearty vote of thanks accorded them at the closing of the recent Congress.

munications from Mr. Crawford, one was in connection with the restrictions on regenerative circuits, and the other asking the club to choose a wavelength within the limit of 250 metres. It was stated by a member that the wave length of 250 metres would be more suitable for relay work, and, on Mr. Howell's motion it was decided that this be applied for, with 218 metres as an alternative in the event of the other being refused. Mr. Bowman stated that the Manly Club was anxious to meet the Waverley Club in a debate, and after discussion it was decided to ask the Manly Club to issue a challenge, thus giving them the choice of subject. The meeting

closed after consideration of the new rules, the club's part in the forthcoming exhibition, and the programme for the ensuing fortnight.

IRELAND JOINS IN.

It is rumoured that Dublin is to have a radio station very shortly. Modelled upon the Eiffel Tower, Paris, it will be under Government control, and its first duties will be to broadcast weather forecasts, market reports and news for the delectation of the small country towns. Political speeches are not included in the programme so far, but they doubtless will have something to say for themselves at election time.

LEICHHART AND DISTRICT RADIO SOCIETY.

At the twelfth monthly business meeting of the society, held at the club room, 176 Johnston Street, Annandale, on Tuesday, September 4th, three new members were elected, bringing the total to 52. Several important matters were discussed, including a proposal to alter the society's meeting night. This question was gone into very thoroughly, and, after much discussion, it was finally decided to change the meeting night to Monday, commencing with the annual general meeting, to be held on October 8th. Until then, all meetings will be held on Tuesdays as heretofore.

On Thursday, August 30th, the Society gave a demonstration at the Annandale Theatre, by special permission of the P.M.G., and an audience of about 1500 thoroughly enjoyed a number of musical items transmitted by 2GR (Mr. Marks, of Rose Bay). The arrangements were in the capable hands of Messrs. Thompson and Rosece, two of the Society's oldest members, and the signals received were clearly audible in very part of the large building.

The next meeting will be held at the club room, on Tuesday next, when all interested are invited to be present.

All inquiries relative to the activities of the Society should be addressed to the Hon. Secretary, Mr. W. J. Zoch, 145 Booth Street, Annandale.

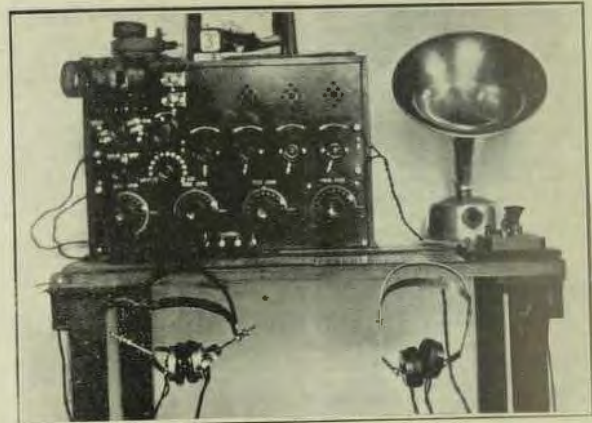
KILLARA RADIO CLUB.

The eighth general meeting of the above society was held at Killara, on August 31st.

After half an hour's buzzer practice the meeting was called to order, Mr. Greenwell taking the chair. The minutes of the previous meeting were read and confirmed, and correspondence received.

The rest of the meeting was devoted to a general discussion among the members.

The club meets fortnightly, in the Congregational Hall, Killara. Enquiries received by the Hon. Sec., phone J2681.



Mr. A. Metham's Set

DESCRIPTION OF MR. A. METHAM'S SET.

The following is a description of the 4-valve receiving set shown in the photo. The set was constructed by myself. The book-eye being one taken from a back number of "Wireless Weekly." I am using one stage of radio, detector and two stages of audio. I use an Annaka valve for detector, and radiotrons for amplifying. With this set I use honeycomb coils for all wave lengths, everything is enclosed in the cabinet except the A battery. My aerial is 120 feet long, 30 feet high, of the inverted L type. The results obtained with this set are very fair, all Australian and New Zealand coast stations being very clearly heard, VIS, VIT, VIM, VIA, can be received on a Prain aerial quite distinctly. On the long wave

most of the big stations in the world can be received, JJC, NPG, NPN, NPL, NPM, can be copied a yard away from the phones. Of the N.S.W. amateurs I can get them all, 2GR, 2JM, 2GM come in very loud, and can be received on a Prain aerial, 2GR being the strongest of the lot. He can be received on the clothes line, or on a pair of phone cords, or without an aerial at all, with the phones attached to the horn he can be heard 100 feet away. Some of the other stations that have been heard are 2JU, 3DF, 3MC, 4OG, 5AC, 3AC; they all come in fairly clear, but not very strong. In concluding, I may state that I have slightly altered the set since the photo was taken, having done away with the tickler coil, and coupled it to the high frequency transformer.

THE END OF A PIONEER.

One of the first U.S.A. Stations, WJZ, Newark, N.J., is now closed down permanently. It commenced operations in 1921, when radio stations were few and far between—there were only about four in all America then. WJZ was the pioneer of many new ventures in broadcasting—it was the first station to have its nightly programme printed in a newspaper. Its radius was two

thousand miles and Australia, India, Europe and South America, and even on occasions Honolulu heard its signals regularly. In the eighteen months WJZ operated many new stations were erected. There must be quite six hundred to-day in America. Quite a touching little final speech was made by the director just before the station closed, and the new known call letters WJZ now belong to the "Broadcast Central," atop of the New York Aedion Hall.

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The Australasian Radio Relay League

By J. W. Robinson, Publicity Officer, Australasian Radio Relay League

Although very little has been said during the past two or three weeks concerning the Australasian Radio Relay League members of the committee have not been idle, but on the other hand much work which was quite necessary prior to the actual commencement of operations has been carried out.

The most important matter which has been finalised has been the securing of the approval of the Postmaster-General.

Some little time ago representations were made to the P.M.G. in Melbourne to have the League officially recognised, and the Chief Manager of Telegraphs and Wireless (Mr. J. Malone) was also communicated with.

During last week the Honorary Secretary (Mr. R. Charlesworth) received a letter from the P.M.G. stating that his department was prepared to grant official recognition to the League on the condition that certain rules were slightly amended and particularly on the condition that it be agreed that all communications between League stations be carried out by licensed experimenters and that such communications refer exclusively to such tests and experiments as are authorised under the conditions of experimental licenses.

The alterations suggested by the Postmaster-General in connection with the rules included the addition of a clause providing that copies of messages be made available to his Department and that facilities be provided for officers of the Department to examine and inquire into the methods of working, and also that priority be given to messages on Government business authorised by the Postmaster-General's or of Defence Departments.

Another condition was that a rule be inserted under the "objects" section of the League's rules stating that one of the objects of the League is to assist the Government in enforcing observance of the Wireless Regulations concerning experimenters.

It was also asked that other slight variations, mainly of a technical nature be made.

RULES AMENDED.

Immediately on the receipt of information from the Postmaster-General, a meeting of the Committee of the League was held the President, Mr. C. Maclurean, occupying the chair. The letter from the P.M.G. was read and on the motion of Mr. Basil Cooke (F.R.A.S.) the recommendations were adopted, and the rules amended in accordance with them.

VISITOR WELCOMED.

A welcome was then extended to Mr. H. F. Marriott, an English scientist, who is visiting Australia in connection with the Pan-Pacific Science Congress, and who is chairman of the Radio Section of that gathering.

Mr. Marriott stated that he was greatly interested in Radio communication as a means for the linking up of the Empire, and was surprised at and pleased with the results achieved by Australian experimenters on low power.

The President of the League (Mr. Maclurean) expressed the view that within two or three years Australian experimenters would exchange signals with fellow amateurs in the Old World.

AMERICAN RADIO RELAY LEAGUE.

A letter was received from the American Radio Relay League asking for particulars regarding the Australian movement. The question of affiliation had been mentioned to the American League by Mr. Squires, an American operator who was present at the inaugural meeting, and the request for information was the result of a report from him concerning the formation of a League in Australia. On the motion of Mr. Maclardy, approval was granted to proceed with affiliation with the American League and it was decided to forward further information to America.

RELAYING OF MESSAGES.

A discussion on the immediate relaying of messages was opened by Mr. Charlesworth who stated that

at the present time it was almost impossible for amateurs to get through to many of the transmitters. He suggested that a time be set apart (for the time being) wherein League traffic should be carried on.

After considerable discussion it was moved by Mr. Fry that League traffic should be concentrated between the hours of 8 to 8.30 and 10 to 10.30 p.m. on a wave length of 250 metres. The motion was carried unanimously.

WIRELESS INSTITUTE MESSAGES.

Mr. Phil. Renshaw, Hon. Secretary of the Wireless Institute, asked if members of the League would relay Wireless Institute experimental messages and was assured by the chairman that it should be done.

WIRELESS EXHIBITION.

On the motion of Mr. Renshaw, it was decided to write to the Secretary of the Wireless Institute and request that a stand be provided for the League at the forthcoming wireless exhibition free of charge. The motion was carried.

MEMBERS WANTED.

The Australasian Radio Relay League is still anxious that amateurs, whether transmitters or receivers should link up with them.

Applications for membership may be forwarded to: The Hon. Secretary, Box 378, General Post Office, Sydney.

FIRST AID TO A SHIP'S ENGINE BY RADIO.

An unusual example of the value of radio in an emergency was furnished by the motor ship Sangvar, which ran out of oil on her way from the Mediterranean to New York. She was obliged to put into Ponta Delegada, where only heavy oil was found to be available. Not knowing how to use this, the captain sent a message by radio to the company's engineers and first aid—in this case, the necessary information—was returned via the ether.

Amateur Receiving Stations.

New South Wales

License	Name	Address
C	Robinson, C. W.	112 Bridge St., Drummoyne. R.
C	Addison, R. P. G.	9 Stapleton Ave., North Sydney. R.
C	Boyle, W. H.	53 Rawson Ave., West Kogarah. R.
C	Benson, C. V.	135 Meek Rd., Marrickville. R.
C	Burgess, R. J.	566 New Canterbury Rd., Dulwich Hill. R.
C	Clark, A. F.	23 Womerah Ave., Darlinghurst. R.
C	Tyler, H. M.	"Healesville," Leanax St., Gordon. R.
C	Gray, J.	79 Mackenzie St., West Concord. R.
C	Gowing, W. E.	15 King St., Ashfield. R.
C	Gibson, M. W.	56 Church St., Wollongong. R.
V	Griffin, R. A.	"Regray," Centre Road, Eastwood. R.
C	Irvine, D.	2 Luncheon St., Arncliffe. R.
C	Willcock, G. R.	"Radford," James St., Waverley. R.
C	Sbarland, A. A.	115 Bellevue Rd., Bellevue Hill. R.
C	Silverthorne, F. A.	Creek Bank, Cockle Creek. R.
C	Simpson, T.	13 Lawson St., Rozelle. R.
C	Strachan, G.	18 Darley St., North Sydney. R.
C	Podney, W. H.	"Emoh Kio," Allam St., Bankstown. R.
C	Porter, A. B.	"Frema," Loen Rd., Eastwood. R.
C	Fox, A. C.	"Mt. Pleasant," Marsden Rd., Ermington. R.
V	Forbes, E. G.	Williams' St., Bulli. R.
C	Lander, W. J.	96 Glenmore Rd., Paddington. R.
C	Lamb, T. F. A.	P.O. Stores, O'Brien St., Bondi. R.
C	Littlemore, D. S.	16 Albyn Rd., Strathfield. R.
C	Martin, B.	Mona St., Bankstown. R.
C	Newman, H. D.	77 Pitt St., Waterloo. R.
C	Holt, T. A.	2 Appian Way, Burwood. R.
C	Hewlett, F. G.	154 Frederick St., Rockdale. R.
C	Hedger, A. W.	12 Bland St., Ashfield. R.
C	Harbor, G. C.	25 Duke St., Balmain. R.
C	Hinves, L. G.	"Boaden," Victoria Parade, Manly. R.
C	Heagarty, W. H.	76 Ourimbah Rd., Mosman. R.
C	Larkins, F. E.	"Inzelhurst," Murdock St., Cremorne. R.
Z E	Seward, Geo.	Georgetown Rd., Waratah, Newcastle. R.
Z F	Cottrell, J. W. M.	23 Dolphin St., Randwick. R.
Z G	Halliday, R. W.	King St., Turrumurra. R.
Transmitting and Receiving:—		
Z U R	Creamer, A. A.	19 Hereford St., Glebe Point. T.
Z U U	Roberts, R. G. C.	9 Church St., Ashfield. T.
Z U W	Samuel, O.	14 James St., Manly. T.
Z V	Bargin, Electric Co. (G. F. Mingay)	352 Kent St., Sydney. T.
Z X X	Mingay, O. F.	Kyring-gai Chase Rd., Turrumurra. T.
Z D K	Whitburn, R. P.	7 Bathern St., Leichhardt. T.
Z I J	Gray, A. H.	Florence St., Killara. T.
Z C I	Charlesworth, R.	173 Parramatta Rd., Haberfield. T.
Z C S	Swain, L. T.	49 Everton St., Hamilton. T.
Z D S	Davis, R. R.	Fisher Av., Vaucluse. T.
Z G B	Marks, J. S.	Ritz Flats, Salisbury Rd., Rose Bay. T.
The following have removed to the addresses indicated:—		
Z D S	Davis, R. R.	Fisher Av., Vaucluse. T.
Z J E	Tatham, G. W.	99 Edgecliffe Rd., Woollahra.
Z H T	Holdsworth, P. R.	Charles St., Greenwich.
Z E C	Gorman, C. A.	31 Segenhoe St., Arncliffe.
Z Q O	Rouse, F. G.	Park Av., Ashfield.

Victoria

V	Chief Commissioner of Police	Russell Street, Melbourne. R.
D	Gurnham, E. P.	65 Lisson Grove, Hawthorn. R.
C	Wales E. A.	319 Rathdown St., North Carlton. R.

FOR FRIENDS IN NEED.

The first radio call for cash to help the suffering and homeless went forth from Fort Worth, Texas, U.S.A. A terrific cyclone shook the town of Colorado, wreaking fearful damage, as only these visitations can. The disaster took its full toll of wrecked houses, deaths and injuries, and a message broadcasted from Fort Worth to the American public in general stated that fifty thousand dollars were urgently needed to relieve the misery caused by the cyclone met with a ready response. From the next day onwards contributions and offers of assistance other than monetary came in steadily.

MISS "SPARKS."

Colwyn Bay Wireless College is very proud of Miss Jessie Kenney, who has taken the Postmaster General's First Class Certificate of Proficiency in Wireless Telegraphy. This young lady trained at the College, and is the first woman to pass the now examination operative since January, 1921. This was held at the Colwyn Bay College, and the tests included (a) working and adjustment of apparatus; (b) transmission and sound reading at not less than twenty words a minute; (c) knowledge of the radio telegraphic regulations. The certificate Miss Kenney holds enables her, if she wishes, to qualify as a first-class wireless operator on board a British ship. For the adjustment tests a 2KW Marconi apparatus was used.

WHAT DO YOU SAY?

Which is the most important aspect of radio? A correspondent suggests the fact that it is making our voyages of all kinds practically safe, is radio's most important achievement. It is, however, such a many-sided science that it seems to us next to impossible to define exactly where it shines most. Its effect has been felt upon a hundred and one other activities, and in making itself felt more and more as time goes on. As a means of spreading news and knowledge it stands unequalled, and what it will have accomplished, say, within the next twenty years nobody can accurately forecast.

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