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SPECIAL FEATURE THIS WEEK

The Need for Co-operation

Resistance Coupled Amplification

BY C. W. SLADE

OFFICIAL ORGAN OF THE AUSTRALASIAN RADIO RELAY LEAGUE.

Vol. 3. March 21, 1924. No. 25

The Need for Co-Operation.

During the last few weeks, two suburban radio clubs, after struggling along for some months in a gallant endeavour to achieve something, have given up the ghost and faded into peaceful oblivion.

Lack of efficient control, and want of proper organisation will spell disaster to any movement, no matter how worthy is the object it is striving for. The experience of those two radio clubs is of value to others, if only to demonstrate the vital need for co-operation among club members.

A great responsibility rests upon the Secretary of a Radio Club, for his is by no means easy task of seeing that a definite progressive policy is put into effect and strictly adhered to.

The officers too, can do much for a club. They should be always striving to make the business of the club more and more interesting, and above all to inculcate that feeling of comradeship and friendly rivalry among members which more than anything else makes for success.

At the Conference of club secretaries which is being called by the Wireless Institute, this subject might well be brought up for general discussion.

Watch for our New Cover

Roster for Week ending 26th March, 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, Mar. 20	2 RA 2 GR	2 IJ 2 JM	2 AR ZG 2 AR	2UW 2 ZN „	2 YI 2ZZ
Friday, 21	2 IJ 2 GR	„	„	„ „	„ „
Saturday, 22	2 RA 2 GR	2 IJ „	„	„ „	„ „
Sunday, ..23	2 RA 2 GR	„	„	„ „	„ „
Mon., ...24	2 RA 2 GR	2 IJ „	„	„ „	„ „
Tues., ...25	2 IJ „	„	„	„ „ 2 ZN „	„ „
Wednes., ...26	2 RA 2 GR	2 IJ „	2 VX	2 UW	„ „

In addition, the 10 Watters Club is working 2 CDM each night from 10 o'clock onwards.

Wireless Weekly

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Telephone, Redfern 964.

Wireless Weekly Cup Competition

This competition is open to any experimenter in any part of Australia.

Competitors are required to submit:

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 4 in. 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 sent to the Editor, Wireless Weekly, 33 Regent St., Sydney, N.S.W., and marked "Wireless Weekly Competition" in the bottom left hand corner.

Send in your nomination form now.

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 .....

.....

"Busting" the Howling Valve Bogey

(By Malcolm Perry.)

In the early days of wireless telephony, that is, two years ago, the papers used to push the howling valve out for all they were worth for the simple reason that howling valves were actually interfering with the reception of amateur telephony. And rightly so, for the telephony was so weak that receivers had to keep their sets on the point of oscillation to get it. I remember several well-known experimenters giving lectures on wireless telephony, and they all used to emphasise the point to set your receiver oscillating and then just move the tickler coil away a little bit and bring it back again, so that the set was on the point of oscillation. No experimenter does this now to receive telephony, but to those who do it, in order to get long distance results, I want to say a few words.

If the Prime Minister of Australia wanted to determine by experiment how far his voice would carry, whilst making a speech in Martin Place, and you were lunching with a friend at the Civil Service Stores, would you cease talking to your friend and make less noise, i.e., create no sound waves in order that the Prime Minister might have free use of the air?

Would the people allow all trams and motors to be stopped? Would you stop all clocks and watches in the Martin Place area?

If the Manager of a large business wished to call his typists, would he ask the whole staff to cease working so that the typiste might hear his voice?

If you were talking to another experimenter in a tram car, and he could not hear you on account of the other passengers' voices, would you ask all the passengers to cease talking? The answer to those queries is No! certainly not! In the first case the Prime Minister would be heard in Market Street if all noise ceased, in the second case the typiste would hear the manager's call, and in the third case your friend would hear every word you spoke. Again, in the first case, if all noise had to cease around Martin Place, it would be encroaching on the inherited rights of the citizens, in the second case the business would not pay, and in the third case in the tram car, you would not be game.

Further, if the Prime Minister wished to attain his object, he would instal several loud speakers over the area that he desired to be heard, or he would employ other men repeating, i.e., relaying his speech at intervals of 100 feet. In the second case the manager would call the typiste by telephone, i.e., directive working, and in the third case you would raise your voice and shout, or, in other words, increase your power. Now, if an oscillating valve interferes with you receiving American amateurs, who has the greater right to complain? The man with the oscillating valve may be listening for either Melbourne or local amateurs, and surely he has a right to do so.

You, listening for American amateurs, have your rights as well. Therefore, is it right to penalise all experimenters for the sake of one? What is the use of long distance communication if everybody has to close down in order that one station may get results?

Would you complain if you were not allowed to put up a record speed, driving a car from Circular Quay to the Railway? The British Wireless Commission, which enquired exhaustively into long distance wireless two years ago (and long distance wireless has not altered one scrap in the last two years), laid down the principle of relay work, under the Norman scheme, because they realised that wireless has two ranges, one certain and the other very uncertain. So coming back to the howling valve bogey, if every valve in Sydney and suburbs did howl, would it affect the reception of telephony? I have listened in during the last six months, probably, more than any other experimenter, and I say unhesitatingly that never on one occasion have I been interfered with by howling valves. Certainly listening for long distance C.W. and telephony, any ordinary oscillating valve will worry you, but I would never think of asking all other stations to close down in order that I might get peak results.

The liberty of one experimenter is limited by the liberties of the other experimenters. If you were shipwrecked, and landed on a desert island, you could make your own local wireless regulations, but if others came along your liberties would be naturally limited.

I have searched and searched American and English wireless magazines,

Continued on page 3, col 3

Aus. Radio Relay League

DISTRICT MANAGERS WANTED.

Attention is drawn in a leader published in our issue of last week, to the work which is being done by the Australian Radio Relay League, and the necessity for the active support of the League by all experimenters was stressed.

During the past few nights some test messages have been transmitted between several of the League stations, but no regular working scheme can be arranged until such time as all experimenters who are members complete the working schedule forms which have been posted to them, and return these to the Honorary Organising Secretary.

The schedule forms are to be filled in by station owners, and on them the times at which they are prepared to remain open for League business must be stated. Those who have given the matter any thought at all, will realise how absolutely necessary it is that such information should be in the hands of the organising secretary at the earliest possible moment. Until some definite information regarding just how much each active member is prepared to do in the way of transmitting is forthcoming, it is not possible to put into operation an effective relay system to cover the whole State.

As it is the League's intention to carry out firstly State, secondly Commonwealth, and finally international amateur relay work, it is of the utmost importance that the State organisation be completed and made to work smoothly before anything further is attempted.

The Radio Relay League unfortunately did not make very much progress during the first few months of its existence, but the very determined effort which has been made during recent weeks by a small handful of committeemen to place matters on a solid basis, deserves more support from the vast body of experimenters in N.S.W. than has been forthcoming during recent weeks.

The committee has done everything possible to make the working of the League successful. The scheme which it has drafted and put into operation is a practical one, and also a business-like one. Much time that could ill be spared has been put forward by those who have taken an active interest.

THE FUTURE OF THE MOVEMENT IS NOW IN YOUR HANDS, MR. EXPERIMENTER.

Canterbury High School Radio

It is some time since the handful of radio enthusiasts at the above school banded together to form the nucleus of a radio club, the pioneer high school radio club. From a half dozen enthusiasts the club has grown steadily, until its members now number over one hundred, and has a roll to which names are constantly being added. This increase is due to the steady, consistent work of an enthusiastic committee, led by the science master, Mr. C. W. Mann, a well-known experimenter.

The club has a twofold aim—to further the study of wireless, and to assist members in their experiments. In connection with the former aim, the club is working along definite lines, and an effort is being made to tabulate the results of experiments which have been carried out. It would be a good plan to organise wireless clubs into groups, each group in charge of an efficient experimenter, to experiment along one definite line, and to make extensive notes on the experiments carried out. It is the intention of the club to concentrate on this phase of club work, and reports will be made from time to time, indicating the progress made in the various directions.

The club has been visited by senior experimenters, among whom may be mentioned Mr. R. C. Marsden and Mr. M. E. Perry, both of whom, at considerable inconvenience gave up an afternoon to lecture to the club. Their lectures were much appreciated by very large audiences. We make an appeal here, to other radio enthusiasts to volunteer to come to Canterbury to assist the younger members in their work. We can promise a very hearty welcome to any visiting lecturer. During the year an exhibition of radio apparatus was held, and about thirty crystal sets and a couple of valve sets were exhibited. I think that this must be regarded as a very creditable performance for a junior club, consisting of members between the ages of 13 and 17.

On Speech Day, 1923, the parents and friends had an opportunity of inspecting the apparatus made by club members, and all expressed their appreciation of the excellent work done by the club.

During the year a demonstration of wireless music was given. Mr. A. W. Watt kindly delivered a lecture, and upwards of 150 friends gathered to show their appreciation of his efforts.

Continued from page 2

and can find no trace of any mention about disturbances being caused by howling valves, and the fact that no wireless traders have complained is sufficient proof that the howling valve stunt is a bogey. Well, then, why limit the amateurs to non-oscillating circuits? If the new chums are causing no interference, it is not likely that the old ones will cause any. Anyway, if you do hear howling valves, your own set must be oscillating to hear them. In closing, I want to just make a few observations on experimental licences.

I suppose the reason why licences for various purposes are issued is to protect the general public. For example, motor car drivers are licensed in order to protect life and property, dogs are licenced, bookmakers and hawkers are licensed. Listening in a couple of months ago to Broadcasters, I could hear at the same time a piano being operated (not played) next door, and the owner of the cottage suggested that as a person who operated a crystal set did no harm to anyone except himself, there was no necessity for a licence. The operator of the player piano, he said, however, should undergo not one examination, but a course of examinations, and should certainly be licenced, as he was a public nuisance, at any rate to his neighbours.

We have commenced the year 1924 with an enthusiastic annual meeting. We believe that we have a good year before us. One must realise that our financial resources are limited, and that a large subscription is prohibitive. Nevertheless, we are reaching out to a high ideal, and hope to be able to maintain the high standard reached by previous members. This year our aim is a three valve set and a five watt transmitter. We are hoping to receive permission to use the latter to transmit local weather conditions to country schools, with the idea of co-operating along the lines of meteorological experiment. We believe that wireless can be made to serve useful experimental ends, both for its own sake and for the general advancement of scientific knowledge.

The officers elected for 1924 are:—Patron, Mr. E. J. Rourke (headmaster), president, Mr. C. W. Mann (science master); vice-presidents, C. E. Jacobs, A. Forbes; secretary, D. Holmes; treasurer, F. Sibraa; librarian, R. Morris; committee, L. Hiatt, J. Long, R. Goleby.

Resistance Coupled Amplificaton

(By C. W. Slade.)

(We inadvertently announced last week that Mr. Slade's article would be entitled, "Note Magnifiers." This was an error.)

How many times is the average experimenter asked by his not-so-well-informed friend: "How can I cut down the low frequency noises in my three valve set?"

Many and varied are the answers given, all more or less successful. It is realised that most things in this life are governed by cause and effect, and that when the effect is noticed, the cause is generally arrived at.

Invariably the cause of this complaint is the audio frequency transformer. Well, suppose we remove it, or them, altogether from the circuit, and substitute in their place resistance coupling.

This will at least provide a most interesting experiment.

Of the two diagrams produced, Fig. 1 shows how to connect up a circuit employing one detector and three resistance coupled note magnifiers.

This system is by far the cheaper, and local noises are not amplified to any great extent, as they are with iron core transformers. The action of this circuit is as follows: The first valve as detector rectifies any oscillations set up in the secondary circuit into an audible frequency rise and fall of the anode, or plate current.

The grid of the second valve is coupled to the plate of the detector through the condenser C1, and therefore its potential will rise and fall at audible frequency. This causes an amplified rise and fall of anode current in the second valve.

Second and third amplifications are affected by the third and fourth valves in a similar manner. This method of note magnification is suitable for all wave lengths.

Radio frequency amplification can be effected by Resistance Coupling.

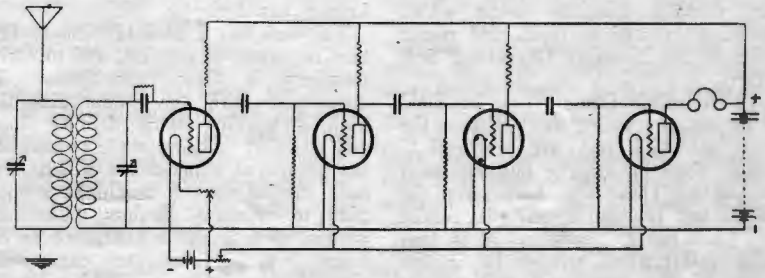


Fig 1.

Fig. 2 shows just how this is done. This diagram is self explanatory, but a word on the action will be of interest.

Before any signal comes in, the anodes of the valves are at a steady potential, and in consequence a certain plate current is flowing. When the incoming signal is applied between the grid and filament of No. 1 valve, it will cause high frequency changes in the plate current.

This will cause a high frequency change in the voltage drop through resistance in plate circuit of first tube. As the condenser between the plate and grid of the second tube is almost a short circuit for high frequency current, this voltage will be applied between grid and filament of second tube, and so on. The condensers also prevent low frequency impulses or hooting. As many as six stages of radio are used in this manner in the British Navy.

For wave lengths of 1000 metres and over, this is the ideal coupling for radio frequency work.

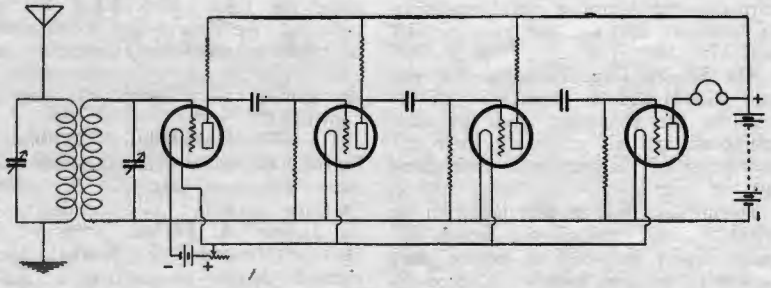


Fig 2

As I have previously mentioned in this article, the resistance coupled system is cheap.

Anyone who has made a grid leak on a piece of bakelite with a pencil can easily fashion suitable resistance for use in both of these circuits.

Michael was Vonnie's white dog, said to be a Highland terrier. Vonnie had a good deal to say about Michael from time to time, which was calculated to embarrass Peter. "You got to get me a book for Michael," she told Peter.

"What sort of a book?"

"Well, I guess it's called 'What a Young Dog Ought to Know.' He don't know any of the facts about life. I can take that dog past a million lamp-posts and ten minutes after I get him back in the flat I've got to lick him. Maybe you could give him a little plain talk, Peter. Coming from a man you know it would carry more weight..—From Mr. Broun's new book, "The Boy Grew Older," G. P. Putman's Sons.

RADIO, 2LO.

(By L. N. Schultze.)

Very fine results have been achieved by 2LO (Mr. L. N. Schultze, Lane Cove, Sydney) with his transmitter and receiver, and details of the station will be interesting to those who have logged 2LO.

The circuit used in the transmitter is the well-known Meissner three coil type, which was adopted because it gave better radiation than numerous other circuits which were tried out. The aerial is of the inverted L type, comprising two wires 95ft. long, 100ft. high at the free end, and 53ft. high at the other. The down lead is 60ft. long. Directly under the aerial is a two-wire counterpoise, 10ft. high, with wires branching out from it on either side.

The three coil tuning element is made up as follows. An ebonite tube 8in. long by 4in. diameter, is wound with 50 turns of 3/40 copper wire. Inside this tube are placed two 3½in. rotors, one (aerial coil) being wound with four turns of 8 gauge bare copper, and the other (grid or tickler coil) bank wound with 30 turns of 28 D.C.C. wire. The turns on the latter were bank wound because the rotor was too small to accommodate the necessary number of turns wound flat.

The plate is shunted by a three plate .0001 M.F. Vernier condenser, and the grid condenser is of .001 M.F. shunted by a 5000 ohm wire-wound grid leak.

When using 'phone four tubes are used, two as oscillators and two as modulators. The plates of these are connected through a 500 turn G.R. coil to help the high frequency currents off the modulators.

The metres used are all Weston instruments. A 0/2 amp. thermo is in the aerial circuit; an 0/100 ammeter is used for measuring the plate current, and an 0/500 volt-meter is connected across the H.T. leads. The filaments are protected by an 0/10 A.C.V.M. connected to a double pole, double throw key switch, so that it may be placed across either the Phillips rectifiers or the modulators.

High and low tension currents are obtained from a home-made 240v., 60 cycle transformer, with four secondary windings. Two of these are designed to give a thousand volts, each tapped at 600 v., each side of the centre connection.

The other windings are for the rectifiers and filaments, giving 6v., 22a. and 10 v. 10a. respectively. Filament and rectifier windings are directly over the primary, and the H.T. is on the opposite leg.

Operation of Set.

When the aerial switch is thrown to the "send" position, it closes the 240 volt circuit, and connects the aerial to the transmitter. Tuning is critical with this circuit, and it was only recently that after considerable adjustment had been made 1.9 T.C.A. radiation was obtained, but not until the wave length had been reduced to practically the fundamental of the aerial by placing a series condenser in circuit. Rectification of the H.T. is obtained by the use of Phillips rectifiers, these drawing 4v. 11a. each on the filaments, and being capable of passing up to 150 M.A. at 10,000 volts on the plates.

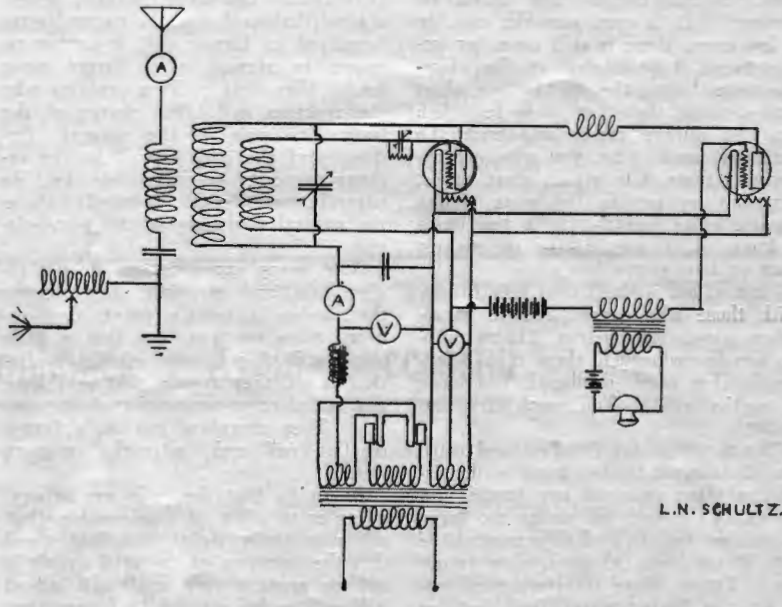
Up to the present, very little D.X. work has been done except with Toowoomba on phone.

Receiver.

Reception is done on a three coil set for long waves, and for short waves regeneration is obtained by tickling back on to a tuned impedance R.F. amplifier. On the long waves, using a V24 as detector, and two 201A valves as audio amplifiers, N.P.M., N.P.N., P.K.X., etc., can be heard about 100ft. from the Magnavox.

Short wave reception has been rather successful, all the Victorian and N.Z. stations coming in quite clearly. A number of American amateurs have been logged on a single detector tube, among them being 6AOS and 6CKR. Giblin-Remler inductances are used for all wave lengths, and these are bound with a layer of oiled silk to keep them damp-proof.

Exchanges would be welcomed by Mr. L. N. Schultze "Waraba," Burns Bay Rd., Lane Cove, Sydney.



General Efficiency of Reception on Short Waves.

Courtesy Radio (San Francisco)

The chief object of this article is to give a few hints to those who are experiencing difficulty with the reception of short waves.

I can hear many of you saying that a man who cannot receive as well on 200 as on 600 does not deserve hints. I would ask those to consider the time when their own 200 metre reception was, perhaps, not all that might be desired. It is even possible, that, in a few cases, there is still room for improvement. Certainly, in the aforementioned lists, the results on short waves, when there are any recorded, are not always comparable with the receivers used. So, you who get everything there is to get on short waves, why not try getting the same results on one valve less? (In a few cases I know of, I should like to suggest four or five valves less.)

First of all, we will deal very briefly with those who cannot receive at all below about 300 metres. Their troubles can be reduced to three main headings. Too much dead-end. Too large a reaction coil. Too much stray capacity.

The remedies for the first and third are obvious, and have been emphasised too often to need any further remarks. The fault of having too large a reaction coil is probably responsible for 60 per cent. of short-wave troubles. Those whose receivers work only on the longer waves find that, as they tune downwards beyond a certain point, they need more and more reaction to make the circuit oscillate. A little further down the circuit will not oscillate at all. Strong spark and telephony can still be received fairly well, but it is noticed that, however much further the A.T.I. is reduced, the wave-length does not decrease. Now the point below which the reaction coupling has steadily to be increased is the natural wave-length of the reaction coil (or, more correctly, of the circuit comprising the reaction coil and the valve capacity). No circuit will oscillate freely at a frequency higher than its own natural frequency. Therefore, the oscillations which are obtained a little below the point are forced and unstable, and cease altogether a little lower down. The reason that reducing the A.T.I. fails further to reduce the wave length is that the reaction coil has now taken charge of the tuning, It must be remembered that, although when we say a set is "oscillating, we usually mean that it is generating oscillations of itself, yet the circuits of a receiver are oscillating whenever it is receiving signals, the oscillations being sustained by the distant transmitting station instead of the receiver. So, for the same reason that the circuit cannot generate oscillations below the natural wave length of its largest coil, it cannot respond to signals of a larger wave length than that. This explains why the reaction coil takes charge of the tuning as soon as the natural frequency of the grid circuit in the ordinary receiver is increased (i.e., its natural wave length reduced) above the natural frequency of the plate circuit.

Now, many experimenters do not realise this, and so, when they observe that, below a certain point, they require more reaction, and that a little lower still they cannot obtain oscillation at all, they assume that they have not sufficient re-action for short waves. They therefore put in a larger reaction coil and so make matters worse.

Assuming that the coils are arranged so as to allow of a reasonable (but not necessarily tight) coupling, and that the damping of the grid circuit is not too great, a very small coil indeed will suffiice for reaction. I have very often heard this excellent advice met with the reply that the set might be persuaded to oscillate a bit with a small reaction coil, but the oscillation would be pretty feeble. May I, therefore, interpolate at this point a few sentences dealing with popular ideas about oscillation. Oscillation is the fetish of the average non-technical experimenter. His first thought about any receiver is not "will it receive?" but "will it oscillate?"

The guiding rule of many receiving men is "if the set will oscillate it must be working, if it will oscillate hard it is working well, if it will howl violently it is working perfectly." Hence the often-heard objection to a small reaction coil, namely, that it will not make the set oscillate hard enough. Let us try to explode this fallacy once and for all. A good autodyne set of any ordinary type is working at its best for the reception of C.W. when it is just oscillating. Theoretically, the signals heard in the 'phones are loudest and purest, when the local oscillations in the circuits of the detector valve are of exactly the same amplitude to those produced by the received signals. Now, with the slight degree of overlap present in the majority of receivers (even if it is too slight to be noticeable) the weakest stable oscillations which our receiver can generate are stronger than those which we are receiving. Therefore, always try to keep the receiver just below oscillation point. On no account blame your receiver because it will not oscillate hard enough. Another very important point must be mentioned in this connection. Whatever the text books may say about it, it is an indisputable fact that if a receiver is connected to an aerial, and any valve of that receiver is oscillating, some energy will be radiating from the aerial. The tuned anode H.F. amplifier, with reaction coupled to the anode coil, is no more free from this trouble than any other. If the set be tuned correctly, and the detector valve is generating oscillations, the H.F. valve will oscillate also and energise the aerial. So there is another important reason for keeping the local oscillations subdued It has been said that the amplitude of the local oscillations should be equal to that of the received oscillations.

In connection with this, it will be understood that the remarks about the local oscillations in an autodyne set always being in practice stronger than those received only apply when receiving weak signals, but, of course, the set does not need to be at its most sensitive adjustment for receiving a station in the next street.

If this ideal of equalising local and received oscillations is achieved, then the interference caused by the receiver is minimised. It means that, even if reaction direct on to the aerial coil were used, the interfering waves received by any other station, however near, could never be stronger than those of the distant station. Now, if all the usual precautions are adopted, and aerial reaction barred, the interference can be eliminated, and reception improved at the same time. In

Continued on page 19

SPECIAL ROSTER

Wireless Weekly Transmitting Tests. March 24th to March 31st

The following is the special Roster arranged with Sydney transmitters for the tests from March 24th to March 31st.

Country and Interstate listeners are requested to send their completed logs to the Editor, Wireless Weekly, 33 Regent Street, Sydney.

Transmissions each night as follows:

7.30 to 7.45 p.m.	2RA	K. Vickery, Hurlstone Park
7.45 to 8 p.m.	2GR	J. S. Marks, Rose Bay.
8 to 8.15 p.m.	2JM	R. C. Marsden, Edgecliff.
8.15 to 8.30 p.m.	2VM	V. M. Derrick, Woollahra.
8.30 to 8.45 p.m.	2VX	D. G. McIntyre, Pymble.
8.45 to 9 p.m.	2ZZ	C. P. Smith, Cremorne.
9 to 9.15 p.m.	2YI	P. Nolan, Bellevue Hill.
9.15 to 9.30 p.m.	2ZN	J. W. Cottrell, Randwick.
9.30 to 9.45 p.m.	2YG	R. Allsopp, Randwick.
9.45 to 10 p.m.	2UW	O. Sandel, Kensington.
10 to 10.15 p.m.	2ZG	R. E. MacIntosh, Lane Cove.

A Highly Efficient Loose Coupler

(By "Insulator.")

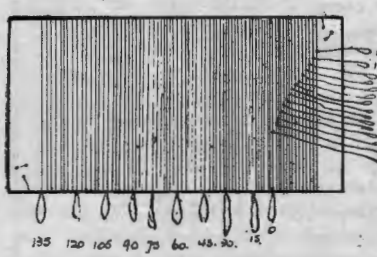
This is the first of a series of articles by "Insulator," a well-known experimenter, who has contributed much valuable data to the science of Wireless. This article will be followed week by week by other articles, all designed to help the junior experimenter along the road to a better understanding of wireless. Any advice that the experimenter may need will be gladly given by "Insulator."

Just address your queries, "Insulator," c/o "Wireless Weekly," 33 Regent Street, Sydney, and the replies will be published in the columns of the paper. If a personal reply is desired enclose stamped addressed envelope.

Radio to-day is attracting a great number of people to its banner. Not a few of these people are boys and youths under 20 years of age, and they certainly do extract a considerable enjoyment from this new science, or shall I say hobby? Give a boy a few pieces of cardboard, some wire, shellac, and a few terminals, and provided he has a slight knowledge of wireless, he quickly will make something, and will be a most vainglorious boy when he finds it will work. He has need to be, because he has achieved something; he has finished something himself with his own hands, and he will not be satisfied until he either improves his first product, or builds something better.

It is my intention in these articles to start at the beginning, or very nearly the beginning, and I want to show the boy how to make his set and how to improve it. I propose to give three different types of crystal sets, and allow the beginner to choose for himself that which will meet with his requirements. And let me also say that while these articles are primarily intended for the boy, the person of mature years need not blush if he is following them up. I hope to be useful to all classes.

Fig 1



Now, the first set I will describe is highly efficient, and, properly made, will last for years, and can be used later on with valves. It may seem a little bit elaborate, but the effort will well pay one. It takes the form of a loose-coupler, only instead of using a slider rod on the primary coil, tuning is effected by switches playing on contact studs. Material required:—

1 Set of loose coupler parts, i.e., 2 cardboard formers, 4 end pieces, 2 slider rods and 1 baseboard.
1 Bakelite panel, 6½in. x 5½in.
3 Switches.
33 Contact studs and nuts.
9 Terminals.
1 Piece of springy phosphor bronze, 2in. x ½in.
1 Phone condenser.
1 Cigar box (25 size).
4 Ounces of 24 gauge D.C.C. wire.
4 Ounces of 28 gauge D.C.C. wire.
Odd pieces of flex, etc.

Take both cardboard tubes and cut them down to 5¾in. in length, and paint them inside and outside with black enamel. This, besides giving them a good appearance, serves to insulate them well, and also stiffens them. Leave them on one side to dry, and meanwhile give the wooden ends, baseboard and cigar box two good coats of shellac varnish.

Now take the larger former, and ½ in. from the end pierce three small holes with a hatpin. Thread the end of the 24 gauge wire through these holes, and wind one turn, taking a tap at the end. Do the same with the second turn, and so on, every single turn up to 15 (Fig. 1 explains this), and then every fifteenth until you have wound on 150 turns altogether. Leave about six inches of wire on each tapping. The completed coil should resemble Figure 1.

Coming now to the smaller former, or secondary coil, proceed to wind on 180 turns of 28 gauge wire, tapping every 20th turn. This time the tappings are pushed through to the inside of the former. Pierce a small hole in the former, make the loop, and push through. Be careful to see that the tappings are long enough to reach beyond two inches of the end of the former. Both coils now being wound, give them a coat of shellac to hold them down.

The Bakelite panel will now need our attention, while the coils are drying. Smooth the edges with sandpaper and apply some Brasso to polish it. This needs a bit of elbow grease, but

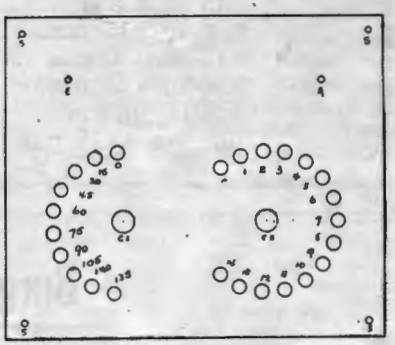


Fig 2

sail into it and a "brilliant polish will result." Next, mark it out as shown in Figure 2. It is hoped that this figure is self-explanatory, and I will leave it to you to set it out to suit yourself. However, if the novice follows out my setting, as expressed in the diagram, he won't go wrong.

In the diagram I have allowed for switch arms having a radius of 1¼in. The holes marked C1 and C2 in Fig. 2 are for spindles of the switches, the four holes being for screws to attach panel to wooden ends. E and A are for earth and aerial terminals, respectively. Personally, in making this tuner, and every tuner employing contact studs, I have found that ⅝ of an inch to be just suitable as a distance between centres of contact studs. Laying out and drilling this panel can be simplified if one draws on paper the exact size of the panel, the lay out being suggested by Figure 2. It will then be a simple matter to mark out the holes with a centre punch and then drill them.

Figure 3 shows the lay of that secondary end piece to which the tap-

pings of the secondary coil are taken. Having drilled the Bakelite panel, this should not present any great difficulties. A little hint here wouldn't be out of place. Drill the holes for the contact studs a shade larger than required, and let some shellac run through. By doing this there are very slight possibilities of any leakage through the wood, the shellac acting as a splendid insulator.

It is not necessary to do this with the two holes marked R, which are

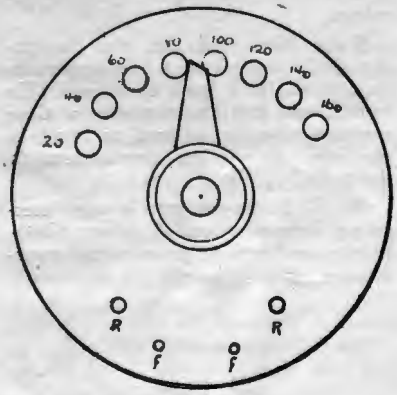


Fig 3

for the slider rods. These rods generally are 3-16 of an inch in diameter, consequently a 13-64th drill will allow easy working. Spaced 1½ inches apart, these rods work splendidly. To ensure that all holes for the rods are true, it would be advisable to clamp all the end pieces together and drill through all at the one time. So far so good.

Insert the contact studs and switches in this wooden end, and also in the panel. The next job is soldering the tappings to the contact studs. Clean the insulation from the wire and attach it to the back of the contact stud, Smear a little fluxite on the joint, and with a good hot iron solder them.

On referring to Fig. 1 it will be noticed that one turn is tapped twice. This is marked O. Now have a look at Fig. 2, and it will be seen that one contact stud in each set is marked O. Attach these tappings to these two studs, No. 1 tapping to No. 1 stud, No. 2 tapping to No. 2 stud, and so on until you finish the unit tappings. Do likewise with the 15 turn tappings until all are soldered up.

Now the aerial and earth terminals

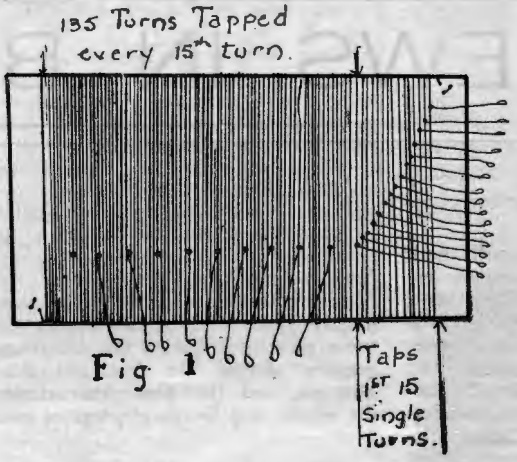


Fig 1

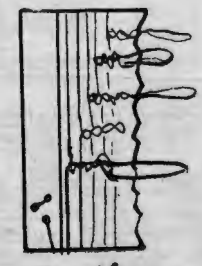


Fig 1a

(which should have been inserted in the panel with the contact studs) are to be wired to the two switches, CE to E, and C2 to A. Use a short length of flex for this purpose, and solder again.

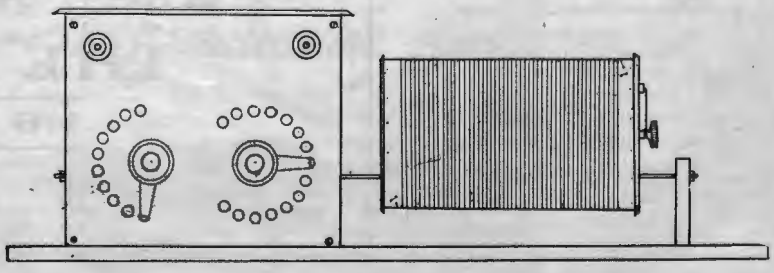
Having done this it should be a very simple matter to solder the tappings of the secondary coil to their respective studs on the wooden end piece. The beginning of this coil (i.e., the turn of wire farthest from the switch end) should be soldered to a piece of flex as should the spindle of the switch, both pieces of flex marked F in Fig. 3. This flex should be about 12 inches long.

All that now remains to be done is to assemble the parts, and see that both coils are wound in the same direction. Insert the primary coil in its end pieces, screw the panel to them, and then screw the whole outfit to the baseboard. The slider rod support should be fitted in its position on the baseboard. The secondary coil is easily assembled by pushing the two wooden ends into the former and a few brass sprigs employed to hold things tightly. The slider rods are next inserted and made secure by the nuts on the ends, and the tuner is completed.

Figure 4 shows the elevation of the complete instrument. Closing in the top and the back of the primary enhances its appearance, and will only cost a few pence extra. Doesn't it look good? Exercise care right throughout, and you will produce something which you can show to your friends without apologies.

Next week I propose to show the construction of an excellent crystal detector unit which can be employed with this coil. So keep the cigar box till then. Meanwhile, I'll help to empty a cigar box; I think I have earned my smoke.

Fig 4



ELEVATION OF COMPLETED TUNER.

W.L.W.

NEWS IN BRIEF

AUSTRALIAN-AMERICAN TESTS. SCHEDULE OF TRANSMISSIONS.

The Trans-Pacific Tests will mark another mile stone on the road the experimenter is travelling. Last year, the possibility of bridging the wide expanse of the Pacific with low power was conclusively demonstrated. At the present time, 2CDM (Mr. C. Maclurcan) is putting up some wonderful long-distance stuff. During the tests it is confidently anticipated that many new records will be created.

The experimenter is progressing so fast that we are beginning to wonder if the next objective will be the United Kingdom.

Australian Times.

Australian stations have so far transmitted as follows:—

March 15.—6 p.m. to 9 p.m.
16.—9 p.m. to 12 p.m.
17.—6 p.m. to 9 p.m.

and will transmit again on March 31st, from 6 pm. to 12 p.m.

American Times.—

The following will be the times of transmission by American Experimenters (all Victorian standard time):—

April 1.—6 p.m. to 9 p.m.
2—9 p.m. to 12 p.m.
14.—6 p.m. to 12 p.m.

Special Two Way Transmissions.

Alternate transmissions will take place on April 15, 16 and 30, during the times mentioned below, the Americans sending during the first and third quarters, and the Australians during the second and fourth quarters of each hour:—

April 15.—6 to 9 p.m.
16.—9 to 12 p.m.
30.—6 to 12 p.m.

LUNCHEON TO MR. G. A. TAYLOR.

The luncheon tendered to Mr. G. A. Taylor (president of the Association for the Development of Wireless in Australia, New Zealand and Fiji), by the members of the Association, was held at the Ambassadors, on March 12. Among those present were the Lord Mayor of Sydney (Alderman Gilpin), Hon. R. T. Ball (Minister for Public Works), Major-General Sir Granville De L. Ryrie, Major C. W. C. Marr, D.S.O., M.C., M.P, and Sir T. W. Edgeworth David. Apologies were received from His Excellency the Governor (Sir Dudley De Chair), Mr. Gibson (P.M.G.), and Mr. J. Malone (Director of Wireless), all of whom sent their best wishes for the success of the Association. Mr. D. H. Scott was in the chair.

In the course of his remarks, Major-General Sir Granville Ryrie, referred to the unfortunate situation of wireless created by the present regulations, and expressed the hope that within a very short time the regulations would be altered to abolish the "sealed" receivers.

Major Marr said that the Association could depend upon his support in its demand for a fresh conference. He further said that "*no company or Government must be allowed to stand in the way of wireless development in Australia.*"

Mr. G. A. Taylor gave a very interesting demonstration of colour photography, and a description of the transmission of photographs by wireless.

The following articles will appear in our next issue:—

(1) "Trap Circuits and the Elimination of Interference," by G. Maxwell Cutts.

(2) "Dull Emitter Valves," by R. D. Charlesworth.

Also the second of the series of articles by "Insulator."

I see that Mr. Bradfield is going in for dentistry. They say his bridgework is wonderful.

Mr. D. G. McIntyre is president and Mr. R. Primmer is secretary of the Exhibition organisers.

The Ten Watters' Club

This club, which was formed a comparatively short time ago, is rapidly improving, and is growing every day. New members are joining up, and everything is proceeding satisfactorily.

The latest member to join is Mr. F. Thompson (2HL), and the club extends a cordial welcome to all transmitters, particularly those in the country. The Ten Watters are doing very practical work, and deserve every encouragement.

Notes

2GR is on the air again with a good punch, but his modulation could be improved, and there is a good deal of hum which needs cutting out.

2JM's piano transmission leave very little to be desired.

2YI has purchased some new records. And very nice, too!

VIS and 2BL are specialising in harmonics lately, and amateur transmitters are subject to great interference.

Any country or interstate transmitters requiring tests, please write to Mr. G. M. Cutts (secretary), or Mr. J. S. Marks (president), Ritz Flats, Rose Bay, Sydney.

Country Experimenter

Splendid results have been obtained by Mr. H. Gotting, of Braemar, N.S.W., whose experimental receiving station comprises a detector and two stages of low frequency amplification, and home-made honey-comb coils.

The aerial used is a four wire cage, 50 ft. high and 100 ft. long, and is screened all round by tall trees and hills. Recently Mr. Gotting forwarded a donation to Wellington (N.Z.) Broadcasters towards the purchasing of a player piano. Upon listening in some nights later he heard the acknowledgment of his message broadcasted by the station at Wellington.

Mr. Gotting's best results in reception to date are:—

N.Z.: 4YA, 1YA, 2YP.
Queensland: 4AE.
S.A.: 5BQ, 5BN.
Victoria: 3ER, 3CU, 3BQ, 3JU, 2UZ, 3ZL.
N.S.W.: 2ZX, 2HM, and most of the Sydney stations.

Well-Known Experimenter

CHANGES BUSINESS ADDRESS.

Mr. G. M. Cutts, well-known as the secretary of the Ten Watters Club, and of the Croydon Radio Club, has recently resigned his position with the New System Telephone Pty., Ltd., and has been appointed to the technical staff of The Wireless Sales Co., 42 Hunter Street, Sydney.

Since the age of 14 years, Mr. Cutts has been experimenting in wireless, and was for some time connected with the Hydro Electric Power Station, in Tasmania.

BROADCAST RECEIVING SETS AND LICENSE FORMS

Together with the FREE SERVICE of Broadcasters (Sydney) Limited may be obtained from the following

L. P. R. Bean & Co.
229 Castlereagh St., Sydney.
Telephone: City 353.

Continental Radio & Electric Company
Equitable Buildings, George St., Sydney
Telephone: B 2467.

United Distributing Company Ltd.
(Wholesalers)
28 Clarence Street, Sydney.
Telephone: City 3566.

W. Harry Wiles
60-62 Goulburn Street Sydney.
Telephone City 3688 1 door from Pitt St.

Wireless Supplies Ltd.
21 Royal Arcade, Sydney
Telephone: M 3378.

Pitt, Vickery Ltd.
335 Pitt Street, Sydney
Telephone: City 6053.

E. R. Cullen
96 Bathurst Street
Telephones: City 869, 2596.

Radio Company Limited.
15 Loftus Street, Sydney.
Telephone: B 5586.

Radio House
619 George Street Sydney
Telephone: City 1487.

Colville-Moore Wireless Supplies
10 Rowe Street Sydney.
Telephone: B2261.

Ramsay, Sharp & Co. Ltd.
217 George Street, Sydney.
Telephone: City 3176.

The Home Electric
106a King Street, Sydney.
Telephone: B 5565.

Pacific Radio Co.
Temporary City Address:
2nd Floor, 121 Pitt St., Sydney.
And 38 Donnelly St., Balmain.

O'Sullivan's Electric Shop
(Frank E. O'Sullivan)
296 Pitt Street, Sydney.
Telephone: City 8070.

Swains
119-123 Pitt Street, Sydney.

N. P. Olsen,
18 Hunter Street, Newcastle.

Questions and Answers.

Under this heading, "Wireless Weekly" will be pleased to assist any experimenter with his wireless troubles. If a reply by mail is required, send stamped addressed envelope. Otherwise questions will be answered in the columns of the paper.

"E.B.W," (Concord): The reason why you could not get VIS was very probably because he is now transmitting on interrupted continuous wave, and his tuning is extremely sharp. The cage aerial is very efficient, because it cuts down the total resistance and impedance of the aerial. The size of the hoops on the lead in is immaterial, and need not be the same as the aerial. Thanks for your good wishes; they are reciprocated. Photo not suitable, as the detail is not clear.

* * *

"E.S.L." (Randwick): Next week's will contain details of a very efficient home-made loud speaker.

* * *

"C.W." (Orange): 350 metres, P.35, S.50, T.50; 1100 metres, P.150, S.200, T.150.

CRYSTOLIS.

Your discovery is nothing new.

One of the methods of detecting wireless oscillations in the old days was two carbon blocks, with knife edges, mounted vertically and having a light steel needle resting on the carbon blocks.

This method is quite satisfactory as an experiment, but is useless commercially because of its delicacy of action.

It is evident that you are getting the results by the same principle, and it is probable that the crystal cup has a slight film of grease which, when lightly touched by the catwhisker, would have the same effect as the steel and carbon block method.

Try polishing the catwhisker and cup with sandsoap and see if the results can be repeated.

Voltmeters and Batteries.

Courtesy "Popular Wireless,"

For general use with batteries, both accumulators and dry cells, two types of voltmeter are available. One is called the "moving-coil" type, and the other the "moving-iron." The moving-coil instrument consists of a coil, carrying current proportional to that in the main circuit, pivoted in the air-gap of a permanent magnet. The interaction of the two fields causes rotation of the coil, to which is attached a pointer. As the rotational torque is due to the action of the magnet and the coil, the coil provides less power than that operating the pointer, the extra power being provided by the magnet. This is of great importance.

The moving-iron type contains no magnet, but a coil of wire connected to the main circuit. Pivoted in the coil is a piece of soft iron attached to a pointer. In some instruments the movement is due to repulsion of the iron by a fixed piece of iron in the coil, and in others by the attraction of the iron by the coil, which becomes an electro-magnet when current is flowing through it. The whole power has to be provided by the circuit, and it is usually about five times that required to operate a moving-coil instrument.

Voltmeters are connected in parallel with the supply, and in order to keep down the loss of power in the instrument the resistance should be high. A moving-coil instrument has a resistance of about 80 ohms, whilst a moving-iron has much less.

For dry battery work, such as a 30 or 60 volt anode battery, the voltmeter must take very little power. A single or two-valve set will consume about two milliamperes from the anode battery.

Moving-coil Type.

If a moving-iron voltmeter is used requiring about 100 milliamperes, which is a common figure, it is evident that the battery is being overloaded, and in fact, if the voltmeter is kept across the battery for more than a few seconds it will soon ruin it, as it consumes far more than the radio set in normal working. The voltmeter will therefore not give a true reading, but will be low.

A moving coil instrument requires about one-fifth of the power of a moving-iron instrument, and so is far better for the cell, and will give a more accurate reading. Usually a moving-coil voltmeter requires about 10 milliamperes for full deflection.

For accumulators the case is rather different. The internal resistance is so low that if 10 of 100 milliamperes are taken by the voltmeter it is not affected. This applies to filament batteries of, say, 10 amperehours or more. Small cells used for anode batteries should be treated as dry batteries, by using a high resistance voltmeter.

Method of Testing.

For accumulator testing two considerations are important. Accuracy of the voltmeter, and the conditions of load of the battery at the time of testing.

The moving-coil instrument is the more accurate of the two kinds, and is the only reliable one. A moving-iron voltmeter will not read the same if the voltage is rising as if it is falling. The indication tends to lag behind the current, due to the hystereses of the iron.

Accuracy is necessary for this reason: During the greater part of the discharge of a cell its terminal voltage is 2.0 volts, near the end of discharge it falls rapidly. If a voltmeter is used which reads 2.0 volts with 1.9 volts applied the cell appears to be still charged, whereas the discharge should be stopped and the battery put on charge.

The condition of the cell cannot usually be judged by a single reading. When a cell is fully charged it should read about 2.3 volts on open circuit, but this soon falls even when not in use. If the voltmeter reads 2.3 it shows that the cell is fully charged, but if measured after a few hours it will be found to be about 2.1, although the battery is still fully charged.

To obtain the terminal P.D. of the battery it must be doing its normal work—i.e., a 10 amperhour continuous cell should be measured when it is on a load of 1 amp. It is this reading which determines if a cell needs recharging or not.

If a cell is discharged and left on open circuit a voltmeter will usually indicate about 2 volts, although when the battery is put on load it will soon fall to about 1.8, showing that it should soon be recharged.

It is useful to compare the internal resistance of a cell during various stages of discharge. It is lowest when fully charged. It may be measured by means of the cell testing voltmeter and an ammeter, or instead of an ammeter, a known load, such as valves whose current consumption is known. Let E1 be the open circuit voltage, and E2 the terminal P.D. on a load of u amp., then the internal resistance is E1 minus E2, divided by u, in ohms.

It now remains to state how a moving-coil instrument may be distinguished from a moving-iron one. Generally it is quite simple, as the scale of a moving-coil voltmeter is uniform throughout. The moving-iron instrument has an approximate square law scale, and so the scale cannot be uniform throughout, although it may be nearly uniform except at the beginning. If the instrument has the first tenth of its scale contracted it is a moving-iron type. Further, the moving-coil instrument is more dead-beat—i.e., it indicates almost at once, whilst the moving-iron type will oscillate several times before settling down.

The advantages of the moving-coil are greater than those of the moving-iron, as will have been seen.

At a lecture one night the speaker orated reverently:

"He drove straight to his goal. He looked neither to the right nor to the left, but pressed forward, moved by a definite purpose. Neither friend nor foe could delay him nor turn him from his course. All who crossed his path did so at their own peril. What would you call such a man?"

"A truck driver," shouted a voice from the audience.

"Judge," said the prisoner, "I'm deaf."

"That may be," said the Judge, "but you'll get your hearing in the morning."—Exchange.

"Why does a hen lay eggs only in the day time?"

"Because she's a rooster at night."—"Disston Crucible."

More About that S.T. 100.

(Contributed by Mr. A. F. Jacob.)

Being the user of an S.T. 100 receiver, I have read with interest Mr. Hamilton's lucid description of same in your issue of March 7th. In most respects my outfit is identical with his, points of difference being that my C2 has a value of .00025, and I do not notice any difference arising from the use of C4.

I have constructed three very efficient loud speakers, one utilising a brass bugle. The second is made from a straight paper-felt cone, 12in. long, 6 in. diameter at large end, and 1in. diameter at the small end. The third is of plain galvanised iron, the dimensions being identical with those of the paper one.

The metal ones reproduce the music of the violin, banjo and cornet, while the paper one gives the most perfect results with vocal items. Each speaker has attached a Brown's 150 ohm phone. With the three connected in series, my neighbour hears Broadcasters clearly in his room, 90 feet away from my window.

Eight crystals are mounted on a panel, and one is selected by rotary switch. At present I am using Silicon, Zincite-Bornite, Q.S.A., Zincite-Copper Pyrites, Silicon, Q.S.A. Galena, Zincite-Iron Pyrites; Morse, Silicon or Q.S.A. with steel catwhisker. Zincite or catwhisker in each case is connected to T1, and C1 is provided with a series parallel switch. Amateurs and Broadcasters are received best with the condenser in series, longer waves in parallel. My aerial is of the L type, two three strand wires, 4ft. apart, 60ft. between supports, height about 28ft. The lead in is about 15ft. long, and earth lead 18ft. to water service tap. The location of my station is near Homebush Railway Station.

A WORD TO EXPERIMENTERS.

The article written by Mr. W. L. Hamilton, on the S.T. 100 has caused us to be inundated with a shoal of letters, telling us of the splendid results obtained from this receiver. The fact that there has been a sudden demand among radio stores for the set shows the interest this article has created. Mr. Hamilton has very kindly offered his advice to any experimenter who may experience any little difficulty with the construction or operation of the S.T. 100. Letters addressed to the Editor, "Wireless Weekly," 33 Regent Street, Sydney, on this subject, will be passed on by us to Mr. Hamilton.

We would also like to hear from experimenters any criticisms or suggestions which may assist us in making this paper of greater service to experimenters. This goes both for the "old timer" and the tenderfoot, who is just planting his feet on the road.

NEWCASTLE DISTRICT RADIO CLUB.

The usual fortnightly meeting of the above club was held at the club room, 25 Winship Street, Hamilton, last night.

There was a good attendance of members, and Mr. Seward, the president, occupied the chair.

A letter was received from the Radio Inspector, Sydney, stating that the Chief Manager was sympathetic with the club's suggestion that the use of full regeneration should be permitted on the reception of wave lengths in excess of 8,000 metres, and that any application lodged for permission to do so would be dealt with on its merits, but some assurance would have to be given that the use of regeneration would not be made on wave lengths below that limit.

A letter was also received from the secretary to the Moore Relief Fund, and it was decided to forward the amount of £1/10/-.

In reply to a letter from the "Daily Telegraph" to the effect that they were starting a wireless column, and would be pleased to publish club reports, etc., the secretary was directed to state that the club would be pleased to furnish any reports of interest.

A letter was received from the secretary, Wireless Institute of Australia, in reference to the forthcoming conference, and one from Mr. N. Gilmour (2ZU), stating that he would be pleased to act as the club's delegate. After discussion, a number of suggestions were formulated for Mr. Gilmour to place before the conference.

One new member was elected.

Mr. Cooper, wireless operator on a ship in port, attended the meeting, and demonstrated the reception of 2FC on a crystal receiver he had built. Suva radio was also heard in good strength.

A communication was received from Mr. C. Walker, of Clifton, in Queensland, stating that on the night of Sunday, 9th inst., he could hear our music some yards away from a loud speaker, using four valves. He reports the modulation as perfect.

A letter was also received from Mr. C. Whitelaw, of Mooroolbark, Melbourne, stating that he had heard us in good strength on several occasions. He used detector and one step audio amplifier.

The club is therefore of the opinion that if 2SO can kick 600 miles overland, it can do the 1000 miles over water, and arrangements are being made to try to "get across" to New Zealand.

WAVERLEY RADIO CLUB.

Very little business was done at the meeting of the Waverley Radio Club, held on the 11th March. The vice-president, Mr. E. Bowman, occupied the chair. A notice was read from Melbourne, with regard to the regulations. The communication was merely received. It was moved and seconded then, that the club purchase a magnetic rectifier from Mr. Howell, for

the transmitting set. This motion was carried.

Mr. Bowman gave a highly instructive and interesting talk on magnets, and their application to electrical apparatus, particularly that connected with wireless. Mr. Bowman also spoke about the construction and care of accumulators.

THE LEICHHARDT AND DISTRICT RADIO SOCIETY.

The 71st general meeting of members of the Leichhardt and District Radio Society, held at the club room, 176 Johnston Street, Annandale, on Tuesday, March 11th, was well attended, there being several visitors present, as well as a large number of regular members.

The business of the evening was the delivery of the third lecture of the new syllabus, by Mr. W. J. Zech, who dealt with the subject of "Crystal Detectors and Their Action." The lecture was illustrated by means of diagrams and specimens, and those present took a keen interest in all that Mr. Zech had to say. At the conclusion of the lecture a number of questions were asked, after which a vote of thanks by acclamation was carried.

The fourth lecture will be held on Tuesday, March 25th, when Mr. T. Thompson will deal with the very interesting subject of "Telephones: Types and Action." A good attendance of members is anticipated, and all non members interested in the subject are invited to be present.

Inquiries regarding the society's activities should be addressed to the hon. secretary, Mr. W. J. Zech, 145 Booth Street, Annandale.

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.

Address all comunications to The Editor, Wireless Weekly, 33 Regent Street, Sydney.

THE CROYDON RADIO CLUB.

The Croydon Radio Club held their weekly meeting on Saturday, March 8, at "Rockleigh," Lang Street, Croydon. Mr. C. W. Slade presided, and there was a good attendance of members.

Mr. G. Maxwell Cutts gave a lecture on general elementary principles of wireless telegraphy for the benefit of new members.

Th club enjoyed a demonstration of the S.T. 100 receiver, which was constructed by Mr. Slade, of W. Harry Wiles. This receiver gave excellent results, and the music was exceptionally clear, and free from distortion.

On Saturday, March 15th, members will meet in the afternoon to construct furniture for the club room.

Communications should be addressed to the hon. secretary, G. Maxwell Cutts, "Carwell," Highbury Street, Croydon. Persons interested in wireless are cordially invited to attend any meeting of the club.

The Moore Fund

We are very glad to announce that the mast and aerial has been disposed of, and Mrs. Moore is relieved of further anxiety on that score.

Results to date with regard to the fund has not been as encouraging as we might expect, considering that there are some thousands of experimenters in New South Wales.

When considering this fearful and tragic thing that has been suddenly thrown into the lives of Mrs. Moore and her little ones, it must be remembered that the late Mr. Moore was an experimenter. His death leaves upon every experimenter who claims that the experimenters are an army of comrades bonded together for the advance of wireless, a moral responsibility to see that Mrs. Moore is provided for.

Don't let us shirk that responsibility. A small sum from each will mean one big total. Don't turn this appeal aside, but send us whatever you can afford now. The need is vital!

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. Hinchen	5	0	0
R. W. Faulkes	0	2	6
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
Charles Tripp	0	5	0
Wireless Branch (P.M.G. Department, Melbourne)	1	8	0
Illawarra Radio Club	0	10	0
T. E. Dickenson	0	5	0
Aust. Radio Relay League	£1	1	0
Goulburn & District Radio Club (Member)	4	0	0
Edison Swan Electric Co.	1	1	0
W. Harry Wiles	1	1	0
Farmer and Co., Ltd.	5	5	0

F. T. S. O'Donnell and Griffin Ltd.	0	10	6
O. F. Mingay	0	10	0
G. E. H. Blanchard	0	10	0
F. Lucas	0	2	6
Mr. Howell	0	10	6
Marrickville and District Radio Club	0	10	6
Croydon Radio Club	1	1	0
Leichhardt District Radio Society	1	1	0
Newcastle Radio Club	1	10	0
N. P. Olsen	1	1	0
L. P. R. Bean and Co., Ltd.	2	2	0
John Danks and Son, Pty., Ltd.	1	1	0
F. Hoffnung and Co., Ltd.	2	2	0
Western Electric Co. (Aus.) Ltd.	2	2	0
Total	£80	1	0

We regret very much that owing to a typographical error, the undermentioned names were duplicated by us in the last list of subscribers to the Moore Fund:—

G. Taylor.
Charles Tripp.
Wireless Branch P.M.G., Melbourne.
Illawarra Radio Club.
T. E. Dickenson.
Aust. Radio Relay League.
Goulburn and District Radio Club (Member).

The total should have read, £69/2/-.

An elderly man of ultra-convivial habits, but withal learned and bookish, was haled before the bar of justice in a country town.

"Ye're charged with bein' drunk and disorderly," snapped the magistrate. "Have ye anything to say why sentence should not be pronounced?"

"Man's inhumanity to man makes countless thousands mourn," began the prisoner, in a flight or oratory. "I am not so debased as Poe, so profligate as Byron, so ungrateful as Keats, so intemperate as Burns, so timid as Tennyson, so vulgar as Shakespeare, so—"

"That'll do, that'll do," interrupted the magistrate. "Ninety days. And, officer, take down that list of names he mentioned and round 'em up. I think they're as bad as he is."—"American Legion Weekly."

Tell your friends about Our Big Competition

Continued from page 6

connection with the last two matters, one cannot too strongly urge the use of a separate hetrodyne. It is the only method by which the strength of the local oscillations can be regulated to a nicety, and the most effective method of minimising the so-called re-radiation.

Now, having reduced the size of the reaction coil, it is possible that the set will still not oscillate on short waves, This may be because the reaction coil has not been sufficiently reduced. In this case the receiver will exhibit the same symptoms as before, but on a lower wave-length. But assuming that the reaction coil is now small enough, the trouble is probably due to an excessive dead-end, or too fine a gauge of wire on the A.T.I. or grid coil. For the best results on short waves, use a coil which just covers the required range and no more. From 150 to 220 metres is a reasonable range for one coil, with, say, three or four tappings. Use plug-in coils if you like them, but make them yourself, using thick wire for winding. The universal fault with all short-wave plug-in coils on the market is that the wire used is far too thin.

All coils for short-wave work should be wound at least 18 or 20 gauge wire. See that all the connections are made with heavy gauge wire, as short as possible, well spaced, and all joints soldered.

Use a well insulated counterpoise in preference to an earth connection wherever possible.

Now, having reduced all damping to a minimum, adjust the set to the highest wave length on which it is required to work. It should just oscillate on this wave length. If it oscillates readily with very little reaction coupling, take more turns off the reaction coil. After adjusting everything in the circuit to its best value, the reaction coil should be just large enough to produce oscillation over the whole range of wave length.

I have already pointed out that it is essential for the natural wave length of the reaction to be below that of the received signals, but so far it has been assumed that it does not matter how close to its natural wave length we work so long as we keep above it. As a matter of fact, it is best to keep its natural wave length as far as possible below that off which we wish to receive, for two reasons. The first is just a matter of mass, and has nothing to do with frequency. We do not want to introduce matter, especially metal, into the field of the grid coil than is necessary, owing to eddy current losses, which may be quite high on these frequencies. The second reason has to do with smoothness in tuning the set. If the curve, obtained by plotting wave length against the degree of reaction required to produce oscillation, is examined it will be found that it is fairly flat at a distance from the natural wave length of the reaction coil, becoming steeper as it approaches that wave length. In other words, if we want to keep the set just oscillating, while varying the wave length, the necessary adjustment of the reaction coupling will be slight if we are working well above the natural wavelength of the reaction coil, but becomes greater as we approach that wave length. This means that "searching" becomes very troublesome if we are working only just above this natural wave length, since, if the set is just oscillating, raising the wave length slightly brings the set "miles off oscillation" and lowering the wave slightly causes it to oscillate much too hard. Thus, for every reason, it is best to have the reaction coil as small as possible. The last reason applies with still more force when a separate heterodyne is used, as the receiver is then used "just off oscillation" instead of just oscillating, and, if these suggestions are followed, the set will be in this state over a small band of wavelengths without adjustment of reaction coupling, thus reducing the number of controls.

Correspondence

To the Editor.

Sir,—With reference to a letter to you in last week's issue of W.W., signed R.C.M., it gives me great pleasure to endorse the views expressed by R. C.M. re the various harmonics from VIS and VKQ. It seems to me that we poor, unfortunate experimenters have to bear the brunt of all those who care to make things out of place for us and also contend with the very often necessary Q.R.L's.

Since our license not permitting us to use regeneration, we have to struggle on with non-regenerative circuit—this means, if we want interst ate or N. Z. stations—more valves, more batteries, and more trouble.

It is to be hoped that we will soon be able to have our little times of peace and happiness on 200 metres.

R.C.M. complained of the interference on the low waves. He does not say anything about the longer waves.

Continued on page 20. col. 3

THE WIRELESS INSTITUTE OF AUSTRALIA.

SOUTH AUSTRALIAN DIVISION. ADELAIDE.

The monthly general meeting of the South Australian Division of the Wireless Institute of Australia, was held in the Prince of Wales Lecture Theatre, at the Adelaide University, on Wednesday, March 5th.

There was a large attendance of members, presided over by Mr. R. B. Caldwell (president).

The minutes of the previous meeting were read and confirmed.

A circular received from Mr. J. Malone (Chief Manager Telegraphs and Wireless), calling attention to Regulations governing experimental licences, was read and discussed. The subject of regeneration was discussed at some length, and the opinion was expressed that experimenters who could show themselves capable of using regeneration without causing interference, should be allowed to use it.

The secretary was instructed to communicate with other Divisions to find out their attitude towards regenerative receiving circuits.

A letter was also received from Mr. Malone, seeking co-operation of the Institute in each State in dealing with experimental licences, the Institute being asked to take over the examination of certain applicants for experimental licenses, thus relieving the Radio Inspector, who is unable to cope with the numbers coming to hand.

A further report of experimental transmission was received from Mr. Sobels, of Watervale (one of our country members who is doing some excellent work in reception).

Eleven new members were admitted and four new applications for membership received.

The remainder of the evening was spent in discussion of the rules, and Mr. Cook gave notice that at the next general meeting he would move that the rate of subscription be altered.

Harold: "That soprano had a large repertoire."

Maggie: "Ain't it the truth, now, and since you speak of it, her dress only made it look worse.—"Yale Panel."

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Perhaps R.C.M. has not been working on 16,000 to 23,000 metres lately, but if he cares to he will experience—probably to his surprise, as it was to me—that VIS has a very strong harmonic on 16,000 metres, almost as strong, if not as strong, as his 600 metre wave.

In conclusion I must state that I consider it altogether over the fence that all our low power tests have the chance of being interfered with, through positively unnecessary conditions any night of the week. I am sure many other experimenters are in sympathy with R.C.M. and myself.

Yours etc.,

GEO. R. CHALLENGER.

Mr. T. R. Anthony, 12 Chestnut Rd., Auburn, N.S.W., submits the following interesting report for the benefit of Victorian transmitters. 3BQ, 3JU, 3BZ and 3BM have been heard good strength. The station of the N.S.T. Co., South Melbourne (3ZL) also has been read at a comfortable strength. Mr. Anthony is using a single valve panel and a special type of tuner of his own design and finds that 3BQ comes in stronger than any other amateur transmitter.

WIRELESS INSTITUTE OF AUSTRALIA, N.S.W. DIVISION.

Meeting of delegates. Club delegates are reminded that the special meeting to consider ways of consolidating the amateur and experimental movement in this State will take place at the Royal Society's Hall, 5 Elizabeth St., Sydney, on Wednesday, 19th November at 8 p.m.

General meeting. The next general meeting of the Division will be held at the Royal Society's Hall, 5 Elizabeth St., Sydney, on Thursday, 20th March at 7.45 p.m. Subject: Modern Broadcasting Methods, by J. W. Robinson.

Here is a little DX by station 2EC. During February the following were logged. Phone 5BQ, 5AH, 3BD, 3BL, 3BQ, 3BY. (C.W.) 7AA, 3HH, 3BH, 3JU, 3JH and others in Victoria. N.Z. (C.W.) 1AA, 2AA, 2AC, 2AF, 2AK, 3AC, 3AF, 4AA. American (C.W.), 6RB, 6AVR, 9QT, 6AOS, 3ARL. Station 2ZL was heard but awaiting reply to 2EC's QSL. Station 9ZT has been consistently heard for many months past. Approximately this station never closes down as it can be heard at all times handling ARRL traffic.

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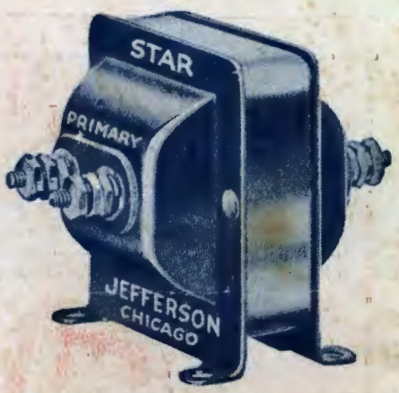

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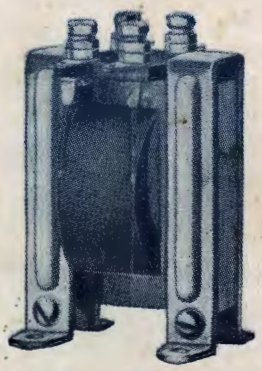

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