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WATCH FOR OUR NEW COVER



OFFICIAL ORGAN OF THE AUSTRALASIAN RADIO RELAY LEAGUE.

Vol. 3.

March 28, 1924.

No. 26

Postmaster-General Acts.

After weeks of patient but insistent toil, the Association for the Development of Wireless in Australia, New Zealand and Fiji, backed by public opinion, has succeeded in persuading Mr. Gibson to grant its representatives a hearing.

As a result, representatives from each licensee for broadcasting and an equal number of representatives of the other interests involved will meet in Sydney within the next fortnight in an endeavour to reach a solution of the prob-

lems which at present bar the public from a proper appreciation of broadcasting.

Since the experimenters are among "the other interests involved," they of course will be represented.

As it may safely be assumed that only those possessing the broadest possible vision and a proper appreciation of the responsibilities which rest upon them will be chosen as representatives, the forthcoming meeting may be regarded as the turning point on the road to experimental progress.

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 to 7.15 p.m.	2DE	W. P. Renshaw, Roseville.
7.15 to 7.30 p.m.	2IJ	A. H. Gray, Killara.
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. Derriek, 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.
10.15 to 10.30 p.m.	2OI	A. T. Whitaker, Banksia.
10.30 to 10.45 p.m.	2LO	L. N. Schultz, Lane Cove.

Wireless Weekly

Subscription Rates:

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 6 months (26 issues) . . 6/6 post free

All communications to be addressed to The Editor, *Wireless Weekly*, 33 Regent St., Sydney.

Advertising Rates on application. Telephone, Redfern 964.

Wireless Weekly Cup Competition

It has been decided to abandon this Competition temporarily. Later on details of another Competition will be announced in this paper.

SOME OF MY SPECIALS

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Momentous Conference.

GETTING TOGETHER

For some months past the need for the combining of the thousands of experimenters in N.S.W. into one great body has become increasingly evident. Although in the past, one or two attempts made by the Wireless Institute at some sort of unity control met with scant success, the rapid march of events, especially during the last few weeks, has demonstrated to every experimenter who has the capacity to think for himself, that for his own protection, organisation on some definite basis is essential.

Some weeks ago, a card was mailed by Mr. Malone to every licensed experimenter in Australia, reminding him that his licence was issued in accordance with the Wireless Telegraphy Regulations, and containing the significant intimation that he may be called on to produce evidence to show that he is experimenting. Whether that card was intended as a veiled threat, or merely by way of showing the broadcasting interests that the P.M.G. Department is on the job, need not be discussed here. In any case, it may be regarded as the thin edge of the wedge, and it must, and should, give rise to some hard thinking on the part of the experimenters, whose lack of organisation has up to the present left them open to attack and interference by the authorities.

During the war, as is well known, experimental activities were shut down by the Government, and the control of wireless telegraphy was passed over to the Royal Australian Naval Radio Service, which had at its head Commander Cresswell. It may not be well known that, after the war, when experimenters sought to have the ban on their activities removed, a determined effort was made to once and for all put the experimenter out of existence.

The Wireless Institute, which after years of enforced idleness, was hurriedly reformed, took the matter in hand. For weeks the Institute championed what was virtually a lost cause, and such was the weight of its fighting strength and the justice of its claims, that Commander Cresswell was despatched to Sydney in order to discuss the position at a conference. As a result of that conference, the Commander returned to Melbourne with the full realisation that the experimenters as a body, was a force to be reckoned with very seriously before at-

tempting to interfere with his progress. The message we want to bring home to all those experimenters who to-day enjoy freedom of the ether, is that they owe their very existence as experimenters entirely to the efforts of the Wireless Institute, with which in those strenuous days must be associated the names of men like Phil. Renshaw, Basil Cooke, and others, whose high ideals and unity of purpose held the Institute together.

The results of their efforts are plainly evident at the present time. Thousands of people, representing every profession and every walk of life all over the State, hold experimental licences. Everywhere radio clubs and societies have sprung up, and the experimental movement is fast growing into an epidemic. The one vital thing lacking is organisation, and this is evidenced by the fact that quite recently a letter was received by the Wireless Institute from Mr. Malone, intimating that, so far as certain experimental matters are concerned, his Department preferred to deal with one central body in each State, rather than with scattered bodies, individually not representative of the whole of the experimenters. A brief consideration will show that this is not only reasonable, but something that is highly necessary in the mutual interests of the P.M.G. Department (which administers the Regulations as they stand at the present time) and the genuine experimenter. The letter from Mr. Malone was virtually a request to the Wireless Institute to take steps towards combining the whole of the N.S.W. experimenters under one central executive control.

It was obvious to all that the Institute was powerless to act without the co-operation of other clubs and societies throughout the State. Accordingly a circular letter was sent to the secretaries of all clubs, inviting them to send delegates to a conference for the purpose of discussing the whole situation.

That conference, which was held at the Royal Society's Rooms, Sydney, on March 19th, was the most important event that has yet occurred in the history of the experimental movement in Australia, and one destined to have the most far reaching results. The full Council of the Institute was present, and the following clubs were represented:—

March 28, 1924.

WIRELESS WEEKLY

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- N.S.W. Radio Association.
- Illawarra Radio Club.
- Railway and Tramway Radio Association.
- Katoomba Wireless Association.
- Northern Suburbs Radio Association.
- Balmann District Radio Society.
- Neutral Bay Radio Club.
- Newcastle Radio Club.
- Waverley Radio Club.
- Marrickville and District Radio Club.
- Campsie and District Radio Club.
- Artarmon Radio Club.
- Wentworth Radio Club.
- Croydon Radio Club.
- Concord Radio Club.
- Kuringgai Radio Club.
- Western Suburbs Amateur Radio Association.
- Metropolitan Radio Club.
- Australian Radio Relay League.

There was a tone of deep seriousness, which showed that the importance of the resolutions which were to be arrived at was fully realised by all.

The broad proposal put to the delegates by the Wireless Institute was for an affiliation between the radio clubs in N.S.W. and the Wireless Institute. It is significant that the points raised by delegates during the discussion referred mainly to minor matters affecting the inner workings of the clubs they represented. In no case was there evidenced any but a sincere desire to achieve the object for which the conference was called, the co-ordination of radio clubs' activities throughout N.S.W.

Mr. Perry (Waverley) moved, and Mr. Luckman (Croydon) seconded the following resolution, which was unanimously carried:—

"That all N.S.W. radio societies affiliate with the Wireless Institute, N.S.W. Division. Such affiliation not to affect the entity of the affiliating society in any way other than that they will be required to adopt the memorandum and articles of association under which the Institute is constituted, and shall pay an annual affiliation fee to the Institute."

Details of Affiliation.

Every club in N.S.W., including the Wireless Institute, is entitled to nominate one delegate for every 50 members, and these delegates are empowered to discuss any matter affecting the experimental movement. Having arrived at a decision, that decision is then submitted to the Council of the Wireless Institute, this latter procedure being necessary under the articles

of association to which the Wireless Institute is bound to adhere. The Council, then, will pass on its recommendations to the executive of the Wireless Institute.

It was proposed by Mr. Newman (Wireless Institute), and seconded by Mr. Hamilton (Marrickville), that the affiliation fee per club be £1/1/- per annum. It was, however, made quite clear that this amount was a tentative proposition only, and that if in the future, occasion arose to either increase or decrease it, the delegates would recommend the necessary alterations. The main fact to remember is that the amount of affiliation fee will be just sufficient to cover the bare costs of the expenses incurred by the affiliation, and is not intended to swell the funds of the Wireless Institute.

It may be argued by some that the fact that the recommendations of delegates must be referred to the Council of the Institute, points to the Council having the final say in any matter. The answer to that is this: If the delegates (amongst whom are representatives of the Institute itself), who are voicing the opinions of every club in N.S.W., make certain recommendations to the Council, it would be a moral impossibility for the Council to do other than carry those resolutions into effect.

Purposes of Affiliation.

These may be summed up in a few words: For the protection and the advancement of the experimental movement. The hopelessness of disunity, of numerous small bodies acting without any co-operation between them, must be patent to any thinking man, and it must be a matter for great satisfaction to every genuine experimenter to know that the foundation stone to the only practicable scheme under which experimenters can hope to exist, has at last been laid by the Wireless Institute.

From this beginning will grow a great and properly organised body, which can take up at a moment's notice any matter which affects the privileges of experimenters. No one can foretell what may happen in the future. The present regulations place the experimenter in a peculiar position, and, aside from the fact that the use of regenerative circuits in certain areas has been prohibited, thus taking away one of the chief interests in experimenting, the present system of broadcasting points inevitably to the fact that sooner or later there must be a clash between experimenters and the broadcasting in-

terests. What form that trouble will take it is difficult to foresee, although Mr. Malone's card seems to throw a little limelight on the position.

However, if it becomes necessary for the experimenter to actively protect his interests, there is vast satisfaction in the fact that the organisation of all clubs under one executive body is now well under way. It is the dawn of a new era for the experimenter.

The credit must be given to the Wireless Institute, which took the initiative. The Institute, which endeavours to live up to the highest principles of service to the movement, is shortly establishing a bureau of information, and Mr. C. D. MacLurcan, who is now in America, has been authorised to purchase the necessary apparatus for the fitting up of a laboratory for scientific research in the field of wireless. The services of this laboratory will be for the benefit primarily of the experimenters, secondly the trade, and thirdly the general public.

Croydon Radio School
Lang-st., Croydon

A Special Class
will be held every
THURSDAY
commencing 27th
March, for experi-
menters who wish
to become more
proficient in Morse.
Pupils will also be
specially coached to
prepare them for
Government Exam-
ination for Transmit-
ting and Receiving
Licences.

Fee: 2/- per lesson
7.30 p.m. to 9.30 p.m.

Crystal Detector Unit

By "Insulator."

In my article last week I described how to make a highly efficient loose coupler and I now propose to tell you how to construct a crystal detector for use with the tuner.

This unit will be found to be very easily made and will prove quite successful.

The materials required for this you may already have; they were enumerated

in the last week's issue. For the benefit of the new readers I will repeat the list.

- 1 Cigar box (25 size).
- 1 Phone condenser.
- 1 Cat whisker.
- 1 Piece of spring phosphor bronze, 2 in. x 1/2 in.
- 1 Contact stud and nut.
- 7 terminals, with nuts.

At least one of these terminals should be of the type having a centre spindle—this is for the cat whisker.

The cigar box having been well shellaced open the lid and place the box on the bench, bottom upwards. It is not necessary to remove the lid. Now proceed to mark it out as suggested by the diagram. This will not require exceptional engineering ability. Again let me advise you to drill all eight holes a shade larger than the diameter of the spindle of the terminals and apply the shellac to these holes so that the inner surface is well shellaced. This prevents any leakage through the cedar. Leave the box to dry and let us look at the strip of phosphor bronze. With a pair of snips or old scissors,

teeth the two ends as shown in the drawing. (Notice I stipulate old scissors; I do this on purpose, for I haven't heard the end of my mistake in using the best in the house. You see, I am married.) Next, find the middle and drill a hole large enough to allow a constant to pass through. Now bend into shape shown.

For a cat whisker most writers suggest a piece of No. 36 gauge fuse wire. While this is quite satisfactory, I much prefer a gold cat whisker, failing which

until a slight stretch or give is noticed in the part being pulled. On releasing the strain it will be found that the wire is perfectly straight and rigid. Right angled bends are accomplished with the aid of a pair of pliers. Before leaving the subject of wiring, let me again emphasise the necessity for soldering each joint.

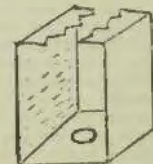


Catwhisker

The cat whisker is now inserted in its place by unscrewing the top portion of the middle terminal and placing the U piece round the centre spindle. Make certain that the pointed end rests on the crystal clip and screw down the top portion of the terminal. Insert the crystal in the clip and the unit is now ready for use with the loose coupler.

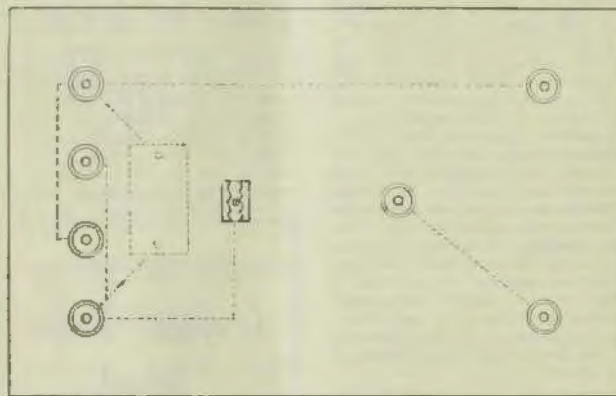
Last week you will remember the two flexible leads which were brought out of two holes which marked in secondary piece (Fig. 3). These two leads are now connected to the two terminals on the one side of the unit and the telephones are connected to either pair of terminals on the other end. I have stipulated U terminals for phones to allow the use of two pair of phones at the one time. This is very useful at times.

Granted that you now have made the loose coupler and the detecting unit with the aid of the phones, an aerial and earth and a knowledge of tuning you are now able to receive signals.



Crystal Cup

If you haven't got these necessities, slip along to a radio friend and borrow his or rather, try your set out at his home. It may take you a week to find this willing friend, so in the meantime I will have time to prepare a few general hints on this subject which will be published next week.



Plan of Detector Unit.

a piece of old banjo string, metal of course. With a piece of sandpaper or a file, point one end and make a U piece of the other end. This U should be about 1/2 of an inch long and 3/16 of an inch wide. Now form a spiral in the middle by winding a couple of times round a pencil. The cat whisker should now take the form suggested in the drawing.

The cigar box is now picked up and the terminals and crystal clip screwed into position. Use the contact stud to fix the crystal clip. All that remains to be done is to wire the unit. For this purpose I would advise No. 16 or 18 gauge tinned copper fuse wire which is obtainable at any of the radio shops advertising in this paper. The dotted lines shows the wiring. Note the position of the telephone condenser alongside the four terminals, and underneath the lid.

Straight wiring looks very nice and in a simple job of this class is really very easy. The 16 gauge wire comes to you on spools, but it can be easily straightened by attaching one end to a strong door knob and unwinding say 6 to 12 feet and then pull hard

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Australian Radio Relay League

The response which has been made by members of the Relay League to the request for definite information regarding the times at which they are prepared to work their stations for League traffic, has been somewhat disappointing. The Radio Relay League in common with other radio experimental bodies, is apparently experiencing difficulty in maintaining any activity, owing to a lack of interest among the experimenters constituting it.

During recent weeks the committee has done all within its power to make the League a success and has now a capital working scheme in hand. This scheme can, however, only be carried out if every member of the League is prepared to shoulder his own particular burden and work so as to make the League a real live body.

A Relay organisation, be it amateur or commercial, depends entirely on its weakest link, and it will quite easily be seen that unless each experimenter who has joined up with the A.R.R.L. is prepared to do his own particular share of actual transmission and reception the movement cannot progress.

It is to be sincerely hoped that within the next few days members will realise that such is the case and will immediately furnish the Honorary Organising Secretary, Mr. S. V. Colville, with the particulars asked for on the schedule forms which were posted to them some little time ago.

It has been pointed out from time to time in our columns that the Relay League is a real experimental organisation, one which will not only give the amateur something worth while, but will at the same time make a trained wireless operator of him.

It is very safe to state that in spite of the large numbers of experimenters at work in this State to-day, very few of them would be of any use whatever if suddenly called upon to do some commercial work in time of national emergency. The amateur movement therefore is not doing all that it might do towards thoroughly training a body of radio men.

If the A.R.R.L. proves a successful movement it should result in amateurs being trained to a pitch of perfection. Their value under such a scheme would be inestimable. Wireless Weekly sincerely hopes that the Radio Relay League will meet with every success.

CRYSTAL DETECTORS AND THEIR ACTION.

(By W. J. Zech.)

When the average wireless enthusiast first becomes bitten by the radio bug, one of the symptoms of his complaint will be a desire to secure and test innumerable pieces of metallic-like substance which he learns to call crystals. If he be of an inquiring turn of mind he will set to work to learn a few facts concerning these so-called crystals, and I will endeavour to explain to you some of the very interesting facts which he becomes acquainted with.

Perhaps it would be first advisable to mention the names by which these crystals are known, and the following are a few in general use. One of the first to be used was carborundum, in appearance not unlike coke, of a bluish-green colour. Another well-known crystal is silicon, whilst others are galena, iron pyrites, copper pyrites and perikon—consisting of zincite and chalcopyrites, used in conjunction with one another. Some crystals—such as galena, iron and copper pyrites—are natural mineral substances,

Continued on page 13

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HYPODERMIC PHONE CONDENSER 300 mfd.

My Experiences with the "Autoplex" Circuit.

(By Percy L. Sewell, M.W.I.A., E.E.)

When Major Armstrong's super regenerative circuit was made public, I think practically every experimenter who had the necessary apparatus

battery voltage. 4½ volts suits a B battery of 45, whilst at 90 volts a Bias of 9 volts negative on the grid is required.

The apparatus is connected as shown in Fig. 2. It makes no difference how these coils are placed, as no interaction is noticeable.

The most suitable aerial seems to be about 28ft. of No. 20 bell wire, hung up anywhere at all. This should be connected to point A, Fig. 2. If both aerial and earth are used the earth is connected to B, and if earth only is used, connect it to A. I find it possible to use any one of these combinations with about equal results, although at different places, one may prove better than the others.

A remarkable feature of this circuit is that it amplifies weak signals in much greater proportion than it does the strong ones. Therefore, it is possible to get local stations much louder on a small aerial than on a large one.

In tuning this circuit, as the valve is lit, a high, pitched whistle, or a sound like the bathroom shower turned full on will be heard in the 'phones. This indicates that the circuit is working O.K. Now, by turning the grid variometer and keeping the shower effect in by means of the plate variometer, the

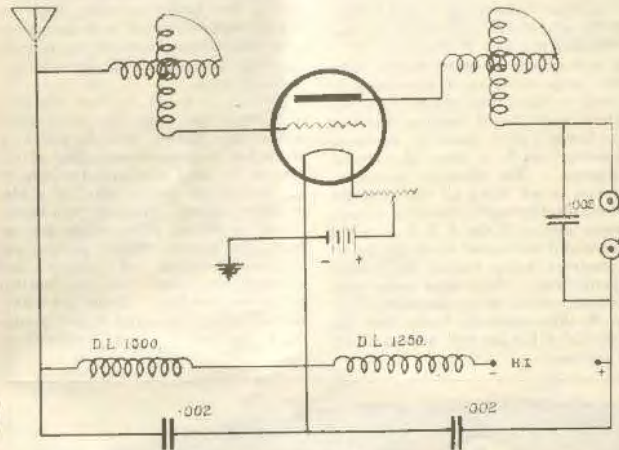


FIGURE 1

hooked it up. However, this circuit did not become popular owing to the extremely critical tuning required in order to get results.

In this article I intend to tell of my results with the Autoplex circuit, which is really an improvement on the Armstrong super. By comparing Figs. 1 and 2 the similarity between them at once becomes apparent.

The Autoplex is very easy to handle, and requires only the following apparatus:-

- 2 Variometers (with stator winding on inside of former).
- 1 UV 201A or C 301A valve.
- 1 1500 turn honeycomb coil.
- 1 Valve socket.
- 1 Rheostat.
- 1 6-volt accumulator.
- 1 B battery, 45 to 90 volts.
- 1 C battery, 4½ to 9 volts.
- 1 Pair of 'phones or a loud speaker.

In order to get best results, it is essential that the variometers have their stator winding as close as possible to the rotor. The 1500 turn coil can be dispensed with if a 1lb. reel of No. 28 d.c.c. wire is available. The C battery varies according to the plate

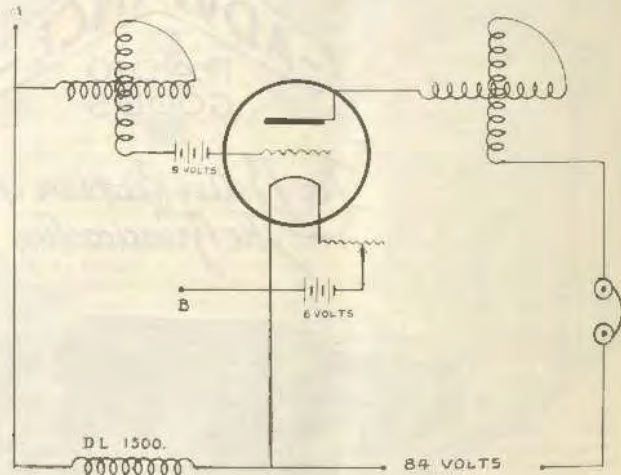


FIGURE 2.

Continued on page 9, col. 1

March 23, 1924.

WIRELESS WEEKLY

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Wireless Broadcasting Received from America.

The Burgin Electric Co. have received from their agent at Braidwood, Mr. Garnett Maddrell, the following report: "Last Sunday night I heard by wireless, music and speech from America. I tuned in to the above at 6.40 p.m., and listened to an orchestra (an excellent one, too) until 7.5 p.m., when I heard the following announcement, 'K.G.O., California, testing; Pacific time 1.4 a.m. Selections played by Hotel Orchestra, San Francisco.' The name of the orchestra was blotted out by the only small burst of static during the time. I obtained this result on a five-valve set built by your firm. The music could be plainly heard on the loud speaker by two or three people in my experimental room, which is 12ft. x 10ft. I should say the wave length was about 320 metres. The voice of the announcer was clear and good.

The Fishing is Good

SAYS C. A. WILES.

We have had a breezy note from Mr. C. A. Wiles, who has snatched a couple of weeks from the business round, to take a holiday at Lake Illawarra.

Mr. Wiles has his famous 4-valve Inverse Duplex set with him, and, using a Manhattan loud speaker, copies Sydney broadcasting stations. The local inhabitants (who, by the way, have never heard any music other than fish yarns), gather some 300 feet away and listen to the radio music each evening. So far, nothing much has been done with interstate amateurs, as the fish appear to bite about the same time as the transmissions occur, and the tuning has to be left in favour of the catching of the daily meal. Later on, photos which Mr. Wiles is sending along will be published in "Wireless Weekly."

Questions and Answers

"E.T." (Bondi): These will be published at an early date.

"D.D.C." (Ulmarra): 4CK is a Queensland station. The diagram published in our issue of February 29th ("How to Keep Below Ten Watts," by C. D. MacLurean) is strongly recommended. Complete lists will be published shortly.

WELLINGTON BROADCASTERS.

H. Gotting, of Braemar, N.S.W., has recently received a letter from Wellington Broadcasters Ltd. (2YB), congratulating him upon his reception of their programmes. The power used at 2YB is only 15 watts (radiating 1.5 amps.), so that this reception is fairly good going.

On Friday and Saturday (March 14th and 15th), 2YB (R. Allsop, Randwick), held two-way 'phone communications for 20 minutes with 2AP (Collier, Wellington, N.Z.), using only 10 watts.

American Broadcasting Received on a "Burginphone"

Again we have pleasure in announcing wonderful results being obtained on our "Burginphone" Wireless receiving sets.

On the evening of the 16th inst., Mr. Garnet Maddrell, of "Garan Vale," Braidwood, received Californian Broadcasting Station, K.G.O. The following is an extract from Mr. Maddrell's letter:

"Last night I heard by wireless music and speech from America. I tuned in at 6.40 p.m. on Sunday, 16th and listened to an orchestra (an excellent one too) until 7.5 p.m., when I heard the following announcement: 'K.G.O., California, testing, Pacific time 1.4 a.m. Selections played by Hotel Orchestra, San Francisco.'"

This was obtained on a "Burginphone" Model 9 receiver and operated a Loud Speaker. Call at our demonstration rooms, 1st floor, Callaghan House, 391 George Street, Sydney, and we will be pleased to give you a demonstration on this or other models. If unable to call, send for illustrated catalogue.

BURGIN ELECTRIC CO.
WIRELESS ENGINEERS AND SUPPLIERS.

Show Rooms and Sales Department; 1st Floor, Callaghan House,
391 GEORGE STREET., SYDNEY.

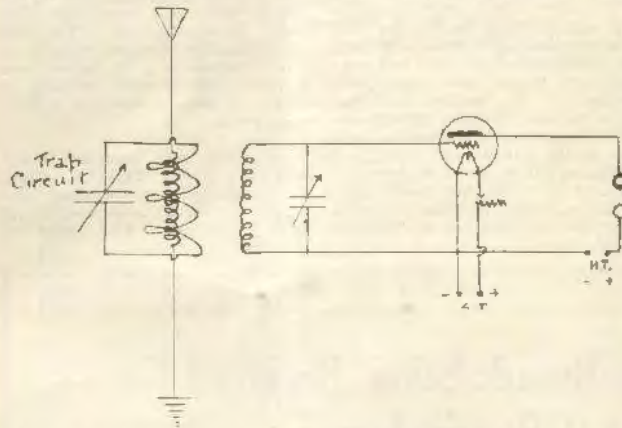
An Efficient Trap Circuit Elimination of Interference

(By G. M. Cutts.)

The reduction of interference is a subject which interests every experimenter. Many complaints have been made of late, by those whose receivers are very close to a transmitting station, that reception of distant stations is badly interfered with by the nearby transmitting station, which can be heard over a wide band of wave lengths.

Interference using such a set when receiving stations whose wave lengths are close to one another. Between Broadcasters and Farmers, however, there is a band of 750 metres, so that it should be a simple matter to receive either one of those stations without interference from the other.

The writer recently constructed a receiver which, although installed only



Now, in order to reduce this jamming one can devise a trap circuit. When this is tuned to the wave length of the offender, the impulses received by the aerial are made to respond only in the trap circuit. Other stations may then be received on other wave lengths without the interference before experienced.

A practical form of wave trap consists of a few turns of thick wire (say 16 or 20 gauge) wound over the primary of the receiver, shunted with a variable condenser and tuned to the wave length of the station whose jamming it is desired to cut out.

Another point to remember is that a condenser placed in series with the primary coil of the receiver (not the trap circuit) will assist in making the tuning more selective.

A stage of H.F. amplification makes a receiver very selective, as does reaction, but unfortunately the latter is prohibited at the present time. A station which is troubled by interference will do well to add a stage of radio frequency amplification and a trap circuit.

Crystal sets are noted for their broadness of tuning, and it is a difficult matter to completely eliminate in-

terference about 200 yards from 2BL, receives 2 FC without the slightest interference from 2BL. The diagram of the trap circuit used is shown on this page.

Suppose a 350 metres wave is being received in the main circuit, and a 200 metre wave is interfering. The trap circuit is tuned to 200 metres, and it will be found that the interference is greatly reduced, if not entirely eliminated.

The reason for this is, to put the matter into simple words, because it is easier for the interfering wave to enter the trap circuit than to overcome the high impedance of the main circuit.

Many interesting experiments can be carried out in this direction by an enthusiastic experimenter. Such experiments will not be a waste of time, for one finds new transmitting stations springing up all over the place, and interference will naturally follow if one's receiver is not selective.

A double circuit will also be found more selective than the single circuit type of receiver. That is to say, a set using only one coil for tuning will not be as selective as an inductively coupled circuit, such as a loose coupler.

DULL EMITTER VALVES.

DEVELOPMENTS IN RECEIVING TUBES.

(By R. D. Charlesworth.)

With the entrance of the general public into radio, manufacturers are turning their attention to providing apparatus of a greater reliability, greater ease of operation, and lower cost of upkeep, resulting in greater efficiency.

The vacuum tube upkeep is the most expensive item in the modern wireless receivers. The tubes are expensive, and their life is comparatively short. The expense of providing and maintaining a six-volt storage battery for heating the filaments of the tubes is also a serious drawback to the person who would like to use a multi-tube receiver, but has not the facilities at hand for easily recharging his batteries.

The cry for a more economical tube to satisfy the demands of the broadcast listeners has been awkward, and the market now offers several of these low temperature, or dull emitter tubes, amongst the best known being the Marconi-Osram, General Electric and Western Electric types.

A glance at the chart on page 19, showing the characteristics of some of these tubes in comparison with the older type of tube, such as the G.E. U.V. 200, will illustrate the great advantage in employing the new types in order to secure less running costs.

U.V. 200, 5 fil. volts, 1 fil. amp, 23½ plate volts, critical; Marconi-D.E.R., 1.8 fil. volts, 25 fil. amps, 25-80 plate volts, not critical; UV 199, 3 fil. volts, .06 fil. amps, 25-80 plate volts, not critical; UV 201A, 5 fil. volts, 25 fil. amps, 25-80 plate volts, not critical; WD11, 1.1 fil. volts, 25 fil. amps, 20-40 plate volts, not critical.

It is true that these tubes are more expensive than the older types, but when it is realised that the storage battery only needs charging once in about eight weeks instead of once a week, the new tubes present a proposition which at once becomes attractive. The development of a new tungsten filament wire has made the manufacture of these tubes possible, and radio engineers consider this discovery as great an advance over the old tungsten filament for vacuum tubes in wireless work, as the tungsten incandescent lamp is over the carbon lamp in the field of electrical illumination.

This new filament has the high efficiency of electron production, of the

Continued on page 19, col. 2

March 23, 1924.

WIRELESS WEEKLY

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Continued from page 6

signals are tuned in. When the signal is received, the shower effect disappears; or should it not, a slight adjustment of the plate variometer will do the trick.

In use this circuit will work a loud speaker well on one tube. Stages of audio frequency amplifiers may be added if desired, but in Sydney I am afraid they will not be desired.

The circuit may be loaded up to higher wave lengths only by adding coils in series with each variometer. Placing condensers in shunt to the variometers will kill the circuit, as they by-pass the radio frequency current around the variometers instead of allowing it to go through them.

In conclusion, this circuit works equally well on distant stations, whilst local stations can be heard thirty feet from the phones and items are distinguishable at that distance.

Bits of Humour

"Did I understand you to say you had a wife and six children in Australia and had never seen one of them?"

"Yes, that is how I stated it."

Then the American inquired, "How can that be? You say you never saw one of them. I do not understand it at all."

"Because," was the reply, "one of them was born after I left."—"Judge."

"How Can One Be Happy in Heaven if Relatives and Friends Should Be in Hell?" is the subject for to-night at the evangelistic services at the Mitchell Park Christian Church, Eleventh and Jackson Streets. Mr. Lunsford will sing, "I Want to Go There."—From a news item in the St. Joseph News-Press.

The Vicar: "Your sons are really terrible, Mr. Little. Don't you ever inflict a little corporal punishment on them?"

Mr. Little: "No, I have never hit my boys except in self-defence."—"London Opinion."

Mother: "Betty, John brought you home very late last night."

Betty: "Yes, it was late mother. Did the noise disturb you?"

Mother: "No, dear, it wasn't the noise. It was the silence."—"Cornell Widow."

Customer: "I want an overcoat that will keep me warm, that will please my wife, that my son will be ashamed to borrow, that my chauffeur will be glad to have next year, that my daughter won't hide, that my partner will be envious of, that no one will try to steal—well, you understand."—"Life."



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Those D.X. Kings. Can You Beat 'Em?

Radio 2ZZ—A (C. P. Smith, Cromorne), submits his log for Friday, 14/3/24, and thereby adds to his list of American amateur call signs.

0910—6LTH calls 7.
0912—6JTB calls 9CJY.
0915—6BNT calls 6CZ.
0917—6AVR calls 4BA.
0920—9MC calls CQ.
0921—6BNT calls 9MC (in answer to CQ).
0926—6BW(?) calls 3AZY.
0935—? calls 6JTB.

Of the above stations 9MC and 6AVR were the loudest. 9MC has been heard before. With the exception of 6BNT all stations seemed to be using A.C. on plates, and it is much more steady than D.C. ORM, from 2AP, N.Z. was very bad, though weather was ideal. A detector and one stage audio was used.

And this from 2YF (F. P. Clarke, Manly):—I have recently heard 3AA, 4AA, 3BU, 3BQ, 3HH, 3BD, and 3JU, the last four of whom were received on a loop aerial, the two ends of which were connected to the aerial terminal, no earth being used. 3BD was also logged on 'phone under the same conditions, being very nearly as strong as the local amateurs. VIM, VIB, VIT, and VID have also been similarly logged.

FOR SALE—Twenty Yard Aerial, complete with fifteen feet masts and Telephone Head Set. Apply, Frank B. Smith, Box 2234, G.P.O., or City 914B.

BOOKS ON WIRELESS

Construction of Crystal Receivers for Broadcast and General Reception, by A. Douglas. Price 2/3 posted.
How to Make a "Unit" Wireless Receiver, by E. Redpath. Price 2/3 posted.
Wireless: Popular and Concise, by C. Crawley. Price 2/3 posted.
A.B.C. of Wireless: A Popular Explanation by P. Harris. Price 10d. posted.

N.S.W. Bookstall Co. Ltd
476 George Street, City

On the night of 6th instant, 2CDM was logged, using an outside aerial and earth.

The receiver used employs first stage R.F. detector and two stages A.F.

And Again!

T. R. Anthony (Auburn, N.S.W.) reports that using a single detector valve, with no amplifications, has logged six Victorians in a quarter of an hour. At the beginning of Maclurcan's tests, 3H, 2BM, 3JU, and 3BD were heard calling 2CDM. During the last few nights the following have been logged good strength. 2HM, 2CQ, 2SO, 3JU, 3JH, 3BD, 3BM, 3ZL, 1YD, 1L1. 2CDM was QSA until March 2nd, when he suddenly stopped.

A Little Voice from Queensland.

C. Walter, Clifton, Q., reports:—The following have come in at my experimental station, QSA, both on music and speech: 5BQ, 5AH, 3BU, 3ZL, 2GR, 2SO, 2HM, 2BQ, 2ZB, 2YG.

On 15th March, 2AQ, New Zealand, came in between 9 p.m. and 9.30 p.m. Equal in strength and modulation to any Australian amateur that I have logged. I logged all the above stations on one detector, and three audio frequency amplifying valves. Most of the above I can get on two valves, and some, on the detector valve alone. I have also logged the following local (Queensland) amateurs: 4GE, 4CK, 4CM, 4FA.

2YI says that 7AL (Tas.) is coming in in good strength.

STUDY THIS LITTLE LIST.

2ZN (J. W. Cottrell, Randwick), sends the following report of D.X. results for the month of February. The stations were heard mainly on one stage of radio and one detector, but at times a stage of audio was added:—
Victoria: 3DX, 3AP, 3BD, 3BU, 3JH, 3JU, 3BH, 3DP, 3DP, 3ZL, 3DB, 3BM, 3HH.

N.S.W.: 2HM, 2CQ.
Tasmania: 7AA, 7AD.
New Zealand: 2AP, 2AC, 4AA, 2AE.
Broadcasters: 4AG, 1YA, 3AA.
South Australia: 5AH, 5BQ, 5BN.
U.S.A.: 6BBU, 6EQ, 5PX.

2ZN further reports logging IOM (the official station of the American RRL, at Connecticut), calling FBAB. Signals were very weak, but 2ZN states that snatches of the message received showed beyond all doubt that it was sent by IOM.

J. L. SCOTT

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March 28, 1924.

WIRELESS WEEKLY

11

Radio Handbook that is Really Worth While.

Keeping yourself up to the minute on radio is a very difficult problem. Many books and texts are published, but are soon out of date by the ever changing radio. To this end the Lefax Radio Handbook is trying to overcome. It is a loose-leaf handbook of pocket size. It grows with every new discovery about radio. Each month a supplement is issued, to be inserted in the original cover, that brings the book up to date. It cannot become out of date, and it gives you all the true known facts regarding each article or apparatus described.

Dr. J. H. Dellinger and L. E. Whittemore, Chiefs of the Radio Laboratory, Bureau of Standards, D.C., U.S.A., are the authors. Both are well known in Radio Engineering circles, are men who know and have done things in radio. Both gentlemen have given a great deal of time to the perfection of this handbook and an owner can rely completely on the published facts.

The latest circuits that are evolved from time to time are thoroughly tested before being published. The circuit and constructional details are then given with their characteristics. Another feature is the simple explanation of the action and reason for each piece of apparatus in the circuit. For instance, how many times have you been asked yourself what is the action of a grid condenser. This is thoroughly treated in the supplements as are very many other such questions.

The average amateurs think most technical books of this nature are too technical for them to understand, and on the other hand that beginners' books are too simple for them. Lefax strikes a very happy medium. It describes each item in such a way as to please an engineer but so the novice can easily understand it. The Lefax Radio Handbook is an excellent guide for all Radio enthusiasts.

FOR SALE—2 Valve Radio, also Electric Radio Gear. £15, cheap. 133 Rose St., Darlington.

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LEFAX Perpetual Radio Handbook

was written by Dr. J. H. Dellinger and L. E. Whittemore, Chiefs of the Radio Laboratory, U. S. Bureau of Standards, Washington, D. C. You simply insert the pages instantly and easily in the handy pocket size, flexibly bound Lefax Handbook.

It is finely, accurately illustrated. It has linen index tabs. It is clearly, cleanly printed. It gives a full list of broadcasting stations with full information about them—and new ones as they are established. Lefax is a reference and instruction book that takes all the mystery out of Radio.

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Telephone City 3688 1 door from Pitt St.

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

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

Radio House
619 George Street Sydney
Telephone: City 1487.

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

Ramsay, Sharp & Co. Ltd.
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Telephone: City 3176.

The Home Electric
106a King Street, Sydney.
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Swains
119-123 Pitt Street, Sydney.

Continued from page 5

whilst others are manufactured. Amongst the latter may be mentioned silicon, and a crystal called magnetite. All, however, are used because they possess the same property, namely, power to rectify. Now, this term requires a little explanation, and I will endeavour to explain to you exactly what is meant by it.

If we draw a simple receiving circuit, but omitting the crystal, or detector as it is called, we find that the following takes place. When the manipulating key of a transmitting station is pressed a series of electro-magnetic waves are radiated from the aerial of that station. These cut the aerials of all receiving stations within range of that transmitting station, and, provided that such stations be tuned to the wave length of the transmitting station, a series of electrical oscillations takes place in the circuits of these stations. Unfortunately, these oscillations are of such a frequency or, in other words, occur with such rapidity, that it is impossible for them to operate any device enabling them to be detected, such, for instance as a telephone receiver. To overcome this difficulty a crystal may be inserted in the circuit with the following effect. Possessing, as it does, the rectifying qual-

ity spoken of just now, it allows the impulses to pass through the circuit in one direction only, thus doing away with the oscillating effect. The result is that a telephone placed in the circuit is able to respond to the comparatively slow impulses thus produced, and the signals radiated from the transmitting station read with ease.

The usual method of placing a crystal detector in a circuit is to mount the crystal in some cup-shaped receptacle, and provide an adjustable contact well insulated from it. The contact generally used is a piece of fine flexible wire, which may be adjusted at will to touch the crystal in any part, and with varying degrees of pressure. The rectifying qualities and sensitiveness of the various crystals vary considerably, and it is almost impossible to determine by the appearance of them, their value as detectors. Only by actual test under natural conditions can this be done. Some crystals are sensitive pathetically over the whole of their surfaces. Others are sensitive only in certain places. Others again become more sensitive if the voltage from what is known as a local battery is applied. In such cases a very small voltage is allowed to pass through the receiving circuit, and is regulated by means of what is called a potentio-

meter, which is simply a noninductive high resistance which may be varied at will. An excellent means of applying this local current to the crystal is to place an almost exhausted dry cell in the circuit, together with the potentiometer spoken of above.

All crystals are more or less delicate objects, and should be handled as little as possible. When it becomes necessary to remove one from its receptacle the operation should be performed with a pair of tweezers. Also, a crystal should never be secured in a cup by means of solder, as the heating of it destroys its detecting qualities.

In conclusion, I would like to emphasise the fact that, in spite of the opinion of many experimenters who change from crystal to valve work, and discover the superiority of the latter, the crystal has not by any means outlived its usefulness. During the past twelve months considerable work has been done throughout the world's laboratories in combined crystal and valve circuits, and much success has been achieved in this direction, so, Mr. Experimenter, when you advance a little and commence experimenting with a valve, do not despise the crystal. Rather should it be looked upon as a very useful adjunct to its more sensitive rival.



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THE WORM TURNS.

The Editor,
Wireless Weekly.

Dear Sir.—With characteristic ignorance "R.C.M." burst into print in last week's issue of "Wireless Weekly," and hurled some particularly offensive remarks at the engineering staff of the Amalgamated Wireless, Ltd. It is to be regretted that an alleged experimenter should make these remarks, both against the individuals and apparatus concerned.

Regarding the interference due to harmonics caused by the operation of high power valve transmitters, both of the C.W. and Tonic Train type, the trouble experienced by receiving stations is as much the fault of the latter, owing to the non-selective receiving apparatus employed by experimenters, despite the assurance to the Government authorities that they would not use single circuit regenerative apparatus. It must be admitted that even with selective coupled apparatus a slight harmonic interference will always be present, but as this is always very sharply tuned, similar to the fun-

damental it should cause no trouble to an experimenter worthy of the name. The third harmonic of 600 metres can be likened to a short wave transmitter working on exactly 200 metres (not approximately 225 metres, as "R.C.M." states), and if one extra transmitting station on the short waves makes all the difference between success and failure, how does "R.C.M." account for the excellent work being carried out by our American cousins, who have to contend with tens of thousands of similar experimental stations, howling valves, and harmonics from long wave arc valve and alternator stations using powers often one hundred times that employed by VIS and VKQ?

In addition to harmonics from long wave transmitters, experimental stations also suffer from the same complaint, and relative to the power used they form a bigger percentage of the energy radiated than in the case of their larger prototypes, owing to the use of direct coupling to the aerial and inefficient coupled circuits. The persistence of these harmonics can be easily demonstrated by tuning in on the odd and even multiples of the 200-250

wave band. If experimenters would only tune their transmitting apparatus clear of the harmonic from VIS, they, in turn, will cause no mutual interference by their third major harmonic on commercial wave lengths.

It should be remembered that the commercial stations are performing a service to the whole of the community, and it would be a sorry day for radio if their operations had to be curtailed to suit the convenience of a bunch of pseudo-scientists who have not, and are never likely to make any useful contribution to the art they have adopted for a plaything. Radio has reached that stage where it requires an expert knowledge of physics, mathematics and engineering principles to make progress, and assuming that "R.C.M." possesses all these attributes, would he be so kind as to outline the ideal station he appears to have in mind? I am afraid that such a transmitter would be like the closing chapter of Shakespeare's "Seven Ages," "sans harmonics, sans everything."

Yours faithfully,

"ONE OF THE ALLEGED."

AN EFFICIENT HOME-MADE LOUD SPEAKER.

(Contributed by C. Mognic.)

Every experimenter at some time feels the need of a loud speaker, but in question of expense very often renders the purchase of a standard model impossible.

Here are the details of the construction of a loud speaker which will give good results, cost very little, and will be the means of creating added interest in experiments.

All that is required is a sheet of galvanised iron, 2ft. 6in. by 1ft. 4in. of 1in. bore copper tubing, and about 6in. of 1in. bore garden hose.

Cut out from sheet of galvanised iron as per shaded part of Fig. 1. Bend over to form a cone and solder the joint. Then drill a small hole in the piece of copper tubing, insert the sharp end of the cone and solder firmly. Fit a piece of hose into the end of the copper tubing, and fasten the phones to the base as shown in Fig. 2. The side elevation is shown in Fig. 3.

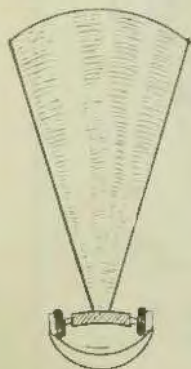


Fig 2

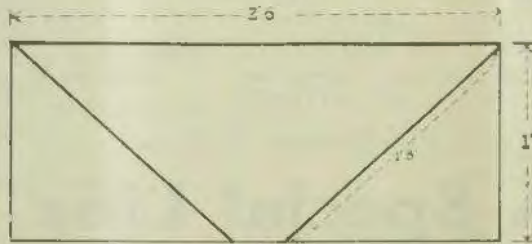


Figure 1

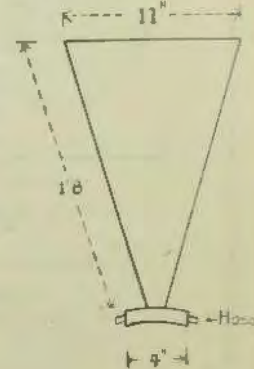


Fig 3

March 28, 1924.

WIRELESS WEEKLY

15

The Editor, "Wireless Weekly."

Dear Sir,—With reference to "R.C.M.'s" letter in "Wireless Weekly," of the 14th inst., on the question of harmonics of VIS and VKQ.

It does one good to know that an experimenter has at last had enough go in him to express his opinion in writing, and now that "R.C.M." has set the ball rolling there will, no doubt, be many others who will have something to say on this most exasperating subject. I, for one, absolutely endorse every particle of his opinion.

It is, of course, a recognised fact that the VIS operators care not one atom for the experimenter, and as an instance I will relate as follows:—

During a visit to Pennant Hills Station (VIS) a few weeks ago, a remark was passed to the operator about the harmonics of his station, and his only answer was a shrug of his shoulders and a remark to the effect that they care nothing about the interference they cause, irrespective of persons, so long as they get their own work through, so of course we experimenters would only be laughed at for our pains should we complain to the authorities of the VIS harmonics. Yet at the same time, pasted up on the wall of VIS operating room is a letter from the Department asking them to report any

instance of interference from experimental stations, and there is no doubt that should any experimenter not heed the QRT and close down without more ado, he would be promptly reported and put to no end of trouble.

Let us hope that some day the authorities will sit up and take notice, and try to give the experimenter a fair go.

Yours faithfully,
"ZJT."

19th March, 1924.

The Editor, "Wireless Weekly."

Dear Sir,—With reference to the article, "The Call of the Wild," by "R.C.M." in your issue of the 14th inst., I do not think "R.C.M." has had much, if any, experience in radio stations employing arc or valve transmitters.

No doubt those harmonics are annoying, as he says, but why does he wind-bag so much about it?

If he has any practical radio ability he would do well by designing something new, and no doubt he would get a good position out of it.

Speaking of harmonics, has "R.C.M." the slightest idea of how such are radiated from arc or valve apparatus. No doubt many of your readers would

be interested to hear all about them, and not be kept in the dark.

I do not know "R.C.M." and I have no desire to know him; but as I have had practical radio station experience, employing spark, arc and valve apparatus up to 60-kilowatts, and have been experimenting some 14 years, and know a little of spark, arc and valve working, I think it would be as well for "R.C.M." to study them a bit more before writing about inside workings of radio stations.

Trusting time and space will permit for publication of same.—I am,
Yours faithfully, "EX-NAVY."

Continued on page 19

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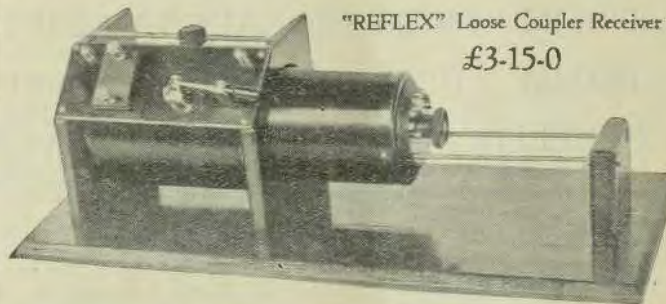
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WAGGA RADIO CLUB.

At present this club, which was formed only last month, has 28 active members, besides a number of junior supporters. Although the club rooms are not yet in order, experiments are carried out on members' sets, and afternoons and evenings are spent out in the country.

A very interesting experiment was carried out recently. About 120ft. of high tension wire was wound around a motor car, and for an earth a piece of fine wire gauze was connected to a three valve receiver by a length of one twentieth insulated wire. Music and speech from the Riverina Wireless Supplies Company's station, 2 miles away, came in very clearly while the

car was moving at the rate of 15 miles an hour.

More compact apparatus will be used for the next test, and even better results are expected. The Hon. Secretary of the club is Mr. A. N. C. McGarry.

WENTWORTH RADIO CLUB.

The club met on March 19th. There was a good attendance, although Mr. McKenzie was unfortunately unable to deliver a lecture, as had been arranged. The lecture will be given at the next meeting, on Wednesday, April 2nd.

NORTHERN SUBURBS RADIO SOCIETY.

The fourteenth meeting of the above Society was held on Thursday, March 19th. There was a good attendance of members. Mr. Alcorn, the Postmaster of Gordon, gave about half an hour's buzzer practice. This buzzer practice is to be a feature of this Society, and all members are asked to be at the meetings at 7.45 sharp every Thursday so that all may become efficient in Morse signalling. The dele-

gate of this Society, Mr. Primmer, to the special meeting called by the Wireless Institute on Wednesday, March 18th, gave the members an outline of what had been done at the special meeting, and it was decided unanimously to adopt the recommendation of the delegate that the Society affiliate with the Wireless Institute. Mr. Hurl, Vice President of the Society, gave the members a short talk on Wave Lengths, which was greatly appreciated by all present. Inquiries to the above Society should be addressed to the Hon. Sec., Mr. R. Primmer, Gordon Rd., Gordon.

THE LEICHHARDT AND DISTRICT RADIO SOCIETY.

Several matters of interest and importance were discussed at the 72nd general meeting of members of the Leichhardt and District Radio Society. The meeting was held at the club room, 176 Johnston St., Annandale, and was well attended. In accordance with a resolution recently adopted, a library has been established for the use of members, and the first donation took the form of a copy of

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the Year Book of Wireless Telegraphy presented by Mr. W. J. Zech, to whom a vote of thanks was accorded by those present.

On Tuesday next the Society's 18th monthly business meeting will be held when a number of applications for membership, and other business will be dealt with.

On the following Tuesday night, the fifth lecture of the new syllabus will be delivered by Mr. F. Roscoe, who will deal with "Crystal Circuits and their Construction."

Inquiries regarding the activities of the Society are always welcome, and should be addressed to the Hon. Sec. retury, Mr. W. J. Zech, 145 Booth St., Annandale.

THE TEN WATTERS CLUB.

On Tuesday night an interesting relay message was transmitted from Perth to Brisbane, in conjunction with the Australian Radio Relay League, P. Renshaw, at 2JM's station, being official organiser and manager. At five minutes to nine, 2GR sent out QRT to all 10 watters, and with the exception of one transmitter, who evidently did not hear the call, everyone

ceased work, a tribute to the discipline and sportsmanship of the 10 watter members. The test was highly satisfactory, but there was unfortunately some mistake at Armidale, where the returned message from Brisbane was lost by 2HM, but it did not materially affect the test, because Sydney transmitters received Brisbane direct.

Notes.

Riddle: What is the difference between 2DE's new transmitter and 2JM's station? Answer: None!

2GR wants to know why they allow faulty valves into the country?

2JM is as loud on the buzzer as he is on the flute.

2YG is coming in with a good punch and good modulation.

2YI is still going strong. If he gets much stronger something will happen.

Our big brothers do not appear to be improving any, excepting harmonics, which are stronger than ever.

2DR's voice is quite lady-like alongside our burly friend, 2JM.

If you hear a loud explosion any time, you will know 2GR is at work with the axe.

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The Moore Fund

It is very gratifying to see the clubs taking a definite move on behalf of this cause. Twelve Clubs have to date sent along contributions, and three of these are situated outside Sydney.

In appealing again to those clubs which have not yet responded, we want to bring home the urgent need for funds for Mrs. Moore and her little ones. We hope to make this a big week. Will Club Secretaries help us by endeavouring to make collections at their next meetings?

To experimenters generally, we aim this appeal. Send us something this week!

Send along the contributions to the "Wireless Weekly," 33 Regent Street, Sydney or to Mr. Phil Renshaw, Box 3120, G.P.O., Sydney.

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

men will see that the money is properly disbursed.

Contributions to date:

Proprietors Wireless Weekly	£5 0 0
United Distributing	10 10 0
Mr. Quail	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. Maraden	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. Hinchin	5 0 0
R. W. Faulkes	0 2 6
A. Dixon	1 1 0
J. Lendlaw	1 1 0
C. Storm	0 15 0
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A. Larkin	1 0 0
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N. Ambrose	0 3 0
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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
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Wireless Branch (P.M.G. Department, Melbourne)	1 8 0
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G. R. Challenger	0 10 6
Northern Suburbs Radio Association	3 3 0
Total	£84 15 6

Harmonies in Harmonics

Continued from page 15

The Editor,

Wireless Weekly."

Dear Sir,—I have noticed an article entitled, "The Call of the Wild," written by "R.C.M." This letter was evidently written by someone with a very elementary knowledge of wireless harmonics. I would like to know how "R.C.M." calculates the ninth harmonic. I am under the impression that there are only three audible harmonics, namely, second, third and fifth.

The ninth harmonic is certainly perceptible in a laboratory test, but if "R.C.M." has heard a ninth harmonic of 2700 metres (which is the wave length of Garden Island), at a distance of 200 miles, he has accomplished something previously unheard of in the world of wireless. It appears that "R.C.M." heard the fifth harmonic, which is approximately 246 metres. It is commonly known that interference is caused on the lower waves by stations using continuous waves, but the production of these harmonics is in no way discreditable to the transmitting station, but rather a reflection on the receiving station that complains, as this is due to the interaction between the aerial and heterodyne set of the receiving station.

The reference to bad tuning is ridiculous and childish, and merely intended to cast a reflection on the abili-

Continued from page 6

oxide coated filament (DER type), and the ruggedness of the old tungsten filament (UV 200 type).

It has quietness of operation, a low operating temperature, and longer life than the old tungsten filament. The wattage consumed by the filament of

accidentally applied to the filament, all of the surface thorium is vaporised, and if the high voltage is left on too long the reserve will also be vaporised. If the plate voltage is taken off the filament, lighted to its normal temperature, a new supply of thorium oxide will come to the surface and ren-

Name of Tube	Filament Volts	Fil. Amp	Plate Volts	Remarks on Operation
U. V. 200	5	1	22½	Critical
Marconi D.E.R.	1.8	.25	25-80	Not Critical
U. V. 199	3	.06	25-80	" "
U. V. 201A	5	.25	25-80	" "
W. D. 11	1.1	.25	20-40	" "

the UV 199 is .18, or approximately 1/27th of the energy used in the UV 200 tube. Yet the characteristics when used as either detector or amplifier are slightly better, the chief advantages being the stability of the electron emission and a non critical filament operating voltage of from one to three volts. The filament of this tube functions at a temperature of about 400 degrees cooler than the ordinary tungsten filament, having only a dull red glow, an advantage over the intense glare produced by the older tubes.

Tubes employing this new device are less susceptible to burn out than any other tube. If the filament is operated at too high a voltage the electron emission falls off and the tube becomes inoperative. The emission may be regained by operation at the rated voltage for a short time with the plate voltage off.

The chemical structure of the filament is responsible for this improvement. A certain amount of thorium oxide is contained in the tungsten, and when the rated voltage is applied a portion of this oxide comes to the surface and forms a coating on the outside of the filament. There is also a continuous reserve just under the surface of the filament. It is this thorium oxide which emits electrons. If a voltage of, say, 5 to 10 volts is

der the tube operative again.

These tubes offer many other advantages one of which is portability. A three or four tube receiver can be taken away on a country trip without the necessity of heavy and cumbersome batteries. Three dry cells in series will provide sufficient energy to run such a set four or five hours a day for many months, whilst a UV 199 tube can be run off a pocket torch battery for 70 hours continuously. Nothing is perhaps more annoying than whilst enjoying a broadcast concert, to have the filament storage battery run down. With the old tubes this means that the instrument will be useless unless another charged battery is available. On the other hand, if low temperature tubes are used the set can still be operated for several hours after first noticing a drop in battery voltage, thus giving ample notice that the battery will need attention. It is not necessary to employ a rheostat to use any of these tubes. If the tubes are supplied at their rated voltage from higher voltage batteries, suitable fixed resistances are all that is necessary to obtain maximum results.

The writer has used these new tubes for the past eight months, and their extra initial cost has been more than repaid by their low cost of maintenance and their simplicity of operation.

ties of the respective officers in charge, with whom I am personally acquainted, and who are both highly trained engineers, scarcely likely to allow their transmitting gear to be badly tuned, well knowing that it would interfere with the range obtained.

It is rather unfortunate that these

two powerful radio stations should be so close to the city, and I am sure that agitation on "R.C.M.'s" part would result in these stations being removed to the bush.

Yours faithfully,

"E.S.T."

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CONDENSERS.

(By "The Little American.")

The condenser obtains capacity, and capacity is the second important electrical effect necessary to set up an oscillating circuit. A condenser consists essentially of two sets of metal plates, separated by an insulator known as the dielectric. The plates of each set are electrically connected, but the two sets are thoroughly insulated from each other. The function of a condenser is to store up electricity in the form of an electric field between the metal plates.

The general principles of construction of a condenser are illustrated by the plates being odd in number and so arranged that one set fits in between those of the other set. Variable condensers have one set of plates fixed and the other set capable of being rotated in and out between the others. Such condensers are used very extensively in radio work.

The capacity of a condenser is measured by the amount of electricity that can be stored up in it. The capacity of a condenser depends upon the area of metal plates, upon the nature of the dielectric, and upon the distance between the metal plates, and the number of plates. The "dielectric constant," or specific inductive capacity of an insulator is the number of times the capacity of a condenser is greater when this material is used as the dielectric constant of one. The dielectric constant K for other materials is given in the following table:—

Air	1
Mica	4-8
Glass	5-10
Hard rubber	2-4
Paraffin paper	2-4
Shellac	3-4

From this table it can be seen that a condenser with a glass as a dielectric will have a capacity of from five to ten times as great as it would have if air was used.

A variable condenser has maximum capacity when the movable plates are completely enclosed within the fixed plates, and can have its capacity decreased to any desired amount by rotating the movable plates partially out from between the fixed plates. The two sets of plates must not touch each

other at any point while in any position, or the condenser will be rendered inoperative. The variable condensers in common use have the plates made of hard aluminium about 1/32 of an inch thick, with an air space of 3/32 of an inch between the plates. The following are the sizes and capacities of the variable condensers in general use in receiving apparatus:—

3 plate	.00004
11 plate	.00025
23 plate	.0005
34 plate—	
Small plates	.00075
Large plates	.001
43 plate	.001
63 plate	.0015

Up to this time there has been but limited development in condenser design. The present type of rotating-plate condensers is seldom very accurate. Though spacing may be fairly uniform when manufactured, handling soon changes positions of the plates. Many of the plates are stamped out with rough edges. Unless the metal is carefully treated, temperature changes will produce warping of the plates. The plates may be shorted, but there is no uniform capacity change. Gradually development and improvements in design will help eliminate these uncertain factors. Dust in the condenser will cause it not to function uniformly.

Little has been said of the fixed condenser because the experimenter cannot construct efficient fixed condensers of the true capacity unless he is in possession of expensive measuring apparatus and great care is to be used. When fixed condensers are specified in a circuit, select one made by a reliable firm, and of a standard design, using mica as a dielectric. All fixed condensers, even of a standard make, do not come uniform to precision, and are only good where a general fixed capacity is necessary. Where a precision capacity is required, a variable condenser is recommended. Fixed condensers save room and money, and are indispensable for capacities above .001.

Next week's contents will include Mr. Perry's article, "Catching the Ringleaders." Also the third article of the series by "Insulator," and details of Station 3BD (Vic.)

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March 28, 1924.

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