

WIRELESS WEEKLY

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transmission by post as a newspaper.

VOL. 6. No. 1.

FRIDAY, MAY 1, 1925.



"THIS IS RADIO KDKA PITTSBURGH, U.S.A. CALLING"

Mr. Raymond C. Allsop—2YG— received the American Station so clearly that the story of the wonderful re-broadcasting by 2BL is common history. Mr. Allsop used a 3-valve Low Loss Set, (containing the highest quality parts), constructed in our own workshops, the exact replica of which we are able to supply for:—

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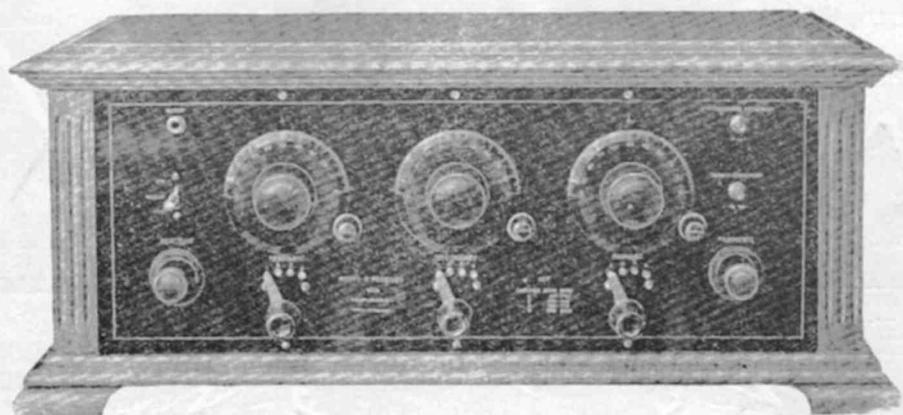
Phones

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RESISTOR PLEX.
1-2V.

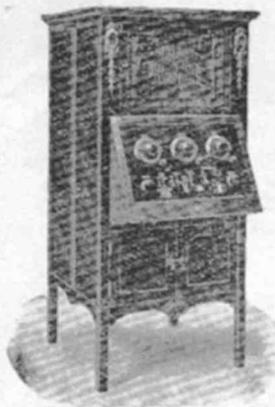
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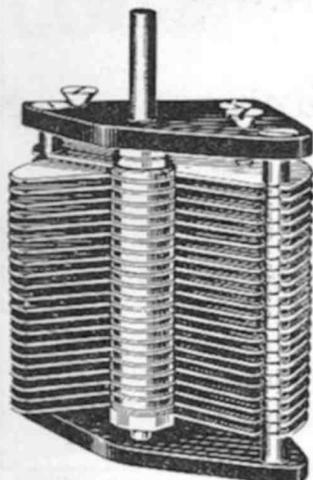
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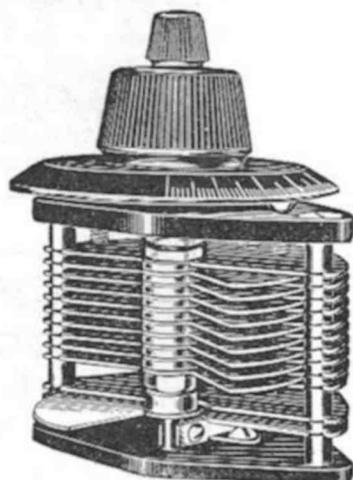
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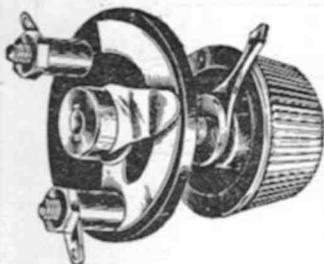
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LOOK FOR

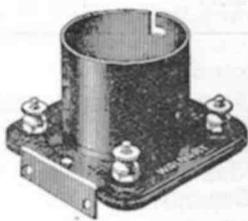


THIS MARK

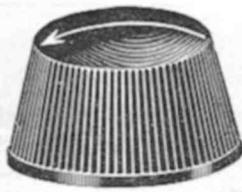
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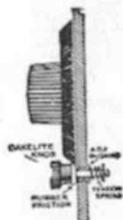
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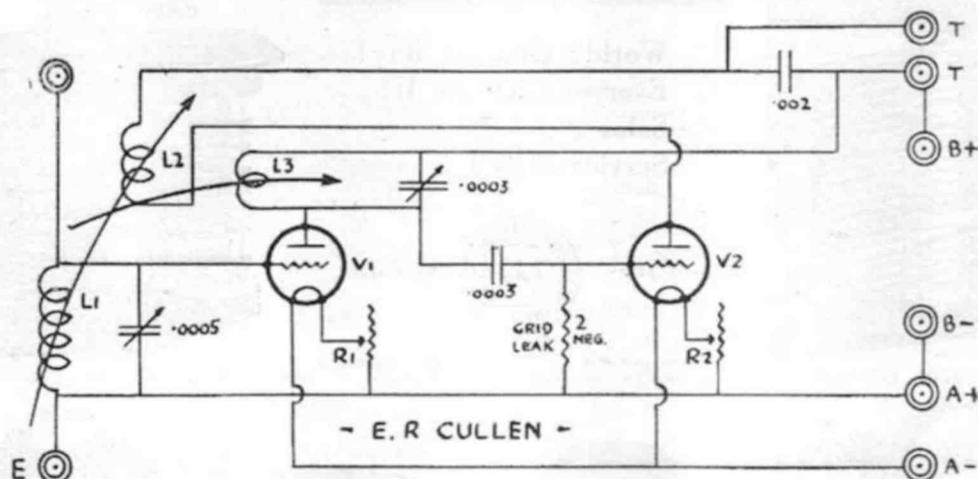
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5th FLOOR

Cullen's Circuit No. 7

"YOU HAVE MY WORD FOR IT."

A 2 Valve Double Reaction Receiver



As is pointed out, No. 7 Circuit takes the form of a Double Reaction Receiver. This has many advantages, the primary one being extreme selectivity. Mind you, this depends greatly on the quality of the components employed in the set. Quality is always cheapest in the long run. It will be seen that all the coils are coupled, L2 being the middle or fixed coil. Coils L1 and L3 are tuned by variable condensers of .0005 mfd. capacity, although a .001 in the aerial circuit would not go amiss. Use these parts:

1 Bakelite Panel, 14 x 7½ x ½ ..	8/9
1 3-Coil Holder (De Luxe Un-assembled) ..	15/6
2 .0005 Utility Vernier Condensers ..	2/0/0
2 Nutmeg Valve Sockets, 3/6 ..	7/0
2 Nutmeg Rheostats, with Dials 13/4 ..	
1 .0003 Wetless Condenser ..	1/6
1 .002 Wetless Condenser ..	1/9
1 Grid Leak (2-meg.) ..	1/6
8 Terminals, N.P. ..	2/8
Panel Wire, Screws, etc.	1/6

True Blue, UV201a or UV199 Valves will function most satisfactorily. Care should be taken to see that interference is not created by the mishandling of this receiver. It may be mentioned that a certain eminent radio man in Sydney claims that this is the best type of receiver for eliminating Farmer's and bringing in Melbourne.

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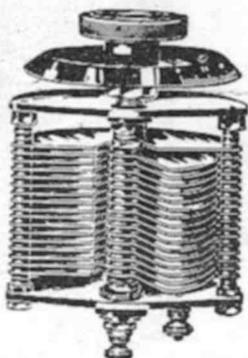
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35	2/2	5/3	.0003 10/-
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75	2/6	5/9	.00075 12/6
100	2/9	6/-	.001 13/6
125	3/-	6/3	
150	3/-	6/6	VERNIER.
175	3/3	7/-	With Knob and Dial.
250	3/9	8/-	.00025 11/6
			.0003 12/6
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			DUO ANODE, .00025 20/6



Ormond

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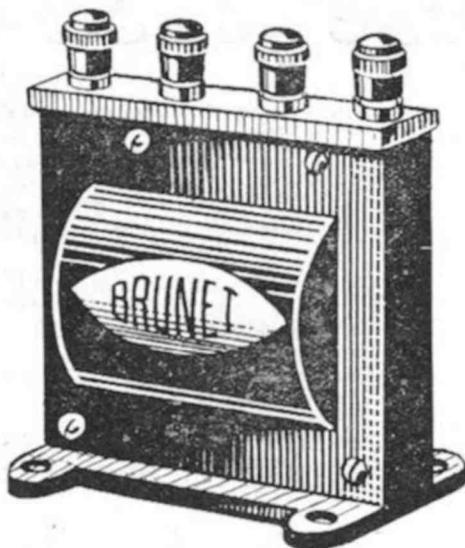
Ormond Condensers are English made, and are variable. There is NOTHING better, and the Ormond special features make an invincible appeal to keen enthusiasts. As shown in the illustration, this Condenser has a separate nut or wiring terminal to facilitate wiring, avoiding wiring to the frame nuts. It offers utmost simplicity in use, because it necessitates only a one hole mounting.

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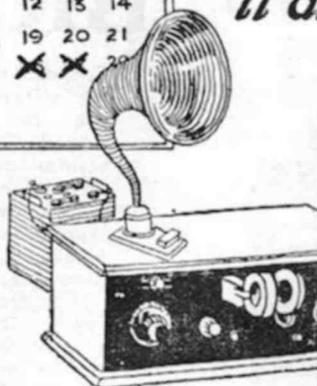
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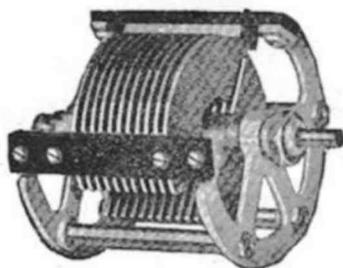
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Wireless Weekly

12-16 REGENT STREET, SYDNEY, AUSTRALIA.

'Phones: Redfern 964 and 930.

Official Organ of the New South Wales Division of the Wireless Institute of Australia, with which are incorporated the Affiliated Radio Societies and the Australian Radio Relay League.

Editor: A. W. Watt.—The Editor will be glad to consider Technical and Topical Articles of interest to Australian Experimenters. All Manuscripts and Illustrations are sent at the author's risk, and although the greatest care will be taken to return unsuitable matter (if accompanied by stamps), the Editor cannot accept responsibility for its safe return.

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VOL. 5 No. 27

MAY 1, 1925

Editorial.

Re-Radiation

THE principal cause of the comparative failure of the April 16th tests, during which nine American broadcasting stations co-operated, is attributed to that age-old curse, "howling valves," which seems to be a greater pest than static.

Interference of this kind is, however, not peculiar to Australia, because it has proved quite a serious menace in both Great Britain and America, where wireless journals devote considerable space to the subject with the object of educating the wireless public, without, it is feared, much success.

It seems that wherever there are regenerative receivers there must be howling valves. After years of broadcasting the position is worse to-day than it ever was, and the most pathetic aspect of it is that nearly all who create the interference do so quite without knowing it. If only they could be shown, things perhaps would be different, and it is certain that the average listener, if he were only aware of the facts, would no more dream of allowing his set to re-radiate than he would motor along a busy thoroughfare at sixty miles an hour. From a close examination of the published comments upon "howling" valves in British and American wireless journals, we find a variety of methods suggested for curing the evil. "Radio Broadcast," a prominent American journal, is publishing a series of cartoons

depicting the owner of the howling receiver as an animal that grunts. Other journals publish special articles in an endeavour to educate the public, but apparently without avail.

The truth is that no one seems to worry about it unless the matter is brought directly and personally before his notice. Direct and beneficial results have been obtained by the members of a Radio Society in England by tracking down these re-radiating receivers and pointing out to the owners the remedy. If no notice is taken, then the names and addresses are forwarded to the B.B.C., which concern presumably takes action.

While this method seems somewhat drastic, it is reported that in the district covered by the activities of this society a great deal of good has been done. This immediately opens up the question as to whether our local radio clubs could not undertake some such scheme here with a view to assisting broadcasting along. It may be taken for granted that anything designed to secure better reception would have the cordial support of everyone, and practical work of this kind by clubs would certainly be appreciated.

BROADCASTING.

ON the occasion of the broadcasting of Grand Opera some months ago, listeners-in were treated to something particularly good. Even though Galli Curei, according to the daily papers, expresses the opinion that the quality of the voice is lost in the process of being broadcasted, and on that account declined to face the microphone, such great artists as Melba, Tetrazzini, and John McCormack have on occasions shown in a practical manner that to be broadcasted is not only good for the artist, but also brings joy to many who cannot afford the admission fee to opera.

In England and America, well known singers and lecturers are easily persuaded to broadcast items; they reach a far greater public than they could ever hope to across the footlights. It is a form of publicity almost beyond price, and builds up for them good-will, which is the basis of all worthy aspirations in this world, and without which, no matter how wonderful the voice, they cannot hope for success. Experience in the broadcasting of portions of plays and musical comedies has shown beyond doubt that the box office receipts are considerably swelled, and this is only natural.

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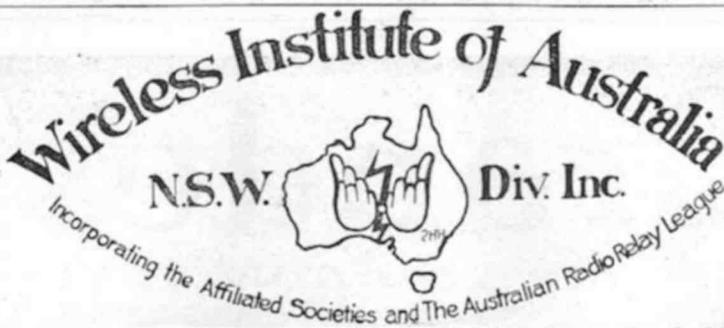
Are you sure that you can invite her to listen. Can you depend on your headphones to give you clear and unsullied reproduction. You want her to appreciate the efficiency of your set, and it's on these occasions that the ordinary headphones choose to be perverse and a rueful but patient smile is your reward. Get Brandes "Matched Tone" headphones and be proud of them—their consistent purity and richness of tone will never fail you. Finished appearance, strong construction and designed for long and comfortable wear, a guarantee enabling you to return them within ten days if you are not satisfied adds to their desirability. Ask your Dealer for Brandes.

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NEW SOUTH WALES DIVISION.

Maclurcan Cup.

The final draft of the rules governing the Maclurcan Cup for competition among the various affiliated Radio Clubs are now available and have been forwarded to each of the Clubs concerned.

It is interesting to note that the various Clubs have unanimously adopted the rules as originally drawn up, and one or two suggestions made by the various affiliated clubs have been incorporated in the new rules.

In the ordinary way, the period will start on April 1 of each year, but as nothing definite was finalised at that period, the marking for the first twelve (12) months will commence on May 1, and will end on March 31, 1926. Thus only eleven (11) months will be taken into account this year. The position of the various clubs will be published at the end of each quarterly period, and there is no doubt that the competition will be a keen one. It is impossible to forecast at the present moment who are likely to be the winning club, as the conditions are such, that every club, large or small, has an equal chance of winning the Cup.

For the general information of members of affiliated clubs the following copy of the rules, marking form, together with the copy of a letter sent to all affiliated radio clubs is printed below.

Standard Frequency Transmissions

It is unfortunate that the official station for the transmission of standard frequencies on behalf of the Wireless Institute of Australia, New South Wales Division, was unable to proceed with the regular programme on April 14. The trouble has now, however, been overcome and the transmissions, it is hoped, will continue without interruption. The fact that these transmissions are greatly appreciated is shown by the number of congratulatory messages which have been received at Station 2CX, and the Wireless Institute of Australia, New South Wales Division, are to be congratulated on the forward move that they have taken in commencing these transmissions. It is hoped that the activities of the Institute will be increased in the near future,

and other items of valuable public utility will be included in the regular weekly programme.

Radio Relay League.

A mass meeting of those who are eligible for membership in the Australian Radio Relay League was held at Institute Headquarters on Wednesday, April 22, 1925. The report of the sub-committee, which had been appointed to deal with this matter, was received and adopted with slight modifications.

The report, as adopted, had previously been before the Delegates Council Meeting, and had been endorsed by them. It will now be forwarded to the Executive Council of the Wireless Institute of Australia, New South Wales Division in the form of a recommendation, and will be dealt with by them at their next meeting.

Briefly, the new scheme involves the following: The New South Wales Division of the Wireless Institute of Australia, will provide suitable apparatus for the conduct of an experimental research and Traffic Bureau. This Bureau will combine the research side of the Institute with the activities of the Relay League, and will be controlled by suitable Committees.

The scheme is one which has much to commend itself and it is anticipated that a good deal of useful work will be accomplished. Details of the scheme have not yet been fixed, but no time will now be lost in pushing ahead with the necessary details and commencing the activities of the new Bureau at as early a date as possible.

QRM.

2GM has been working on the highest power input yet used at that Station. He surely has some punch.

2CZ, G. W. Exton, of Lismore, was a welcome visitor at Headquarters this week. We are always pleased to see country members, and the only trouble is that they don't let us know sufficiently in advance for us to arrange a more entertaining programme for them.

New Zealand Tests.

New Zealand tests are on this week. All reports should be sent to the Honorary Secretary as early as possible.

Round the Clubs

The asterisk denotes clubs affiliated with the Wireless Institute of Australia (N.S.W. Division).

THE LEICHHARDT AND DISTRICT RADIO SOCIETY.*

Whilst it is essentially and primarily a radio club, there are occasions when the members of the Leichhardt and District Radio Society get away from the serious business of experimental wireless and indulge in a little social activity of another kind. A case in point was the holding of the 127th general meeting on April 21st, when members gathered together in great force for the purpose of entertaining Mr. A. W. Watt, editor of "Wireless Weekly," and Mr. W. Hamilton, so well known to the readers of this journal as "Insulator." There were also a number of other visitors present as guests of the society, and each and every one of those present—both members and visitors—spent a most enjoyable evening. The first portion of the evening was utilised in the screening of a most interesting cinematograph picture entitled "King of the Rails," which depicted the construction of the tremendously powerful electric locomotives now in use in various parts of America. To those unacquainted with the work necessary in the building of these locomotives the picture was a revelation, and all present agreed that it was extremely interesting and instructive. The serving of refreshments followed, during which numerous toasts suitable to the occasion were drunk. The rest of the evening was spent in a discussion amongst those present, and everybody took advantage of the opportunity offered to "get together" and exchange views. The discussion lasted well into the night, and when eventually the chairman was compelled to close the meeting on account of the lateness of the hour, all present agreed that it had been one of the most successful and enjoyable that the society had ever held.

Next Tuesday evening the 31st monthly business meeting will be held, and applications for membership dealt with. Other formal business on hand will also be disposed of, and a good attendance of members is expected.

On the following Tuesday evening, May 12th, the 8th lecture of Syllabus No. 3 will be delivered by Mr. J. R. Alexander, who will talk to members about magnetic rectifiers, and on Tuesday, May 19th, a competition night will be held, particulars of which will be announced in our next issue.

The society is always pleased to receive inquiries regarding its activities, and these should be addressed to the hon. secretary, Mr. W. J. Zech, 145 Booth Street, Annandale.

THE CROYDON RADIO CLUB.*

The usual weekly meeting was held on Saturday, April 18th, at the Club Rooms, "Rockleigh," Lang Street, Croydon.

After much discussion a set of rules was made up governing the competition for the valve donated by M. Walker. In addition to the Lighting arrester donated by Mr. Pickering as second prize, Mr. Luckman added a series parallel switch as third prize. Each competing member is to make some piece of apparatus, marks being awarded for efficiency, finish and ingenuity. Time allowed, one month. At the conclusion of the judging, if competitors so desire, a sale and exchange will be held to dispose of any apparatus which was made only for competition purposes. It has been reported that a few ex-members of the Club have been seen wearing the Club's badges and we have decided to re-purchase these badges from these one-time members if necessary, at a premium. The members remarked upon the fineness of the tuning of 2BL during the recent American tests and wished to thank that station for not causing any interference thereby. Mr. Pickering volunteered to give a lecture on "Electric Motors" at our next meeting. He was rushed.

The members were very pleased to hear that Mr. Thrum would be out of hospital very shortly. They have nearly forgotten his definition of Induction!

All correspondence, etc., to Hon. Secretary, Croydon Radio Club, "Rockleigh," Lang Street, Croydon, will receive prompt attention.

MARRICKVILLE AND DISTRICT RADIO CLUB.*

The above Club held its usual weekly meeting on Monday night, 20th April, at the Marrickville School of Arts. There was a good roll up of members and friends.

After the Club's private business had been dealt with, the Chairman, Mr. W. L. Hamilton, announced that Mr. Henry French and Mr. A. W. Young, B.Sc. had kindly come along at the request of members, the latter gentleman having promised to favour us with a lecture dealing with "Factors and Formulae met with in Wireless." Commencing with a clear explanation concerning the functions of the various parts that are employed in a modern receiving set, the lecturer then proceeded to explain fully the meaning of the terms Inductance, Capacity, Resonance, Conductance, &c., and also stressed the need for bypass condensers, especially in reflex sets. Perhaps the most interesting subject dealt with was the one explaining the "Characteristic Curve of Valves," which Mr. Young explained, if thoroughly understood

by experimenters would mean getting the best results possible with the particular valve employed.

Throughout the lecture, formulae and figures, diagrams, etc., were introduced to make the various matters touched upon more clearly understood, and throughout, the greatest interest was taken by all present. At the conclusion, many questions were asked the lecturer and satisfactorily answered, and after a hearty vote of thanks to Mr. Young had been moved and carried in the usual way the hope was expressed that we would be favoured with a further lecture from him at a later date. This Mr. Young agreed to do and thanked the members present for their attentive hearing.

Members of other Clubs are cordially invited to visit us any Monday evening and intending members can obtain full information by getting in touch with the Club's Secretary, Mr. A. W. Hemming, of 23 Central Avenue, Marrickville.

STRATHFIELD RADIO CLUB.*

The usual weekly meeting of this club was held at the club rooms, corner Albert Road and Darke Street, Strathfield, on Monday evening, 20th inst.

Mr. A. F. Jacob presided, and there was a very fair attendance of members.

Proceedings opened with the addition of another new member, and, correspondence and questions having been dealt with, a paper was read by the hon. secretary on "Inductance, Capacity and Resistance" and their effects in radio receiving circuits, with particular reference to head and hag due to the presence of capacity and inductance respectively.

The sine curve and a few of its properties, methods of calculation by means of Vector diagrams, and the derivation of various fundamental formulae were dealt with, practical examples being given in each case.

The manner in which the hag due to a highly inductive aerial system was utilised in modern direction finding apparatus was also explained, in response to requests from members for more information regarding this highly interesting subject, which was so well treated by Mr. Apperley in his lecture to our last meeting.

In proposing a vote of thanks, which was carried in the usual way, Mr. Simpson expressed his high appreciation of the instructive nature of the paper, which has been presented to the club for perusal by individual members at their leisure.

As a change from theoretical lectures we are having a practical demonstration next week of a very efficient 3-valve receiving set constructed by our resourceful president, Mr. A. F. Jacob, when everything from American amateur signals to local

broadcasting and all wavelengths in between will be served up to members on a loud speaker.

In connection with this demonstration, a practical lecture will also be given on the fine points of valve operation and satisfactory operation of regenerative sets.

Satisfactory progress is being made on the construction of the club's new receiving apparatus. A small but willing committee meet every Wednesday and work on same, and it is expected to have it in operation at an early date, when practical demonstrations of various types of circuits, etc., will be a regular feature of the club's work.

The competition for the MacLurean Cup, which commences 1st May, should stimulate considerable interest in club work, and present indications are that this club will be in the running when the whips are cracking.

A few more new members would be a welcome acquisition to this club, which is in a position to render excellent service and instruction, as well as providing a means whereby experimenters or others interested in wireless work can meet and exchange ideas and experiences under pleasant conditions. Correspondence addressed to the hon. secretary, 44 Bayard Street, Mortlake, will receive prompt attention.

WOOLOOWIN RADIO CLUB, BRISBANE.

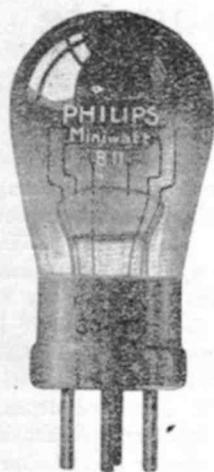
As previously notified through the Press, the meetings of this Club are now held on each Thursday evening (Formal meetings on the second and fourth Thursdays), at the Club's new Headquarters, in the residence of Mr. G. W. Jear, Lisson Grove, Woolloowin.

At the meeting held on 16th instant, a very satisfactory attendance of members was noted. The Secretary, (Mr. H. A. Jear), reported that arrangements were almost finalised for the acceptance of the Club's Transmitting License—approval having been given by the authorities in Melbourne some weeks earlier—and details of the proposed transmitting panel were brought up for the consideration of the meeting. A start will be made on the actual construction next Thursday night, and the Club takes this opportunity of expressing its appreciation of the action of those members who have intimated their intention of supplying sundry component parts.

A letter of congratulation has been sent to the newly formed Nambour Radio Club offering any assistance that the Woolloowin Radio Club may be able to render.

During the course of the evening, Mr. V. F. Kenna gave an excellent lecture on "The Theory of

(Continued on Page 33.)



QUALITY PLUS VALUE

If cheapness were the only virtue of Philips' Valves, we would not recommend them or spend money in advertising them, as cheapness is too often attained at the expense of quality.

In all Philips' products quality is principal objective, and huge sums are spent annually in research work with the object of continually improving Philips' manufactures. Cheapness naturally follows, however, as the immense resources of the company, its efficient organisation, and huge output, reduce cost of production to a minimum.

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It matters not what circuit you use, there are Philips Valves to suit your needs. For detection, there is no valve to equal a DI or DIV—for amplification, try a DII, DV, or E—for portable sets, use a BII (dull emitter) or BVI (dull emitter tetrode). Numbers of users recommend BVI and DVI (bright tetrode) for unidyne work or in cases where a B battery is a difficulty.

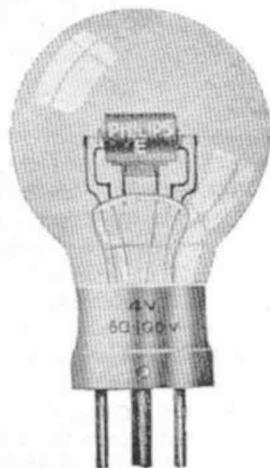
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The Amateur's Proficiency Certificate

By "WIRELESS WEEKLY."

(Continued.)

THOSE of our Readers who are following this series of articles, should now be well prepared to go a little farther. This week we intend to deal with Inductance and Self induction but before doing so, however, it is necessary to add a little to last week's article and explain the various measuring instruments as used for radio purposes.

The Voltmeter.

is an instrument used to measure the D.P. across two points, or across a battery. It is designed to take as small a current as possible, and has a high internal resistance. It is connected across the mains).

The Ammeter

is an instrument used to measure the current flowing in a circuit. (It is joined in series with the mains at any convenient point.) Its resistance must be as low as possible, so that there will be a very small voltage drop in it. There are three types of ammeters — moving coil, hot wire, and Thermo. Their respective uses are: moving coil, steady D.C. currents; hot wire and Thermo, alternating or oscillatory currents. The hot wire meter may also be used as an A.C. voltmeter when a high resistance is placed in series with it.

Fig. 1, shows how a voltmeter may be used to measure (1) the voltage applied to a bank of accumulators under charge or (2) the voltage of the accumulator, while the ammeter as shown measures the charging rate.

Inductance.

When a current of electricity flows along a wire, the surrounding aether is subjected to a magnetic strain; in other words, the wire is surrounded by magnetic lines in the form of concentric circles. There is a converse effect which we shall now proceed to study. If a wire is surrounded by aether in a magnetic state of strain, and that magnetic strain suddenly changes in value, electrons will flow along the wire and one end will momentarily be at a higher potential than the other end. A wire surrounded by magnetic lines of force or placed in a magnetic field of lines of force is said to be interlinked with the magnetic lines, so that we can describe the above phenomena in this way: If a wire is interlinked with a magnetic field, and the number of

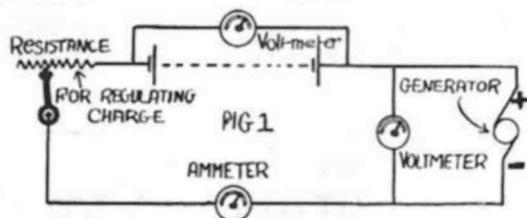
magnetic lines interlinked with the wire changes, a momentary difference of potential is set up between the two ends of the wire. See Fig. 2. Here the conductor A B is moved upwards or downwards through the magnetic field between the poles N. and S. Whenever it is moved, the lines of force linked by the whole circuit will be varied, an E.M.F. will be set up in it and current will flow.

The intensity of the E.M.F. induced depends on the rate of cutting of lines of force. That is, the greater the number of lines cut by a conductor in a given time, the greater will be the E.M.F. induced in the conductor.

Self Induction.

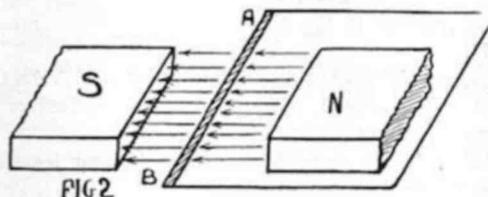
When a conductor is cut by its own lines of force, i.e., when the lines of force associated with its current vary in number due to the current changing in strength, then an E.M.F. will be induced in the conductor. Under any circumstances there are only two cases to be considered, (1) When current is increasing, and (2) when current is decreasing.

Consider a D.C. circuit or a portion of it consisting of a single conductor and let current be switched on. A short interval of time will elapse before the current attains its maximum and steady value, just as with all bodies it takes time to produce speed in them. In this interval of time in which the current and the lines of force are increasing in magnitude, the conductor will be cut by all the lines of force as they emanate from the centre of



the conductor and expand in the form of concentric circles in and around it. Thus the conductor will be cut at every instant in this space of time by an increasing number of lines of force, and an E.M.F. (varying in value from one instant to another) will be induced in it. This induced E.M.F. is termed the E.M.F. of self induction.

Lenz's law states that electro magnetically induced currents always have such a direction that the action of the magnetic fields set up by them tends to stop the motion that produces them. From Lenz's law we deduce that the induced E.M.F. will act in opposition to the E.M.F. applied to the circuit, and thus delay the growth of the current. When the current, however, reaches its maximum steady value, the lines of force cease to increase and lie steady



round the conductor, cutting it no longer; hence there will be no E.M.F. induced when the current is steady. When the circuit is broken by means of a switch, the current and the attendant lines of force take time to fall to zero value. The circuit is cut this time by the decreasing lines of force as they collapse inwards, hence an induced E.M.F. appears again. By Lenz's law the induced E.M.F. will oppose the cause producing it, hence it will oppose the decrease of current and flux. That is, its effect is to endeavour to keep the original current flowing. In consequence where the circuit is broken, a spark will appear which represents the endeavour of the original current to continue. The induced E.M.F. together with the applied E.M.F. act across the break or gap in the circuit, overcome the resistance of the air gap and cause a current in the form of a spark; i.e., a convection current, to flow across it. It lasts until the current flux and induced E.M.F. have died away.

To sum up: The effect of self induction only occurs when the current is changing—increasing or decreasing. The effect of self induction is always to oppose an increase or oppose a decrease in the current, that is, it always opposes a change in the direction or strength of the current.

These effects remind us exactly of those we are familiar with in the starting of a body from rest and in its change of motion. Consider a man wheeling a truck loaded with sand; he has to push against it, steadily, until its inertia or disinclination to move has been overcome. Once on the go, however, the work is much easier. When he wishes to stop it he has to pull against it just as hard as he had

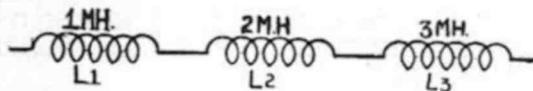


FIG 3

to push to start it. Similarly with the electric current: When the circuit is made, part of the applied voltage is employed in overcoming the E.M.F. of self induction and part in driving the current through the ohmic resistance. While the former lasts, energy is being given to the circuit and is stored up in the magnetic field; finally by the time that the current reaches its maximum value the induced E.M.F. has fallen to zero and the applied voltage is solely devoted to driving the current through the resistance. When the circuit is broken, the electrical inertia or inductance of the circuit objects to a decrease of current and before the current can be reduced or stopped this energy must be partly or wholly removed in the form of heat at the break of the circuit.

In D.C. circuits, the inductive effects are in operation only on switching on and off, or when changing the resistance and thereby the currents. In A.C. circuits in which the currents are continually changing in strength and direction, inductive effects are continually present.

What Inductance Depends On.

The Inductance of a length of wire depends upon the form it takes—how it is arranged or wound. If

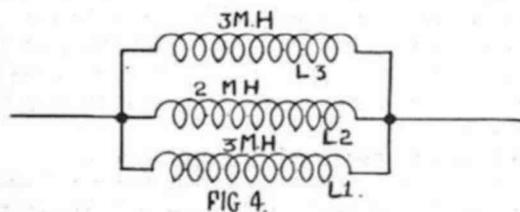


FIG 4.

left single so that lines of force from one part of it do not interlink with another part, its inductance will be small because the amount of cutting or linking must be small. If the wire is wound on the bight, viz., the wire carried back on itself, the magnetic field of one half will neutralize that of the other and the circuit will be non inductive. (Resistances for transmitting grid leaks are excellent wound in this way.) If the wire is wound singly in the form of a coil, the inductance is greatly increased as the flux of the turn not only interlinks with that turn, but with neighbouring turns, i.e., the amount of interlinking is greatly increased.

Again, in the case of a coil with an iron core, the iron has a multiplying effect on the flux and the interlinkages and inductance are increased to a still greater extent. The practical unit of Inductance is the henry. A coil has an inductance of one henry when, if the current through it changes at the rate of one amp per second, an E.M.F. of one volt is induced. Various subdivisions of the henry are used. The millihenry is a thousandth of a henry. The

Microhenry or Mic. is a millionth of a henry.

Various Forms of Inductance.

There are several kinds of inductances used for radio purposes.

(1) The inductance used in a valve transmitting circuit, usually called a choke. The duty of this inductance is to cut out the ripples of current caused by the making and breaking of the segments of the commutator. It has an inductive value of between 2 and 3 henries and is fitted with an iron core.

(2) Inductances of a very small value, having very low resistance and very large current carrying capacity, such as the Helix of a valve transmitter.

(3) Inductances of large value of low resistance and fairly low insulation between turns. Such are the inductances used in receiving circuits.

(4) Variometer Inductances. A variometer inductance is composed of two coils joined in series. One is fixed and the other can be rotated inside the fixed one. When in one position the direction of the windings of the two coils is such that the field produced by one annuls nearly all the field of the other and the inductance of the two coils is a minimum. When the moving coil is rotated through 180 deg. from this position the fields produced by these two coils assist one another and the total inductance of the two coils is a maximum. Thus a variometer affords a very delicate variation of inductance.

Inductances in Series and Parallel.

If two or more inductances are joined in series, as in Fig. 3, their total inductance is found by adding their several inductances together.
Total Inductance = 1 + 2 + 3 = 6 microhenries.

If they are joined in parallel as in Fig. 4, the joint in opposing the rise or fall of current is decreased in exactly the same way that the joint resistance of several resistances in parallel is decreased. (See back article on Resistances in Parallel).

Formula for Inductances in parallel is

$$\text{Inductance} = \frac{1}{\frac{1}{L_1} + \frac{1}{L_2} + \frac{1}{L_3}}$$

$$\frac{1}{L} = \frac{1}{6} + \frac{1}{3} + \frac{1}{2} = \frac{11}{6}$$

$$\therefore L \text{ or Inductance} = \frac{6}{11} = .545 \text{ m.h.}$$

Readers' attention is particularly drawn to the similarity of Inductances and Resistances in series and parallel. Note, when resistances and inductances are placed in parallel, their total resistance or inductance will be less than the smallest resistance or in-

ductance used. When resistances or inductances are placed in series, their total effective resistance or inductance can be found by adding their several resistances or inductances together.

Questions Based on the Above Article.

- (1) Explain the use of the Voltmeter and state why it is connected across the mains.
- (2) Explain the use of the ammeter and state why it is joined in series with the mains.
- (3) Where is the Thermo or hot wire ammeter used?
- (4) Explain what you know about self induction.
- (5) How would you wind a non inductive resistance?
- (6) What is the effect of placing an iron core inside a coil.

SHORT AND SNAPPY.

Among the qualities possessed by the publicity manager of KGO, the friendly station across the Pacific is not that of ultra conservatism. Periodically we receive from him a sheaf of interesting matter couched in quite original style.

Here is a sample:—

"Dear Editor,—The announcement sent you last week concerning the church service to be broadcast on—was incorrect. Please kill it."

And a press release which tells its own pathetic story as follows:—

"Disqualified from speaking over radio KGO because his false teeth made too much noise for the sensitive microphone to ignore, Fred Mantle, San Francisco landscape gardener, is to-day considering a silencing grid to be used between the plates.

KGO control room operators declared the noise of Fred's mouth crockery sounded like defects in their broadcasting machinery for changing words and music into electrical currents of varying intensities."

AUSTRALIAN GENERAL ELECTRIC CO., LTD.

Branch Office at Adelaide.

It should be understood that Messrs. Chas. Atkins and Co., Ltd., of Currie Street, Adelaide, are no longer handling G.E. or B.T.H. products in South Australia. All future business transactions in this field will be conducted by the branch office of the Australian General Electric Co., Ltd., 25/27 Grenfell Street, Adelaide.

The Resistoflex Receiver

By Insulator.

REPEATED requests from readers of this paper for particulars of this interesting receiver prompted me to build it and write the details for Wireless Weekly. Well I've done so, and I certainly am pleased to give the instructions necessary to build a Resistoflex using two valves.

To John Scott Taggart belongs the credit of producing this set, and he certainly deserves quite a deal of credit as I, at the moment, am listening to a church service being punched out on a loud speaker quite loudly, considering only two valves are used. The volume I should say is a bit better than two valves of a straight out circuit but not quite so loud as a three valve P1.

Even if the results were only equal to two valves straight out, this form of receiver is to be recommended on account of the low cost of constructing. Not one low frequency transformer is used, the method of coupling being by resistances. Readers will remember that a fortnight ago I described a Distortionless Amplifier, the second valve of which was coupled by the resistance method. Sweetness was the keynote of that amplifier and all reports to hand at the moment have borne out my claims in this respect.

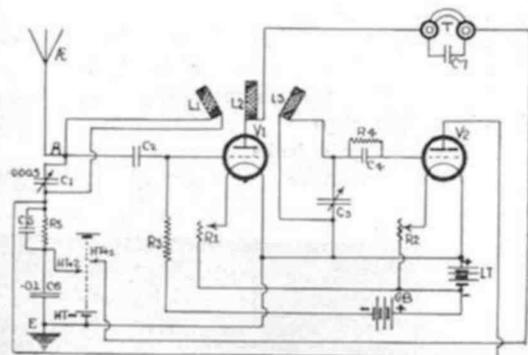
This week's receiver again will be found very sweet and clear. Mind you, please don't think I am laying the blame for any, or all of the distortion (which may creep into the average wireless set) on the audio transformer. Very often the operator through bad handling causes distortion. Again sometimes the B battery will cause this, particularly when it is old and dying of senile decay.

I've seen B batteries being used which should have been buried weeks before and the owner of the set surprised to note the different results obtained when new B batteries were substituted. A high value fixed condenser often soothes a noisy crackly B battery. In this week's receiver one of the order of .01 mfd. is used although it is not critical in value.

But I am wondering—I am inclined to do that when I am light hearted and pleased with my day's work. The week end is often a trial to me, a mystery in fact—I never know what Sunday night will bring forth, as often the set I set out to build does not come up to expectations and then the fun begins.

However, although only employing two valves, this set, being a reflex set, yields the results of one radio, detector, and one audio. It will be noticed that the first valve acts firstly as a radio frequency amplifier, the second detects, and the rectified impulses are fed back through a resistance (R5) in the grid circuit of the first valve and thereby amplified at audio frequency. Many people don't like the ST100 reflex set on account of the crystal detector. This circuit with a valve detector may interest them although, mark you, it doesn't produce the volume of the ST100.

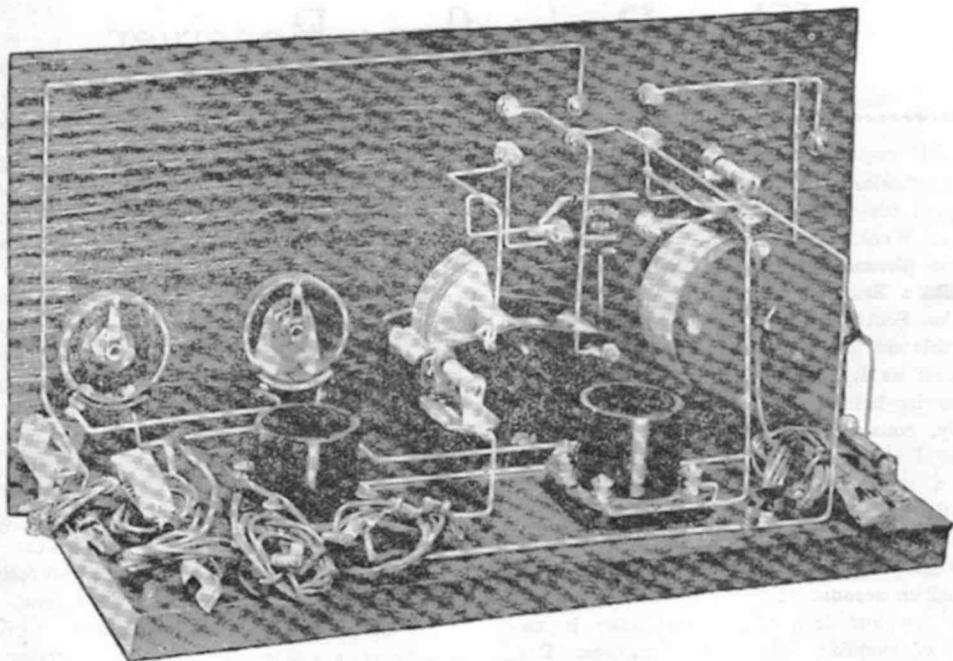
The Tri-coil system of tuning employed in this set I must say appeals to me. It is certainly selective and very critical of adjustment. When first hooked on to the aerial some difficulty was experienced in controlling oscillations, but, I very quickly got "the hang" of it and by correctly juggling the coils and condensers and reversing the direction of the aerial coil the set settled down. Varying



values of resistances were tried and results noted. Up to the moment I haven't had an opportunity of trying out for distance but I feel sure this receiver will respond on account of the liveliness in its being.

Still the actual making concerns us. Out of the week-end parcel I opened the following:

- 1 Bakelite panel 15 x 7½ x 3/16
- 2 Movable coupling plugs
- 1 Fixed coupling plug
- 2 .0005 variable condensers
- 2 rheostats
- 2 sockets, (Table mounting)
- 2 terminals

*Back Panel View.*

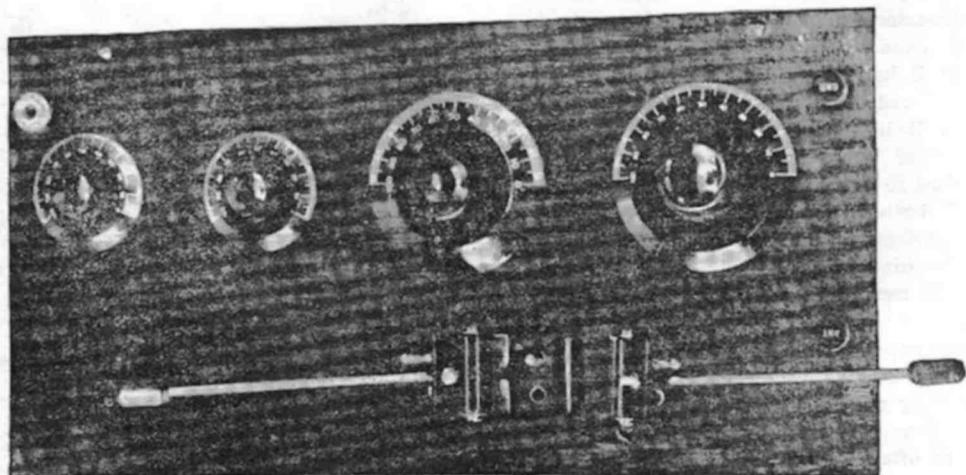
- 1 single circuit jack
- 1 .0003 fixed condenser
- 2 .00025 fixed condensers (with clips)
- 1 .01 or .006 fixed condenser
- 5 grid leak clips
- 2 2-megohm grid leaks
- 1 100,000 resistance

1 baseboard 14 x 7 x $\frac{1}{2}$

8 Busbars, screws etc., Flex, clips.

Having perused this list now look at the front view for the panel layout.

The variable condensers and rheostats are on the same level, exactly 2 $\frac{1}{2}$ inches from the bottom. Reading from left to right these are the distances be-

*Front Panel View.*

ABOVE ALL — SOUTHERN CROSS.

tween each item. From edge to 1st condenser $2\frac{1}{2}$ inches; from there to next condenser $4\frac{1}{2}$; thence 3 inches to first rheostat which is 3 inches away from its neighbour. Between, yet above the two condenser dials, may be seen the fixed coupling plug with a movable coupling plug $1\frac{1}{2}$ inches away on each side. The top hole of the fixed plug is exactly $1\frac{1}{2}$ inches from the top of the panel. The distances given are to the centre of the spindle holes. Different brands of variable condensers will supply a template for other holes necessary for fixing.

Drill all the required holes and mount up your components, keeping a careful track on all small screws and nuts dissembled for this purpose. This saves time in the long run. Screw your panel to the baseboard and screw down your valve sockets; one behind the second variable condenser and the other behind the first rheostat. On the edge near the first variable condenser attach two grid leak clips: (see back of panel view). Now you are ready for wiring. Personally, to simplify matters I made use of a grid leak clip to attach direct to the movable plates of C1, the fixed condenser C5 with the clips at take R5 and also a similar clip from the fixed plates of the same condenser for fixed condenser C2. In a similar fashion, one spindle of the fixed plates of the same condenser for fixed condenser C4 and 2 megohm leak R4. You no doubt will be able to do likewise with your parts. Pause for a moment and you will see just how to do this.

Using square busbar proceed with the rest of the wiring. From the top of the aerial coil, L1, to aerial terminal A, thence to the fixed plates of C1 to which there is attached the fixed condenser C2. From the other side of C2 to one side of the grid leak clips on the baseboard, thence on to the grid of the first valve socket. The bottom of L1 to the movable plates of C1, thence to P of the second valve socket. The movable plates support C5 and R5 the other side of which take, via the .01 condenser, to the bottom side of L3. From here a lead is taken to the movable plates of C3. The fixed plates of C3 are joined to the top of L3. The fixed plates of C3 support C4 and R4, the other side of which is connected to G of the second valve socket. From E a busbar is taken to F + on the first valve socket which in turn, is connected with F + of the second valve socket. The bottom of L3 is also taken to this earth lead. The F - terminals of the valve sockets are taken to one side of the respective rheostats, the remaining terminals of which are joined together. The bottom of the middle coil (L2) is connected to P of the first valve socket while the top of this coil is joined to one lead of

the phone jack. The busbar wiring of this week's set is now finished; all that remains to do is to connect short lengths of flex for the battery connections. Two flexible connections are taken from the F + of the second valve socket, one for A + and one for H.T. negative.

Two more flexibles are taken from the busbar joining the two rheostats, in this case one for the filament minus and one for the grid bias positive. The grid bias minus or negative is taken from the unconnected end of the resistance on the baseboard. The H.T. + No. 1 lead is soldered to the remaining side of the phone jack while the H.T. + No. 2 is soldered to the right hand side of the .01 fixed condenser, that is, the outside lead of C5. All the B battery leads are now connected and may be completed by adding a small battery clip to each flexible lead. Coils I used for broadcasting stations are

Station	L1	L2	L3
2BL	35	50	50
2FC	150	150	150 or 100

While these were the values I used they were found to be critical, so try varying values. Should severe oscillations take place and the loosening of the coil coupling not stop this, reverse the leads to the aerial coil L1. The coupling is very critical as are the rheostats of both valves, so be careful.

Another good feature is that by turning the rheostat of the second valve off, the set will function as a straight out single valver. This is a remarkably good feature—one well worthy of approbation.

A MAKESHIFT EARTH.

IT happens sometimes when one is testing out a set away from home that though there is no great difficulty in rigging up an aerial a suitable earth cannot be found. After all, any piece of wire suspended almost anywhere will make an aerial, so long as it is pretty well insulated from its supports, but unless there is a handy water pipe the earth is not quite so easy. Here is a tip which the writer has found most useful on occasions. Take a coil of flex or other covered wire and throw it anywhere on the floor near the set. Then bare one end and attach to the earth terminal. In a recent test made in a reputed blind spot in the west country, there was very little to choose between the coil of wire and a roughly-made earth, made by burying a large sheet of metal, which was rigged up a day or two later. The coil of wire acts probably in much the same way as a counterpoise.

THE NEUTRODYNE

By "POLDHU."

WITH the advent of broadcasting and amateur transmission on short wavelengths, the time seems opportune for a short account of the neutrodyne principle of reception. The latest tendency is for more transmission on short waves, and my experiences with the neutrodyne indicate that a very great measure of success can be obtained when using this principle on short waves. Although many schemes were tried over a period of five months' intensive experimenting, introducing much laborious calculating, no satisfactory method of increasing the band of wavelength was adopted, and it was found that, for all practical purposes, the neutrodyne functioned at its best for wavelengths shorter than 500 metres. No principle of reception has ever given me the same satisfaction as the neutrodyne—that is, on its own wavelength—and I can readily recommend the construction of a three or four valve reflex neutrodyne for those who desire a good strong set. The component parts necessary for this set are:—

- 6 Spiderweb formers and plugs.
- 1 Variometer.
- 2 Neutrocondensers.
- 3 .0005 mf. variable condensers.
- 2 Audio transformers.
- 1 Grid leak and condenser.
- 2 Telephone jacks.
- 4 Rheostats.
- 7 Terminals.
- 1 Piece bakelite, 20in. x 7½in.
- 1 Baseboard, 20in. x 10in. x 1in.

The underlying principle is briefly sketched out thus: You are quite familiar by now with the Howling valve. In a regenerative valve set the signal strength increases right up to the point at which the circuit oscillates. During the oscillation the music is distorted, and very likely the radiation from your aerial will disturb sets in the immediate vicinity. Suppose, however, that it were possible to continue the regeneration without allowing the circuit to oscillate, it should be possible to further increase the signal strength to the utmost value of the valve. Now, the valve has its own capacitance, and this, of course, is one factor in causing the circuit to oscillate. If an equal value in capacitance were introduced into the circuit it would be possible to neutralise the capacitance of the valve and thus allow an increase in regeneration without any oscil-

lations of a disturbing nature being set up. This is exactly what the neutrodyne claims to do.

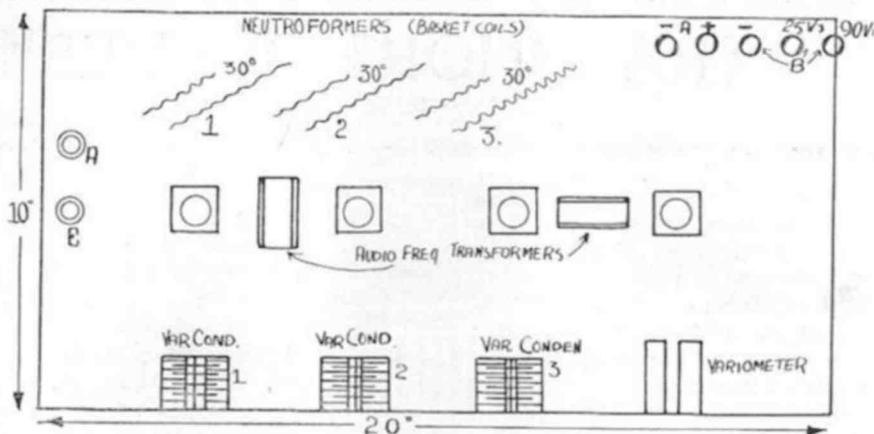
Thus the neutrodyne condensers are the very heart of the circuit. The capacitance of the average valve is very small, and thus the neutrocondensers must have a small value and are constructed in a special way.

The diagram explains the construction. A couple of pieces of copper wire, No. 12 gauge, are filed square; over this fits a piece of glass tubing, and over all a sleeve of brass which can be moved along the glass tubing. The distance between the copper wire will be obtained by experiment, but will be in the vicinity of 1/4in. When the set has been assembled, the first valve, while still in its socket, may be turned out and the signals will be received faintly on the remaining valves, the turned out valve acting merely as a capacitance. Then adjust the copper wires and the brass sleeve of the first neutrocondenser until the signals received are faintest. Then turn out the second valve and turn on the first, and repeat the performance. The adjustments are thus made, and the brass tube may be fixed with a piece of sealing wax to prevent it moving, and the neutrocondensers are complete.

In place of the old-fashioned neutroformers, use basket or spider web coils. These have the great advantage of being interchangeable, thus increasing very considerably the wavelength range and flexibility of the set, and thereby the utility. For wavelengths from 150 metres to 550 metres it will be necessary to use three sets of coils, each set having

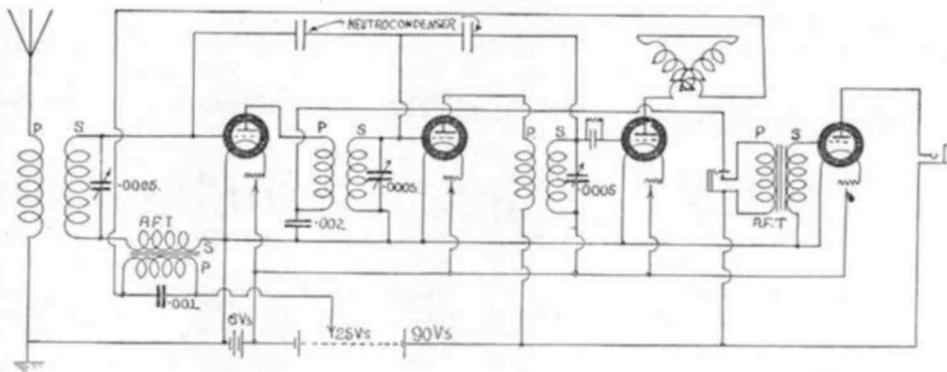


one 10 turn and one 45 turn. Coils for shorter wavelengths may be used, provided a ratio of 4—1 or 5—1 is maintained. It will be seen that the ratio of amplification is from four or five to one for each stage, which is a considerable increase over the usual radio frequency amplification ratio. In order to overcome the undesirable effect of inductive coupling between stages, it will be necessary to mount the plugs for the coils at an angle of 30 deg. to the back edge of the baseboard.



For best work the reflex circuit, though perhaps a little more difficult to construct and adjust is to be recommended. No difficulty should, however, be experienced in following the circuit diagram. Two jacks are needed, one coming from the first audio and the other from the second. In most circuits

The general layout of the set is quite simple and the receiver will operate as soon as the last wire has been connected. Space the transformers—neutro and audio—as far apart as possible. I will make no excessive promise as to what the set will do. It is an excellent circuit for short waves and



the coarse adjustments are made in the primary circuit. In the neutrodyne, however, the third condenser gives the broadest tuning and the final adjustments are made in the aerial tuning circuit. Once a station has been picked up, the dial settings can be noted and since they are the same in each condenser, no trouble will be anticipated in picking up the same station again. The valves used may be 201A though dry cell tubes should operate successfully.

when I constructed my set, some two years ago, there were only two amateurs whose transmission was good enough to stand both stages of audio amplification. The main test, however, is clarity, and since only one stage of amplification is usually necessary, distortion on this account may be reduced to a minimum. I would advise all experimenters to give the neutrodyne another trial and can heartily recommend the reflex circuit to all listeners in who want an efficient circuit.

ULTRA SHORT WAVES

By "Mu"

THE use of ultra short waves which is now enjoying great popularity with scientific experimenters in other parts of the world, is not so much a new development as a resurrection of past achievement.

Hertz and the other early pioneers confined their activities to the use of waves of less than one meter in length. The use of longer waves was due largely to the experiments of Marconi. He found that with longer waves greater power could be used and the effects produced by the waves at a distance increased with their length.

Some of these conclusions we now know to be at least partially inaccurate, as has been proved by the results obtained by the results of local short wave transmission. It seems probable that closer study of the ultra short waves, from 10 metres to 1 metre or less, will be responsible for vast improvements in the art. The modern experimenter starts with an incalculable advantage over the earlier workers both in knowledge and apparatus. At the time Hertz was experimenting very little was known about radio waves, their properties were but dimly guessed at, and their possibilities were utterly unrealised.

The only known method of producing them was the plain spark coil and the only method of detecting them was by watching sparks jumping a similar but smaller gap. Even such crude devices as the co-hearer and crystal detector were unknown. Considering the lack of information and the crudeness of the apparatus available it is remarkable that any progress was made. Contrast the state of these pioneers with that of the present experimenter with his oscillating valves, crystal and heterodyne detectors, his thermo galvanometers and thousands of other devices of high sensitivity and precision.

The modern experimenter has untold advantages and the field of investigation remains still untouched since the days of the early pioneers. The actual work of constructing and using apparatus on these short waves does not call for any more skill than ordinary reception. The apparatus used is simple and cheap in the extreme, while the possibilities are unlimited. The rediscovery of these short waves is the chance of a lifetime. Never again is the average experimenter, who suffers as a rule from a small pocket book and a lack of deep technical knowledge, likely to have such a golden opportunity to make investigations of real commercial and scienti-

fic value. In America, France and England, experimenters are realising this fact. Australasian experimenters must wake up and get busy NOW or they will be left out of the honours list.

Before starting to experiment, decide on the problem to be investigated, map out a plan of campaign, build the necessary gear and get busy.

The main things necessary for success are to stick as closely as possible to the plan of campaign and take detailed notes of all experiments. Casual experiments, while possibly interesting, are in themselves of little value and seldom lead to results of value.

The following are known uses of the ultra short waves and suggested new applications which should be sufficient to stir the imagination of all experimenters and result in action.

One of the earliest applications of the ultra short waves was their use as an absolute standard of wavelength in the calibration of wavemeters and kindred apparatus. Their application to the "Beam" system of transmission is well known but the system is still far from perfect and improvements can only be made through experimentation. For portable or military use these waves seem particularly adapted as the efficiency of radiation is high, the tuning sharp, and the necessity for large apparatus and aeriels is obviated. It remains only to improve the apparatus used and increase the amount of power that can be used in it. These again are purely experimental problems and should particularly appeal to those experimenters who keep their five watters red hot with point double to something of a watt going through them.

Examination of the position of these waves in the spectrum of all forms of radiant energy shows that the shortest of them join up with the infra red rays. From this it might be expected that their properties would be somewhat different to those of the longer waves. It might be possible by their aid to produce some form of death dealing ray such as Gridell Mathews claims to have discovered. On the other hand they may possess properties of great medicinal value such as the ultra violet and X rays possess. In fact experiments indicate that they are capable of curing cancer in plants. The properties of these waves have never been fully examined and their effects have never been systematically studied. Experimenters who have encountered the effects of

"Fading" or the puzzling "Night effect" which renders wireless direction finders temporarily inoperative realise how little is known about these phenomena and also the value of any experiments which would increase our knowledge of them. It is well known that such effects are most troublesome when the distance travelled by the waves is great compared to their length. By the use of these ultra-short waves it is possible to keep the ratio of distance to wavelength unaltered while reducing the distance to such an extent that the complete path

of the waves may be observed for possible causes of the trouble.

An additional advantage lies in the fact that these waves are much more readily affected in this way than those ordinarily employed.

Apart from these possibilities the experiments that may be performed with these waves are the most entertaining and instructive that I have encountered in ten years of experimenting and commercial work.

Interstate Notes

SOUTH AUSTRALIA.

Considerable dissatisfaction is still being expressed locally in the present service from 5CL, the "A" class station, and it is hoped that before long something better will be offered the public.

5DON N.

5DN is too well known throughout the Commonwealth to need any further introduction, their transmissions are perfect and their studio concerts every Thursday evening are looked forward to eagerly by the many listeners-in in this and other states.

The writer noticed a letter from a Victorian reader of Wireless Weekly in the 27th March issue, where it was suggested that most amateur transmitters and broadcast station engineers should occasionally listen to 5Don N, as the quality of transmissions from this station is something which the owners should be proud of, and that this station might well be taken as a model by experimenters and other broadcasting stations. There is no doubt that the quality of the transmissions from this station is unequalled by any of the other Australian broadcasting stations.

The transmitting set used at this station was built by Mr. L. C. Jones, who gained his knowledge of radio transmitters while carrying on as an experimenter. Mr. Jones was well-known as the owner of station 5BQ which used to be heard at great strength in all other states.

5Don N is gradually increasing his power and will eventually reach 500 watts which is the power allotted to a "B" class station.

Mrs. Hume, who for sometime past has been doing the announcing for this station, is becoming quite famous, and is quite skilled in the operation of the station. At last Thursday evening's studio concert Mrs. Hume, who was in sole charge, told the bed-time story for the children, arranged the items,

and attended to the amplifier, adjusting it to suit the different voices and instruments played.

The station is now working on Wednesdays, Thursdays, and Saturdays. The broadcasting of the Wednesday and Saturday concerts from the main hall at the All-Australian Exhibition is proving a great success, and is being greatly appreciated by listeners-in, particularly those living outside of the Metropolitan area. The concert last Wednesday evening was particularly fine, the music coming through beautifully.

5Don N has arranged with Mr. Thomas Grigg, the prominent violinist, for his orchestra to give a concert some Sunday afternoon in the near future. This will be a musical treat, and listeners-in would do well to keep a look out for the concert.

A Popular Soprano.

The Victorian correspondent asked who was the soprano singer who has been heard from 5CL lately with such telling effect. The singer is probably Mrs. Keith Steward, who has been heard a number of times from this station recently. Mrs. Steward is the possessor of a very fine soprano voice, and her songs are much appreciated among the listeners-in here.

The American 100 Metre Test.

Judging by the number of canaries whistling around on Sunday morning, quite a small army of experimenters and listeners-in were endeavouring to raise W.G.Y. (the station of the General Electric

Telephone B 5925

CHARLES D. MACLURCAN
Consulting Radio Engineer

Pratten Building,
26 Jamieson Street,
SYDNEY

Company of Schenectady, U.S.A.) who was broadcasting a test programme on 100 metres. So far the writer has not heard of anyone successful in picking up the transmission. Two different local newspapers gave different times for the test, so that probably many of us were listening at the wrong time.

Among the Experimenters.

Things have been very quiet down among the short waves during the past few weeks. 2YG on phone has been heard lately, his modulation being very good. 6AG has also been heard on CW again after having a spell from the ether. 2CM, 2BK, 2GC, 2DE, 2DS, 3ZA, 3BS, 3YX, 3AY, 3DX, 3XA, 3TM, 3EF, and 3SW have been heard during the last fortnight.

Mr. Buckerfield has been confined to his bed for some time past and so has not been able to get on the job. He is now well on the way to recovery, and will no doubt be heard again very soon.

5RG, Mr. Reg Gruner, has been heard with some punch, and should be able to make himself heard in the other states.

A new license has been issued. This is 5BT, Messrs. Kauper, Williamson and Austin, three well known experimenters who have combined and are now known as The Big Three. Those who know these three experimenters will expect to hear something extra from them as each of them individually has in the past shown ability in the handling of transmitters.

AMERICAN BROADCASTING TESTS.

ON a 5-Valve standard A.131 Western Electric set Mr. O. G. Chapman, of Wyong, New South Wales, clearly heard station K.F.I. Los Angeles on the night of April 16th. The following announcement was reproduced very distinctly—"Station K.F.I. Los Angeles, California, broadcasting to Australia. The next item will be a pianoforte selection played by the announcer of W.R.C."

In addition to this, Mr. Chapman heard two choruses, a soprano solo with banjo accompaniment and finally "God Save the King," all from station K.F.I.

On the same evening he listened-in to a bugle item from W.O.C., Davenport, Iowa.

At Collaroy, near Sydney, Mr. F. V. Hilliard successfully received broadcasting from K.F.I. on a home assembly set using four Weeco valves.

The Art of Big Demonstration

DURING Show week tens of thousands of radio enthusiasts and the public in general listened during broadcasting hours to the twenty-four loud speakers, used by the United Distributors Limited in their display.

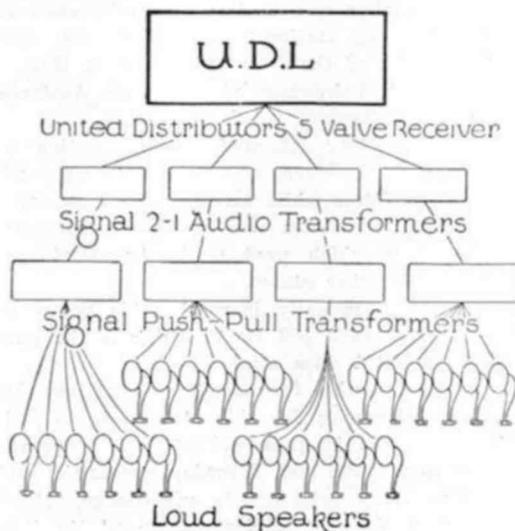
Experimenters will be interested to know how the display was carried out.

The signals were picked up on a United Distributor's 5 valve set, and divided into four by means of signal 2-1 audio transformers. Each transformer supplied a six valve power amplifier using "Signal" push-pull transformers, until sufficient volume was obtained to operate six loud speakers each. Despite the tremendous amplification required, the signals were remarkably free from distortion owing to the careful planning of the circuit so as not to overload any one valve or speaker. The diagram will make the layout clear.

A total of thirty to thirty six valves were used, according to conditions, and from twenty to thirty loud speakers. This is the largest number of loud speakers ever controlled by one detector valve on one set in Australia, and as far as is known, anywhere in the world.

Mr. E. S. Beard, Chief Radio Engineer of United Distributors Limited, is responsible for this remarkable achievement.

Despite the rain, Melbourne was received on several occasions, and the only difficulty experienced was due to the rain wetting the wires which lead to the loud speakers.



RADIO TRANSMISSIONS FROM U.S.A.

It will no doubt, be of considerable interest to your many readers to know that of the seven radio transmitting stations which were transmitting specially to Australia on April 16th, six of them were of Western Electric manufacture. These are as follows:—

W.A.H.G. Operated by A. H. Grobe, Inc., Richmond, New York

W.L.W. Operated by the Crossley Manufacturing Company, Cincinnati, Ohio

W.O.R. Operated by L. Bamberger and Company, Newark, N.J.

W.O.C. Operated by Palmer School of Chiro, Davenport.

W.M.A.G. Operated by Chicago Daily News

K.F.I. Operated by Los Angeles "Herald" and "Examiner."

The remaining station, W.C.C.O., may possibly be Western Electric as there is a Western Electric transmitting station in Minneapolis but unfortunately a record of the call sign is not available.

**CALIFORNIA RADIO AMATEUR GETS 1924
HOOVER CUP.**

THE highest honor in amateur radio, the 1924 Hoover Cup, has been awarded to a California radio man, B. Molinari, of 653 Union Street, San Francisco, it was announced lately by the American Radio Relay League special committee. The cup is given annually by Secretary Hoover to the operator of the best amateur radio station in the United States in which the bulk of the apparatus is the handiwork of the operator himself. The 1924 cup is the last of the Department of Commerce trophies now authorized.

The station for which the award is made, 6AWT, has been unusually efficient in communication with foreign countries, its signals have been reported by amateurs in Asia, Australasia, South Sea Islands, Europe, Africa, South America, Central America, and Danish America. 6AWT was one of the seven stations selected by the A.R.R.L. to transmit press reports to Captain Donald B. MacMillan in the Arctic. In addition to this country and Canada, the station has been in two-way communication with New Zealand, Australia, Asia and other countries.

In submitting a record of his apparatus in connection with the award, Molinari included a complete log of the station's operation from January 1 to December 31, 1924. This showed that the station had been used consistently during the entire period and that an average of about forty messages per month had been handled, all of these having been

delivered to destination. A letter from D. B. McGown, radio supervisor for the sixth district, stated that 6AWT had been operated according to regulations.

The station uses the familiar Hartley circuit for the transmitter which employs one 250 watt tube. The receiver is of the conventional amateur low loss type, the tuning of which is accomplished by a glass insulated condenser across the low loss secondary coil. The antenna is a semi-vertical parachute type, 15 feet long, and 80 feet high at the free end. The counterpoise is a nine wire fan-shaped affair 40 feet in length.

YOUR RECEIVER DESERVES GOOD TUBES.

Your radio set is not better than its tubes—for volume and beauty of tone reproduction you must rely on them.

Dr. Lee De Forest, the inventor of the three-electrode vacuum tube has spent many years in research work with the object of increasing the efficiency of radio valves. The result is the De Forest tubes which give surprising volume and beauty of tone. They are economical in the fact that they use very little current. There are two main types of De Forest receiving tubes: The DV3 for which dry batteries are used and which is particularly adapted for use in portable sets such as on camping trips and in other places where there is no electric power. Designed for use with storage batteries, there is the De Forest DV2 and this type of tube may be operated in practically every circuit in use at the present time. The feature of De Forest tubes is that they are inspected throughout, during, and after production, and are thoroughly tested. They are packed in individual cartons containing the instructions for proper operation and connection.

**THE WIRELESS WEEKLY SIMPLE
TRANSMITTER.**

The proof of the pudding is in the eating. In Wireless Weekly, March 27th, we described the construction of a Simple Five Watt Transmitter. Mr. Hobler, of Rockhampton reports that he received good phone transmission from such a transmitter at just on 800 miles.

At Lake Cowal, N.S.W., Mr. Les Wilson (2LM) constructed a transmitter along exactly the same lines as the W.W. set and tried it out recently with splendid results. 2DG, at Kyogle, 700 miles away reported C.W. signals at good strength on 2 valves. Another report from Woonona, 250 miles, mentioned—"transmission is the goods, fone comes through lovely—modulation as steady as a rock."

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MODEL AR102.

This little instrument is the very latest in Loud Speakers, and is now being marketed for the first time. It has been perfected after many years of experiment and research on the part of Wireless experts, and is an absolute revelation in the purity of tone. Although astonishingly small and compact, the results to be obtained from it are as near perfection as it is possible to reach at the present stage of scientific progress.

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Another shipment just arrived of the famous Supersensitive Tungstalite and Russell's Hertzite, English Guaranteed Crystals. 1/6 each.

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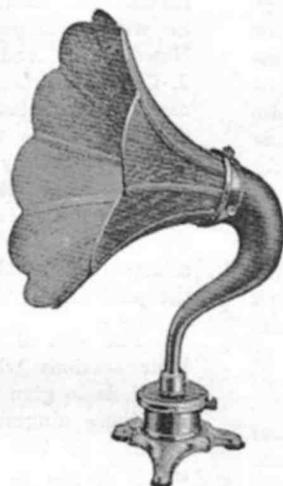
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New Junior De Luxe, AR114	5	5	0
Standard Dragon, AR19	8	0	0
Music Master, AR15	9	0	0

Sterling Dinkie	£2	17	6
Sterling Junior	4	15	0
Sterling Audiovox	9	0	0
Western Electric, £2/19/6, £7/2/6,	16	0	0
Magnavox M4	8	0	0
T.M.C.	8	0	0

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Radio Voice Competition

THE radio voice competition conducted by the "Evening News" in conjunction with 2FC station—Farmer & Co. Ltd.—has created intense interest in musical circles. A record number of entries were received—1030 in all—from amateur singers. The conditions excluded professional singers and those who had previously received a fee for broadcasting, which necessarily eliminated the number, but the entries exceeded even the most optimistic forecast. The search for the ideal radio voice, and the preliminary tests to reduce this huge number of entries is carried out best suitable to the discovery of this estimable quality, that is, a voice that records with clearness and sweetness. The adjudicator, Mr. Gustave Slapoffski, is the veteran of many Eisteddfods in Australia, and his qualifications are undoubted. A visit to Farmer's studios during the period of one of these tests shows a crowd of 15 to 20 competitors waiting for their number to be called. The adjudicator is seated in a room removed from the studios where he listens in to every item with headphones. A buzzer is attached to the desk so that he can communicate with the studios to ring off the competitor when he has heard sufficient. The number of each competitor and the song that is being sung is given out by the announcer, Mr. Ewart Chapple, and this is the only indication the adjudicator has of the singer. Sometimes a few bars only are required to satisfy Mr. Slapoffski, in other cases a verse, or the whole song is necessary. It does not mean, of course, that if only a few bars are heard the voice is not good. Sometimes the reception of the first few notes is sufficient to warrant passing on to the next one. The elimination of the 1030 competitors to 80 semi-finalists is being carried over a series of fifteen-minute tests during the day. The arrangements are carried out in a most satisfactory manner, there is no delay and each competitor has had several days' notice when they will be required for trials. By Wednesday, 29th, the first test will be completed, and the 80 semi-finalists will then be gone through again. In this case the treatment is different.

They are divided into six lots and will be taken at the rate of fourteen a day, commencing on Thursday, 30th April, and again on Friday, 1st May; Monday, 4th; Tuesday, 5th; Wednesday, 6th, and Thursday 7th. These singers will be heard over

the air and transmissions taken between 12 noon and 2 p.m. They will sing their competition song in the first instance and one of their own choice in the second instance. They will still be known by numbers and the adjudicator will commence his further elimination to 16 finalists. In this test he will be helped by the editor of the "Evening News"; Mr. Andrew McCunn, musical director of J. C. Williamson, Ltd., and Mr. W. Ferguson, local manager for Messrs. Allen & Co. The names of the 16 finalists will be published in the "Evening News" on Friday, 8th May. The nights on which the public are asked to judge are: Friday, 8th May; Sunday, 10th; Tuesday, 12th, and Thursday, 14th. On each of these alternate nights four of the finalists will be taken, they will then be known to the public by their name and the voting take place.

The idea of the preliminary tests at the lunch hour sessions when the 80 semi-finalists will be heard, is to give the public an opportunity of hearing these singers and judge the quality of their voices. Listening in posts are being arranged at the principal radio dealers in Sydney, and several convenient halls are being secured for the purpose of allowing lunch-hour enthusiasts to attend and prepare for the final voting. The total prize money for the competition is £175, £100 of which goes to the successful 16 finalists, £55 to the public, and £20 to the teachers of the first lady and first gentleman who are adjudged winners by the public.

In the first instance the Tivoli Theatre offer one week's engagement to the successful lady and gentleman at £15 per week, with the option of further appearances. Farmer's have the option to engage any of the 16 finalists at their studios for two months from the conclusion of the competition, paying them fees for their appearances.

Full particulars are obtainable from Farmer & Co. Ltd., or are published daily in the "Evening News."

FOR SALE.—5BG REFLEX SET. Polished Rosewood Cabinet 201A's, Large Columbia Batteries, CAV Accumulator and Case. All 8 weeks old. Exhibition any night. £20. Apply No. 96, "Wireless Weekly."

The Wavemeter

(By F. Basil Cooke, F.R.A.S.)

THE progress of wireless is so rapid that one is tempted to believe almost anything. Only two years ago the idea of Australia hearing American broadcasting would have been considered impossible; to-day it is an accomplished fact.

When KDKA tried the first test with Australia some few months ago, there was a lot of interference, not only from static, but from howling valves, while the recent test last Saturday was almost free from this trouble. The reason was that all those who know they could hear this station also knew the setting for his wavelength, and consequently no vain searching attended by howling valves.

As a striking contrast, we have only to remember the chaos of two nights before when the big test was on.

From the above it becomes obvious that if one could conveniently set his receiver accurately to the wavelength of the expected station, much disappointment could be obviated and interference with other listeners could be saved.

The heterodyne wavemeter is naturally the solution of these troubles. The name heterodyne is chosen, as the use of the instrument depends for its action on the well-known heterodyne principle. The user sets the wavemeter to the desired wavelength, then re-tunes his receiving set until he hears the note from his wavemeter. As soon as this happens his set is now tuned to this wavelength, and consequently he is set for the distant station.

There are many different uses to which the wavemeter can be applied. For example, one often desires to know for future reference the wavelength of some station heard. This is easily accomplished, as one now leaves the receiver at the same setting on which the station is heard and moves the wavemeter dial until its note is heard in the receiving set. The wavelength of the wavemeter is now naturally the same as that of the station. The writer has found a very interesting and useful game along these lines. Whenever a station is heard it is written down, and its wavelength taken and entered with the station. After a while a goodly sized list is soon accumulated. Having this list whenever he wants to hear if this or that station is working, he sets the receiver to the correct wavelength and in a moment can determine if it is there or not. This saves a great deal of worry and trouble.

The obvious question now obtrudes itself: Why not calibrate the receiver and have done with it once and for all? This is not possible, as a receiving set has too many different variables. For example, suppose the dial on one of the condensers shifts. Then the calibrating is useless. Again, most sensitive receivers have some form of regeneration which is effected either with a vario-coupler, variometer or movable honeycomb coil. In all these cases different positions of the tickler will affect the wavelength sufficiently to throw out the calibration. Different aerials, earth, or voltage of either A or B batteries all contribute to make it impossible to accurately calibrate the set itself. The wavemeter, however, is free from all these factors, and is just as accurate in any locality or with any set.

The writer proposes next week to give full particulars of the construction of a meter with a wavelength range of 40-2,000 metres. Such an instrument should be particularly useful even to the beginner, as it covers all amateur and broadcasting wavelengths. With the winter now fast approaching American broadcasting will undoubtedly be received in Australia. It has been proved possible even to re-broadcast American music from our broadcasting stations. An accurate wavemeter becomes of paramount importance for this work, as naturally the tuning is exceedingly fine, and many evenings might be spent in a vain attempt to hear the American through not knowing just where to start tuning for him. The wavemeter saves all this uncertainty, and in a few minutes the station will either be heard or not. In the latter case it is because the set will not respond, and consequently much time will be saved which can more profitably be spent in making the receiver more sensitive.

Radio Manager—Wanted

Applicant must be competent to take charge of a Country Radio Business. He must be a confident salesman and demonstrator, with a thorough technical knowledge of receiving sets.

This is a splendid opportunity for an able, ambitious man. A good salary and very liberal share of profits is offered.

State qualifications and age to the Secretary—

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Moree, N.S.W.



Miss Doreen Douglas, whose excellent violin solo was broadcasted through 2BL from the Town Hall on Saturday, April 25th, on the occasion of the Anzac Concert. Miss Douglas played one of Miss Edith Harry's compositions.

RECEIVING VALVES AS TRANSMITTERS

AT Station 2UW (O. Sandel, Bellevue Hill), a very interesting experiment was recently carried out. At the request of Mr. Walter T. Maling (Managing Director of Parsons & Whittemore Limited), that TRUE BLUE VALVES be substituted for 50 watt transmitting valves, the opinion of other visitors was, "Impossible." However, it was tried, and gradually Mr. Sandel increased the plate voltage. Transmitting was continued, and reports asked for. These were promptly received by 'phone, and listeners reported a distinct improvement in clarity, and a complete absence of microphonic noises. A few days later a letter was received from North Queensland, 700 miles distant, advising Mr. Sandel that the writer heard his announcement that he was, as an experiment, changing over to the TRUE BLUE Receiving Valves, and he reported that the music, (an Edison Phonograph Record), came through with a decided increase in both clarity and volume to that previously received from the 50 watt tubes. Mr. Sandel reports that he transmitted on these two TRUE BLUE VALVES three nights, and on testing them later for "recei-



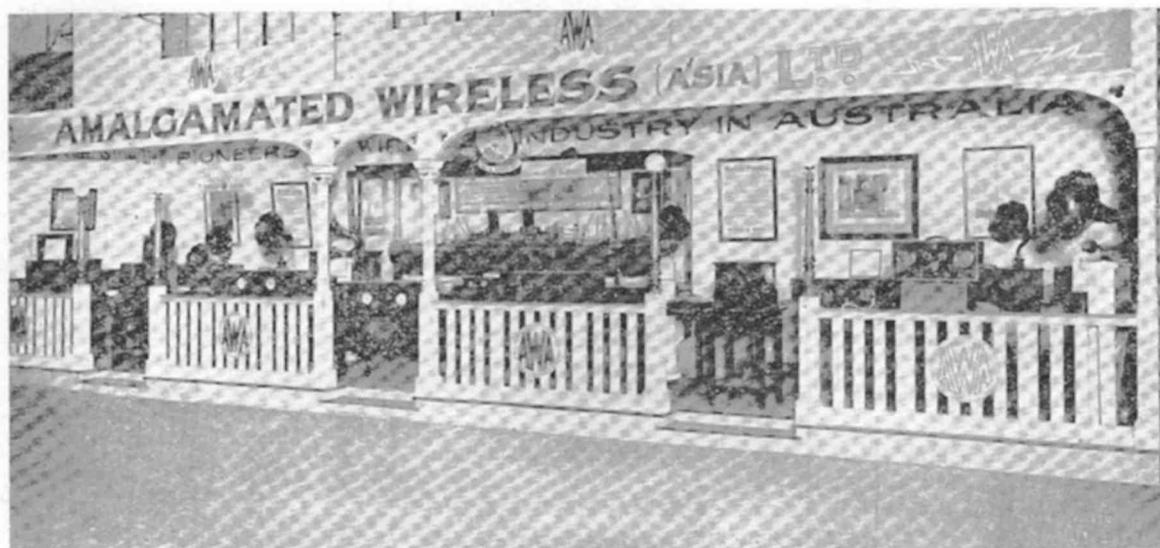
Miss Edith Harry's, whose compositions are well known to music-lovers of Sydney.

ving" found they had not deteriorated in any way, as the result of the high voltage to which they were subjected. Mr. Sandel found that the best operating voltage was on 300 volts.

BROADCASTING FROM BRITISH SHIPS.

The Transatlantic liners under the American flag are developing broadcasting. The Leviathan, for instance, operates a regular service and receives special transmissions from the American side when in mid-Atlantic.

The British Mercantile Marine appears to be lagging behind in this, and the complaint is made that the Post Office definitely discourages the idea.



The exhibit of Amalgamated Wireless (Asia) Ltd. at the Royal Agricultural Show, Sydney. The class of apparatus inspected daily by thousands of interested persons was typical of the progress of the Australian Wireless Industry. The model shown in the photograph is that of "R.M.S. Cathay," of the P. and O. Line, fitted with Marconi wireless.

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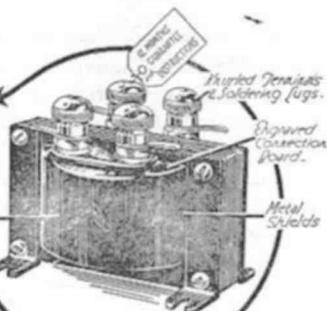
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Father Time tells—
Quality is Economy

MOST COMPACT
AND HIGHEST
AMPLIFIER OF
ALL TONES

Winding on
insulated
bobbin—
Ratio 4 to 1



Wired Terminals
or Soldering Jugs.

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Connection
Board.

Metal
Shields

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DE FOREST

The Man who Invented Broadcasting

25s. each



D.V.3 D.V.2
 Filament, 3 volts Filament 5 volts
 .06 amp. .25 amp.
 Both Types Fit Standard American Socket.

De Forest Valves

TYPE D.V.2—Takes 5 Volts at $\frac{1}{4}$ Amp. on Filament 25/- each

Plate Voltages, Detector .. 18-22 $\frac{1}{2}$ Volts

Plate Voltages, Amplifier 60-150 Volts

TYPE D.V.3—Takes 3 Volts at .06 of an Amp. on Filament 25/- each

Plate Voltage, 16-22 $\frac{1}{2}$ Volts, Detector
 Plate Voltage, 60-120 Volts, used as an Amplifier.

Both Types Fit Standard American Socket.

(Wholesale Only)

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CLEAR RECEPTION.

PRICES RANGE from £8 for a 1 valve set to £75 for a
5 valve set.

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WINCHESTER.

22½ V., large capacity cells 13/-
45 V., large capacity cells 26/-

New Gramophone—Radio Combination

Its tone will satisfy the musician and its appearance will
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MAKES ENTERTAINMENT AT HOME EASY

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Write for our New Radio Catalogue
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THE WORLD'S GREATEST SPORTS STORE

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The meaning of the three letters QSL is: "Please give me a receipt" — or, in other words—"Send me an acknowledgement."

There isn't a transmitter on the air now who is not glad to get a report on his signals, whether they are phone or C.W.

You can put everything you want to say on a Publicity Press QSL card. It takes only a minute to fill in and conveys all the information the transmitter wants.

Over the last few months we have printed thousands of these cards for both transmitters and receivers, among them 2UW, 2CX, 2BF, 2LM, 2WW, 4CK, etc.

There is a QSL card for every purpose and they may be had either from stock or to suit individual tastes.

Write, phone or call.

Publicity Press Ltd.

Printers and
Publishers

12-16 Regent Street
SYDNEY

Phones Red. 964 & 930.

(Continued from Page 10)

Condensers." Leading the meeting through the various stages of the use of condensers from the earliest experiments with Leyden jars and Franklin Pane types. Mr. Kenna showed, without introducing technicalities, how a condenser is used in Wireless and Line Telegraphy, and in closing gave a very interesting outline of the manner in which condensers are used in the Brisbane telephone systems. At the close of his remarks, Mr. Kenna was kept busy answering questions asked by the various Club members who evinced considerable interest in the details of the Lecture.

After the lecture the usual Morse practice was carried out for 20 minutes and a satisfactory increase in reading speed was noticeable amongst the members.

Intending members are invited to address their inquiries to Mr. H. A. Jiear, Hon. Sec., Wooloowin Radio Club, Lisson Grove, Wooloowin, Brisbane.

For the Publicity Committee,
C. J. GRANT.

THE CROYDON RADIO CLUB. *

The Club's Weekly meeting on Saturday, April 4th, was held at the invitation of Mr. G. Maxwell

Cutts, at Station 2GM. The usual business formalities over, Mr. Cutts welcomed the members at the first official visit to his station. Mr. Cutts related his many experiments with his previous transmitters and gave a complete explanation and demonstration of his present hook-up. The lecture was conspicuous for the clarity and the manner in which part of the apparatus and their functions were described. For the benefit of the members, Mr. Cutts worked N.Z., (after 10 p.m. of course), just to show how easy it is—when you know how.

The Club was particularly struck with the neat and orderly arrangement of the apparatus, no long, untidy leads being visible and very much appreciated the fact that it was quite possible to move freely about without bumping High tension stuff. After suitably thanking our host the meeting was closed.

No meeting of the Club was held on Easter Saturday, April 11th. Our next meeting will be held on April 18th, at the Club Rooms, Rockleigh, Lang Street, Croydon. All Inquiries and correspondence should be addressed to the Hon. Secretary, G. Maxwell Cutts, 25 Malvern Avenue, Croydon.

(Continued on Page 36)

Results prove the Superiority of the "BURGINPHONE"

COPY OF A LETTER RECEIVED FROM W. A. RUSSELL, JIMBOUR HOUSE, DALBY, QUEENSLAND, on 20th APRIL, 1925.

Dear Sirs,

Your letter of the 16th inst. to hand. The wireless set I got from you is very good, and we have been able to log the following stations:—

2FC, Sydney; 2BL, Sydney; 2VW, Sydney; 3AR, Melbourne; 3LO, Melbourne
5CC, Adelaide; 5OM, Adelaide; 6WF, Perth; 7ZL, Hobart; 1YA, New Zealand.

The set is as good as any I have heard, and in every way satisfactory.

Yours truly, (Signed) W. A. RUSSELL.

This Receiver, which is a Burginphone, Model 9, also picks up Melbourne and Sydney stations in the middle of the day.

Illustrated Catalogue on Application.

BURGIN ELECTRIC CO. LTD.

Wireless Manufacturers and Suppliers—340 KENT STREET, SYDNEY

Victorian Agents: A. Beal Pritchett (Aust.) Ltd., 150 Queen Street, Melbourne; Queensland Agents, Amico (Q.) Ltd., Queen Street, Brisbane.

Correspondence

(To the Editor)

Sir,—Carrying out some experiments with my "Reinartz" Receiver, some results of which tests were published in "Wireless Weekly" of April 3rd, I picked up KDKA on Saturday last, the 18th inst., at about 8 p.m. I was not previously aware of the test, nor was I aware that Broadcasters had re-broadcasted this transmission until afterwards.

On the following Sunday morning I managed to get on to WGY although not until about 10.40 a.m. This station was very faint although quite audible. I might mention that I was only using one stage of audio.

The interesting part of this is that I picked up these stations on 63 and 100 metres respectively, exactly on the curve obtained by me as a result of Mr. H. A. Stowe's standard transmission. The coil used was a 4:12:4 turns, 2½ inch diameter wound on pegs similar to those used in carrying out previous tests.

This curve is a straight line within the limits of the readings and goes from 60 metres at 38 per cent. of the condenser to 100 metres at 92 per cent. of the condenser. Yours etc.,

G.W.S.

28 O'Connell Street, Sydney.
23/4/'25.

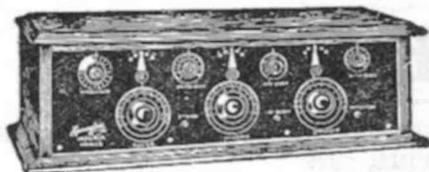
To the Editor.

Dear Sir,—I beg to advise you that I have been granted experimental license No. 546, call sign 2PH, and intend transmitting with low power C.W., i.e.w., and phone on a wavelength of 220 metres. I would be pleased to hear from anyone hearing my transmissions, and would like to hear from anyone willing to co-operate in experiments with low power transmission. I would be pleased if you would be good enough to publish these particulars in your journal, "Wireless Weekly," and incidentally I might mention that the transmitter I am using is built on similar lines to the one published in your journal No. 22. Thanking you.—Yours, etc.,

P. HOARE.

Mann Street, Gosford.

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HARRINGTONS LTD.

Listening-in Sets are scientific instruments, although anyone may quickly learn to operate them. It is reasonable to assume that We, a firm whose business for the past 36 years has been connected with scientific instruments, would have RELIABLE RADIO GOODS. We have the largest and finest range of Radio Sets and Parts in the Southern Hemisphere at LOWEST POSSIBLE PRICES.

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Warehouses

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BRISBANE—93 Queen Street.
KATOOMBA—Katoomba Street.

MELBOURNE—266 Collins Street.
ADELAIDE—10 Rundle Street.
AUCKLAND, N.Z.—140 Queen Street

WELLINGTON, N.Z.—42 Willis Street.

The Little Station with the Big Kick

2UW.

HERE is the programme for Sunday next (May 3rd):—

7—7.30: Children's Hour—

Pianoforte solos and duets by Olive Borracluss and Mary Burrett, pupils from the studio of Miss Althouse, No. 7 Quay Chambers, George Street.

Bedtime stories by Uncle Otto.

Nursery rhymes by Uncle Ben.

8—10: Evening Programme—

Mr. Harold Bennett:

- (a) "Old Pal."
- (b) "Coming Home."

Miss Jean Kennelly:

Songs at the piano.

Mr. George Dalton (tenor):

"Mexicali Rose" (by request).

Miss Jean Kennelly:

- (a) "Love Is My Life."
- (b) "Love Sends a Little Gift of Roses."

Mr. A. Pringle:

- (a) "Macushla."
- (b) "Marcheta."

Miss Anderson (contralto):

- (a) "Yonder."
- (b) "To You."

Miss Dorothy Durant:

- (a) The Dancing Season."
- (b) The Waltz Song from "Tom Jones."

Miss Bellamey (piano):

"Romance" by Sibeilus.

Mr. Harold Bennett (tenor):

"Songs of Araby."

Miss Dorothy Durant (soprano):

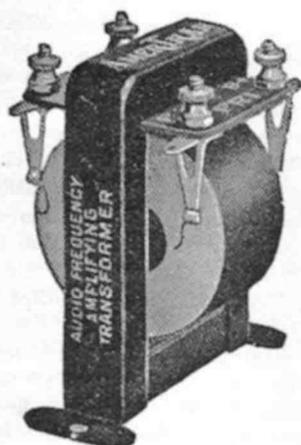
- (a) "The Pipes of Pan" (from "The Arcadians").
- (b) Mussetta's Aria from "La Boheme."

Miss Jean Kennelly (soprano):

"Villia" (from "The Merry Widow").

Miss Rita French (piano):

Popular dance numbers.



"IMPROVE YOUR SET
WITH AN AMERTRAN"

You are sure of the best results
only by using the best
Transformer

"AMERTRAN"

Squeals and howls in audio-transformers are due to regeneration between the tubes and the amplifiers. To get rid of this trouble, very careful wiring is necessary. The grid and plate leads must be short and straight, and the other wires of the set must be grouped together. Insulated wires should be used, if possible. A proper "C" battery should be used in the grid circuit of each tube to match the first battery used in accordance with directions given with the transformer. Also, squeals may be avoided by placing a resistance of $\frac{1}{2}$ megohm across the secondary of the last transformer. Capacity should not be placed across the secondary, but may be placed across the primary. This capacity may be as high as .004 M.M.F.

Australian Distributors:

WELBY RADIO CO. 13 ROYAL ARCADE, SYDNEY

(Continued from Page 33)

CONCORD RADIO CLUB.*

The usual weekly meeting of the above club was held on Thursday, 9th April, at the club rooms, "Euripides," Wallace Street, Concord. The chair was occupied by Mr. J. V. Stevenson, and the attendance was fair. After the usual business, the second item on our syllabus, "Transformers and their Construction," was proceeded with. Mr. Barker, our worthy secretary, dealt with this subject in a most efficient and capable manner, and is to be congratulated on his initial attempt at lecturing. Much valuable information was forthcoming, and the subject was much appreciated. Meeting closed at 10.40 p.m.

Broadcasting

2FC.

The following are the features from Farmers' Broadcasting station, 2FC, for the next few days:

Thursday, 30th April.—The second act of the "Maid of the Mountains," with Miss Gladys Moncrieff, will be broadcast from the Theatre Royal. There will be a talk by Mr. Millen, Secretary of the Sydney Exchange, on the Sydney Harbour. Y.M.C.A. talk, and the studio artists include Mr. Charles Stephens, tenor; Miss Joyce Hadley, soprano; Mr. George Veevers, baritone, and Mr. Lindley Evans, pianist. In the afternoon the Richard McClelland Quartette will make its first appearance. The second trials for the radio voice competition commence to-day.

Friday, 1st May.—There will be a talk on "Gems, by Mr. Percy Marks. A Bridge talk by Mrs. Gaynor. A Wireless talk. The Chamber Trio will appear. Soloists include, Mr. Gladstone Bell, cellist, and Miss Jeanette Ethelstone, soprano. Mr. Livingstone Mote, M.A., will give his second musical lecture. The subject will be "Sir Charles Stanford, late Professor of Cambridge," and the lecture will be illustrated by soprano and tenor songs, choral and instrumental numbers.

Saturday, May 2nd.—An hour of jazz music from the Wentworth Hotel. A talk on "Rotorua" by Mrs. W. R. Blow. Comedy sketches from Mr. Scott Alexander and Miss Nellie Ferguson. Banjo solos. Musical comedy excerpts by Miss Vinia de Loitte and Mr. Frederick Hughes. Band music by the 2FC Brass Quartette.

Sunday, 3rd May.—In the afternoon a special service will be transmitted from the Lyceum Hall, arranged by the Central Methodist Mission. There will be a musical programme, and the Prime Minis-

ter, Mr. Bruce, will give an address. In the evening a church service will be taken from the Lyceum on the occasion of the anniversary of the Central Methodist Mission. The studio concert at night will include the following: Miss Elsie Peerless, who will sing "Mad Scene from Lucia," with flute obligato; Ernest Archer, Tenor; Mr. Harold Tollemache, baritone; Mr. F. Quartley, Flautist; Chamber Trio; violin solos by Mr. Lionel Lawson.

TRUE BLUE VALVES.

Two of these valves were forwarded to us by the agents, Messrs. Parsons & Whittmore Ltd. for test, and under ordinary receiving conditions we find that they are not in any way misrepresented.

The feature of this valve is that it is non-microphonic and any valve having this characteristic must be of high standard. The two valves were tested in relative positions as detector and amplifier and although the plate voltage was reduced greatly to a little over 2 volts, it was found that the valve oscillated at this voltage with 3 volts on the filament. The True Blue Valve has certainly an attractive appearance having a mahogany base and fitting standard sockets.

The feature of the contact prongs is that they are constructed of sterling silver resulting of course in the elimination of resistance losses due to corroded contacts.

A Radio Speed Cop.

This trenchant announcement from KGO carries a weighty message:—

"Radio announcers and other talkers over the air are warned that there is a speed cop listening. His name is F. C. Parkes. At the ether cross-roads, Portage, Wisconsin, he twirls his dials, clocks his victims, and sends out notices for first offences. Today, Wilda Wilson Church, at KGO, who conducts a Monday night radio hospital for English language ailments, which is spoken of over the air as "A lesson in English," received her first notice of word speeding.

"Dear Mrs. Church," the warning reads, "I am the radio speed cop for this part of the world at large. The limit of audibility is reached at 160 words per minute. Faster than that it sounds like static. KGO announcers never exceed 140. But I clocked you last night, and you were spinning merrily at over 200 words per minute. Beware, the jail is yawning for you at the second offence."

They use novel methods over there, but one wonders whether they couldn't with advantage be used in Australia.

FACTS ABOUT VALVES AND THE HIGH COST OF BATTERIES. Practically the only cost of upkeep in a receiving set is in the batteries, but the problem of the high cost of batteries has been solved by the **WONDERFUL TRUE BLUE VALVES.** Tests made have shown that the "B" Battery consumption in the **TRUE BLUE TUBES** is only one-fifth of that of other valves, the comparison being: True Blues, 1.7 milleamperes, others 6.75 milleamperes. On the "A" Battery True Blues will reproduce all tone frequencies on less than 4 volts, which can be increased to 6 volts if great volume is required. These facts show why True Blue Valves save their cost in batteries and are cheapest in the long run. The wonderful tone of the True Blues, their freedom from microphonic noises and long life is known to all who have them. Truly they are the **WONDER TUBES OF 1925**, whether you are buying a set, building a set, or improving your set, **don't say "Valves" — say "TRUE BLUES"**—and insist on them.

NOTICE TO USERS OF DRY CELL VALVES:

The **NEW POWER-PLUS TRUE BLUES** will fit your sockets and double the signal strength with an "A" Battery. Power Plus True Blues are the only small socket full power tubes made. Wonderful True Blues are now reduced to 31/6. You've never heard perfect music by wireless unless you have the **WONDERFUL TRUE BLUES.** Obtainable at most radio shops. Get some to-day. Sole Agents: **Parsons & Whittemore Ltd., 30 Market St., Sydney.**

THE LATEST 1925 LINES IN RADIO

REMO Super Speaker: This Speaker is constructed on a different principle to all others. It is well known that a curved horn is against the laws of acoustics, as where sound waves are reproduced in the base, they strike against the outer edge of the curve. The Remo sound unit is at the mouth of the horn, from which the sound is thrown backwards, and radiates around the bell which widens out to a circumference of 36 inches, producing a tone "like the human throat." It is a speaker of squatty build, big capacity and heavy construction to eliminate vibration. The Remo is sold at the remarkably low price of 95/-. Most dealers have them, and you are asked to compare their tone with speakers at double the price.

Buy only the best in radio — "True Blue," and "Remo."

If your Radio Dealer cannot show you these new High-Class Goods see us:

Parsons & Whittemore Ltd.

30 Market Street, Sydney

A RADIO ROMANCE.

A LITTLE love story was unfolded recently in Sydney that bears comparison with anything Charles Garvice ever served up.

Two years ago the parties met in Chicago. Romeo is an Australian, while Juliet was a citizeness of the United States. They loved, pa objected, and Romeo returned to the land of his birth, sad and lonely.

During the ensuing two years they conducted a scattered correspondence, with Romeo's letters chasing Juliet from city to city as she and pa flitted from one place to another. Finally pa managed to beat the post office by two laps, and in due course Romeo's letters came back marked "Address unknown." Juliet mourned in silence, and, not hearing from her hero, ceased writing. For months the silence between them was unbroken, except for a few sobs.

A couple of weeks ago the A.M.S. Ventura deposited a lone maiden on the wharf at Circular Quay, and that evening found the maid installed at a high-class boarding establishment at Darling Point. In the same house is a "fan"—a radio "fan"—and to entertain this newcomer from the States he switched on his flivver and asked the lady her opinion of the broadcasting. "Punk," she called it, so our friend tuned in on the "ham" wavelength and selected an amateur who was obliging with a few records. This "ham" has a homely name, which for short we shall call Esmanagevna. As soon as the lady heard the announcement "A2XZ, Bill Esmanagevna testing," she rushed to the telephone and phoned him up. Yes, 'twas her long lost Romeo whose long lost honeyed accents she again heard—by radio.

Thus does radio carry on the good work of mending broken hearts, watering the arid patches of true love's garden, and all that sort of thing.

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WAY OF GETTING BIG RESULTS
IS TO ADVERTISE IN**

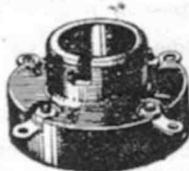
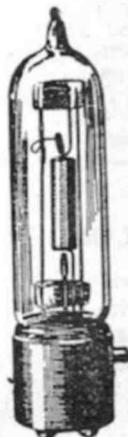
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 SET THE **WE** STANDARD

Wecovalves

now reduced to
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FIRST favourites, either for use as detectors, high frequency amplifiers, or low frequency amplifiers, Wecovalves at the new price are unusually economical. Especially when cheapness is judged solely in relation to durability and high efficiency.



Wecovalves are robust, yet most delicately adjusted. They improve the reproduction of any properly constructed set. They simplify its operation since no accumulators are necessary — Wecovalves work on dry cells.

The top illustration shows a Wecovalve, actual size. The lower one a Wecovalve Socket. Both Wecovalves and Sockets may be obtained from all radio dealers.

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Our new 120 page Illustrated List of Radio Parts now ready, Showing Trade and Retail Prices. Copy sent on application. COMPLETE SETS AND COMPONENT PARTS.

We were one of the very first Wholesale Factors of Radio, and to-day hold the largest stocks of Wireless Goods in the British Empire.

Staggering Prices — Huge Stocks — Get to Know Us — It will Pay you.

Wireless Traders order from us. We have a large Export Department, and know how to deal with your Indents. To prevent delay goods can be ordered through London Merchants or if ordering direct should be accompanied by 25 per cent. deposit, balance at Sight-Draft.

Buy from an Established House.

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A.B.C. 6th Edition.



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So It's Reliable

"Radiophone." The mere fact that it's an "Ediswan" product is sufficient guarantee as to the quality of the workmanship and parts used.

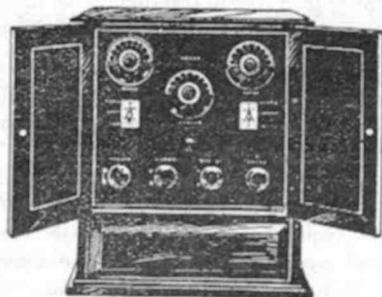
The Radiophone surpasses many of the more expensive 4 Valve sets offered, for long-range reception and selectivity.

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4 Valve Long Range

RADIOPHONE

Separate terminals are supplied for 'phones and loud speaker. A switch provides for the use of 2, 3, or 4 Valves. Aerial circuit may be earthed by means of switch, the batteries at the same time being disconnected.

Socket for loading coils are provided to receive wave lengths over 500 metres.

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High Frequency Currents

By E. Joseph.

MOST wireless enthusiasts know that in pursuit of their hobby they are using "high frequency currents," just how high they are sometimes not aware and to many of them, any statement as to its value is received with an incredulous smile. This is perhaps excusable because the mind is quite unable to realise the rapidity of the changes in direction of the currents.

The fact that 2FC uses currents changing in direction 546,000 times per second, 2BL, 1,714,000 times and KDKA in the recent tests nearly 10,000,000 times, conveys nothing to the mind. It is true nevertheless and the measurement of these rapid changes is not a matter of very great difficulty. The distance from London to Sydney is known to a high degree of accuracy, yet it is not measured with a rule. The exact length between supports for the North Shore Bridge is a matter of importance in the fabrication of the huge girders which will be used and which must fit into their appointed places. Even this could not be measured directly, yet it is known to a small fraction of an inch, probably more accurately than if a tape had been stretched across the intervening space.

The measurements of frequency—and in fact of all electrical quantities—are made indirectly as are the measurements of length referred to. The magnitude or strength of the high frequency currents used in any receiver is extremely small and in most cases are impossible to measure with the apparatus at present available. Even in the amateur transmitters apparatus the currents and voltages are measurable only to a very rough degree of accuracy, and apart from the purpose for which the primarily generates them, the user is not aware, because he is unable to perceive their most peculiar and strange properties.

High frequency currents seem to be outlaws. They appear to set at defiance all the natural laws laid down for the regulation of law abiding direct and low frequency alternating currents. This is only in appearance, however, for with a sufficient supply, it is found that if due regard is paid to the various factors determining their behaviour, they are just as law abiding as their better known brethren. High frequency currents of fairly large

magnitude are quite easy to generate and powers of from 50 watts upwards are capable of demonstrating, usually in the most striking ways, their properties.

• They are sometimes but not very often, generated by dynamo electric machinery built and designed on similar lines to the ordinary generator of lighting and power currents. Usually, however, they are obtained by means of capacity and inductance, forming oscillatory circuits.

In these cases the apparatus does not generate the currents but transforms D.C. or low Frequency A.C. into high frequency A.C. The oscillating valve circuit does not generate currents. It merely transforms D.C. from the B battery or other source of supply to the plate circuit, into high frequency current.

The spark coil used by the early workers in the radio field, the transformer used in its place by the more ambitious workers and by commercial stations formed part of the chain of gear used to produce high frequency currents.

In these cases the high frequency currents occur in gushes, each pulsation of current in the primary of the spark coil and each change in direction of the current in the primary of the transformer giving rise to a charge of electricity in the condenser—inductance circuits associated with them, which charge rushes backwards and forwards getting weaker each time—but not altering its frequency—until it dies out and the circuit awaits the next charge.

The Modern Power Valve, the Poulsen arc, and certain modifications of the transformer system will give the condenser inductance circuits charges which do not gradually die out but will continue at practically uniform strength as long as the supply of primary current is maintained. The pressure or voltage in high frequency circuits is capable of being very easily transformed so that voltages which it would be extremely difficult to obtain in D.C. or low frequency A.C. circuits may be obtained and studied. This of course also applies to the currents or amperage. A most remarkable fact is that however high the voltage, high frequency currents are harmless and will not give one a shock. In dealing with

them burns may be experienced. Burns are painful, but nothing approaching the feeling experienced on touching two wires at say 240 volts can be felt on touching terminals at 240,000 volts high frequency. The inductive effects of H.F. circuits on neighbouring circuits or masses of conducting material are prodigious. Stray fields, which, at low frequencies, are too small to be of importance, will at high frequencies cause effects in the way of sparks and discharges over distances of several yards. Owing to the high voltages arising in the circuits, remarkable electro-static effects are noticeable, attraction and repulsion of light articles occurring at considerable distances from the circuits.

The shape of a circuit plays a very important part in its ability to carry high frequency current. Quite a thick copper bar may offer a far higher resistance to the passage of the current than does an air gap, so that the astonishing phenomenon of a gap short circuited by a copper bar and yet being jumped by brilliant sparks is seen.

Again the shape of an insulating body or perhaps I had better say of a body made of insulating material, or even better of non-conducting material, has a most important bearing upon its behaviour to high frequency currents. An ordinary insulator may be quite a good conductor for H.F. Materials which are effective as insulation on D.C. and low frequency A.C. are sometimes useless on H.F. Glass may be taken as an example. Glass is usually considered to be one of the finest insulators. It may be used to insulate extremely high voltages D.C. or low frequency A.C., yet the same sample of glass used in the same way to insulate the same pressure H.F. may break down in a few minutes.

Prior to their utilisation in wireless transmission, H.F. currents were not used to any extent. They have been and are employed in medical work, but apart from this were principally of scientific and spectacular interest. They are now, however, being used for several purposes besides wireless. For some years past use has been made of them in the melting of metals not containing iron when extreme purity and close attention during melting and mixing was necessary and they are now coming into use in the melting of fine steels.

Large numbers of very small H.F. transformers are now sold under the name of "Violet Ray Outfits," for the treatment of nervous ailments and other disabilities to which the present day human is heir.

Use has been made of them to locate large bodies of metallic ores in the earth. Undoubtedly other applications will be discovered and increasing use made of their properties in the near future. From

the view point of the "man in the street" they are interesting mainly because of the instructive and spectacular experiments which can be performed easily and safely with a moderately sized transformer and with the Editor's permission, I propose at a later date to describe in detail a few easily arranged systems which will produce H.F. currents sufficiently

An Improved Thermocoupler

EXPERIMENTERS desiring to construct thermocouple instruments are confronted with the problem of obtaining suitable wires of dissimilar metals. The result is that in most cases they are compelled to use such readily obtainable materials as "Eureka" and steel or copper. Such couples are disappointing in sensitivity. In search of a more sensitive combination, some of the wire from the grid of a defunct UV-201A, allegedly molybdenum, was tried in conjunction with "Eureka." The result was a couple which gave four degrees galvanometer deflection as against less than half a degree from the best copper "Eureka" couple under similar conditions. A further advantage was found in that the couple was less affected by oxydisation when in use.

Couples constructed from these materials are cheap, and seem to be admirably suited for use in thermo-galvanometers or ammeters.

MU.

A LONDON HOTEL INSTALS WIRELESS IN EVERY ROOM.

THE first British Hotel to instal wireless in every room is Garland's, in Suffolk Street, London.

The fact that this hotel is over one hundred years old adds considerably to the interest of the news. To celebrate the installation the management gave a dinner, during which, all the musical items were provided by a wireless receiver.

Loud speakers are fitted in the public and private lounges and sitting rooms. In the bedrooms, headphones are used.

Every loud speaker and headphone is provided with a plug which fits into a wall socket in each room. The receiver is operated by the hotel staff, and to listen-in it is necessary for the guests only to connect the plug.

The actual installation of the wireless was carried out by the Rees Mace Manufacturing Company. The set consists of a portable single-valve receiver to which is coupled a three-stage Western Electric amplifier.

	1		2	3	4	5	6	7	8		9	
Phillips Valves, 12/6.			10									Panel Mounts, 1/6.
Jefferson 41 Transformers, 24/-.	11	12		13							14	Sin. Dials, 1/6.
Jefferson Star, 19/-.	15		16		17					18		Walnut .001 Variable Con- denser. 17/-
Radiotron 201a Valves, 21/-.		19								20		Porcelain Sockets, 2/9.
Phillips Valve 12/-.		21						22				Ormond .001 Vernier Con- denser, 16/6.
Pico Phones, 20/-.		23								24		Bakelite Knobs, 9d.
Buck's Trans- formers, 12/-.	25				26		27		28		29	Bradley Stats, 12/6.
Ormond 6 ohm Rheostat . 3/-	30			31				32		33		Bradley Leak, 12/6.
Coil Mounts, 1/6.			34							35		Resin Solder, 2d. per foot.
	36											

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2nd Correct Solution opened—Radio Goods valued at £1/1/-.

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Special Prize: Radio Goods valued 10/6 for the competitor living the farthest from Sydney.

Address your Solutions: Price's Radio Den, Cross-Word Competition, 220 Oxford St., Woollahra,

N.S.W.

HORIZONTAL.

1. A broadcasting term.
10. A fish.
11. One of the United States (init.).
13. Silent.
14. Preposition.
15. To lean from the vertical.
17. A married woman.
18. Printers' measure (plural).
19. A well-known car (init.).
20. Part of the verb to be.
21. Feared by the underworld (init.).
22. Part of the verb to be.
23. Printers' term (init.).
24. Person opposed to liquor (init.).
25. Little (obsolete).
26. Animal.
28. To fell.
30. Preposition.
31. Played on Uncle George's pianola.
33. Egyptian Deity.
34. Units of electrical current.
36. Earthly.

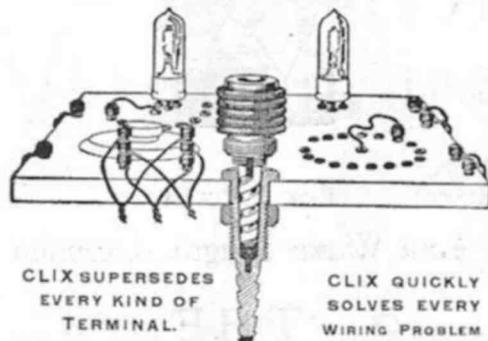
VERTICAL.

1. Before connecting your "B" Battery on completing set.
2. Exclamation.
3. Man's name (abbrev.).
4. Term used in card game.
5. On speaking terms with Uncle George.
6. A bird.
7. A rebuke.
8. Telephone transmitters (init.).
9. In code.
12. Path of an electrical current.
14. For measuring current.
16. The King of Radio Dealers.
18. One of the terminals of your receiver.
25. A unit of electrical power.
26. To gull.
27. Girl's name (abbrev.).
29. A defence.
31. Sentence denoting annoyance used by wireless fans (inits.).
32. An Indian measure of weight.
35. Syllable applied to seventh tone of any Major Diatonic Scale.

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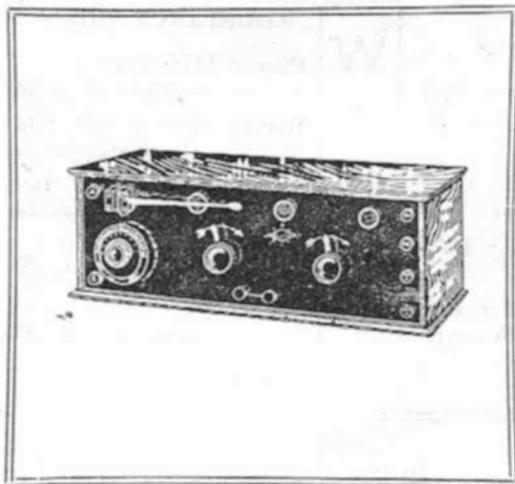
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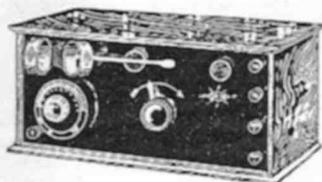
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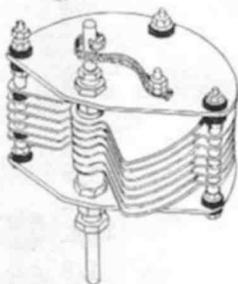


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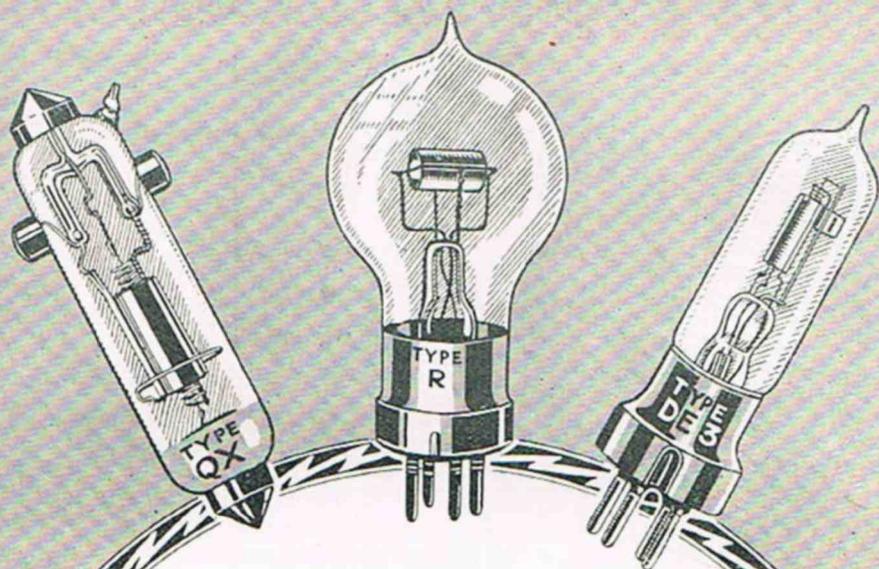
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