

RADIO

IN AUSTRALIA
& NEW ZEALAND
Incorporating "Sea Land and Air"

VOL. I.

JULY 11, 1923

No. 8



THE LATEST IN MILLINERY—AN
"AERIAL" HAT.

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Experimenters Need Not Fear

THE utterances of men prominently identified with the progress of radio in Australia should effectively dispel any lingering doubts regarding the freedom to be allowed experimenters under the broadcasting regulations.

That there was never any real reason to fear that the activities of genuine experimenters would be needlessly interfered with is now abundantly clear. We must give the authorities credit for wishing to afford them every possible opportunity to further their study of radio science.

The world in general, and Australia in particular, stand to benefit materially by every new discovery or invention in wireless equipment. It has been demonstrated on countless occasions that Australian experimenters are second to none the world over in the skill and enthusiasm they bring to bear on the problems they

are frequently up against. Already they have riveted the attention of radio experts in England and America, and there is every reason to believe that those undertaking the study of wireless in the future will at least be as keen and efficient as the men who have already added lustre to Australia's name in the field of radio experimentation.

Although much has been accomplished to date, the possibilities are by no means exhausted, and there is little doubt that whatever new discoveries and improvements in radio equipment the future may bring, the names of Australian experimenters will figure prominently in the list of those responsible for their origin.

The authorities are no doubt keenly alive to this phase of the situation, hence the well-founded feeling of confidence regarding their intention to allow experimenters all possible freedom.

A Problem for Radio Clubs

SOMETIME ago a suggestion was made by an official of a Radio Club near Sydney that all Clubs should have a common meeting night. The motive behind the suggestion was an excellent one, and was prompted by the fact that since the number of transmitting stations has increased so much there is a marked tendency amongst members to stay at home and "listen in" in preference to attending the Club meeting. If all meetings were held on the same night each week, it was intended to ask all experimental transmitting stations to close down on that particular night. A double object would thus be achieved. The Clubs would have the attendance and support so vital to their existence, and experimenters would still be able to hear all the musical entertainments which are now proving so great an attraction.

The proposal has not so far received the unanimous support its originators anticipated. It has been contended by opponents of the idea that it will seriously interfere with the practice of Club members visiting other Clubs for the purpose of delivering lectures, conducting demonstrations and exchanging ideas. This is probably true, and constitutes a legitimate objection. The point is, however, would it interfere with the practice mentioned sufficiently to prove a real hardship? In the great majority of cases visits of an inter-club nature

consist of only the members actually taking part in the proceedings. A Club can always spare one or two of its members much more easily than it can the number who now stay away to "listen in." Of course, it can be argued very logically and effectively that members should not require to be "saved from themselves", so to speak. They should take sufficient interest in their Club to forego for at least one night every week, fortnight or month, as the case may be, the pleasure of "listening in" to attend to the more serious business of keeping their Club alive and useful. Perhaps a little plain speaking on the part of Club officials may have the desired effect. It is essential that some action be taken, and that action should be along lines that will mean the "greatest good for the greatest number." Radio Clubs fulfil a useful part in our midst, and they must be kept going at all costs. There are thousands of young Australians still to receive the preliminary training in wireless which can be acquired nowhere so well and quickly as by attending the lectures and demonstrations which figure prominently in every Club programme.

If the attendance can be kept up without interfering with the present order of things, so much the better. Again we say, a plain talk to members may achieve that result. At any rate, there is no harm in giving it a trial.

Unique Australian Receiver

Panel Unit Radio Set

Ideal for Experimenting

FOR some time past the Research Engineering Department of Amalgamated Wireless (A/sia.) Limited has been investigating the merits and demerits of designs of apparatus best suited for Radio Experimenters.

The usual type of apparatus manufactured for this purpose is a complete set, which, while often having a very good appearance, has many disadvantages in operation. The set is wired according to a particular circuit, and should the experimenter wish to use other circuits, he is precluded from so doing by reason of the set not being adaptable to alteration. Additional apparatus cannot be added to it, nor can existing apparatus be dismantled or transposed at will without impairing the appearance of the set as originally designed. Even if alterations can be effected, the cost of so doing is heavy, and the set as a composite piece of apparatus is sacrificed to the exigency of the re-arrangement of the component parts.

Where an amateur has a set composed of apparatus of different types and manufacture, the whole resembles not so much a composite set as a heterogeneous collection of wireless apparatus, without unity and design, and lacking compactness and workmanship.

Having in mind the great progress that has taken place in the field of Radio experimentation, and the unlimited scope available to the experimenter in trying out new circuits, Australian Radio Research Engineers have endeavoured to design a Radio Set which, while offering all the merits of a complete set, has not the disadvantages and limitations to re-arrangement of the usual amateur installation.

The result of their efforts is a set based on the Panel Unit System, and we have no hesitation in stating it is the last word in amateur radio engineering construction, and will prove

an invaluable and economical piece of apparatus to every experimenter.

Compact and yet expansive, its workmanship is such as to make it as handsome and appropriate a piece of furniture as a gramophone cabinet.

The Panel Unit System consists of separate Bakelite panels, each 4½ in. x 4½ in., and any number of panels can be linked together by an ingenious method of spindle rods let through eyelets at the back of each panel. Special bases and side supports are provided according to the number of units required and their disposition. The panels are all of uniform size and readily interchangeable, and each carries its own piece of apparatus, such as valve, condenser, filament resistance, potentiometer, inductance coils, high frequency transformer, grid leak, etc. All wiring connections are made at the back of the panel, consequently any new circuit arrangements do not affect the naturally finished appearance of the individual units, no matter how rough the wiring may be. In order to facilitate wiring, the terminals are made long enough to enable two or three connections to be made on each. With the facilities for changing the wiring on the panel units at will, it is possible to obtain the highest efficiency of operation from a given circuit, and any harmful action may be eliminated as soon as it is located.

New circuits can be tried out, old ones discarded, at will, and the experimenter will thus find the set a source of continual pleasure, enabling him to probe deep into the wonders of Radio science.

The Panel Unit System will prove exceptionally attractive, not only to the novice, who generally prefers to build up an economical receiving set stage by stage, according to the financial means at his disposal, but also to the experienced worker who desires to increase amplification with additional

valves, or experiment with particular circuits.

The system is equally suitable to the amateur wishing to commence with a small crystal set, and add to his apparatus stage by stage with the various circuits, trying out the more advanced circuits, as it is to the advanced experimenter desiring a set incorporating the latest regenerative circuits.

Whether it be desired to use a Crystal circuit, two valve circuit or seven valve circuit, the Panel Unit System is alike applicable; the only difference being in the number of panels required, their disposition, and the requisite apparatus.

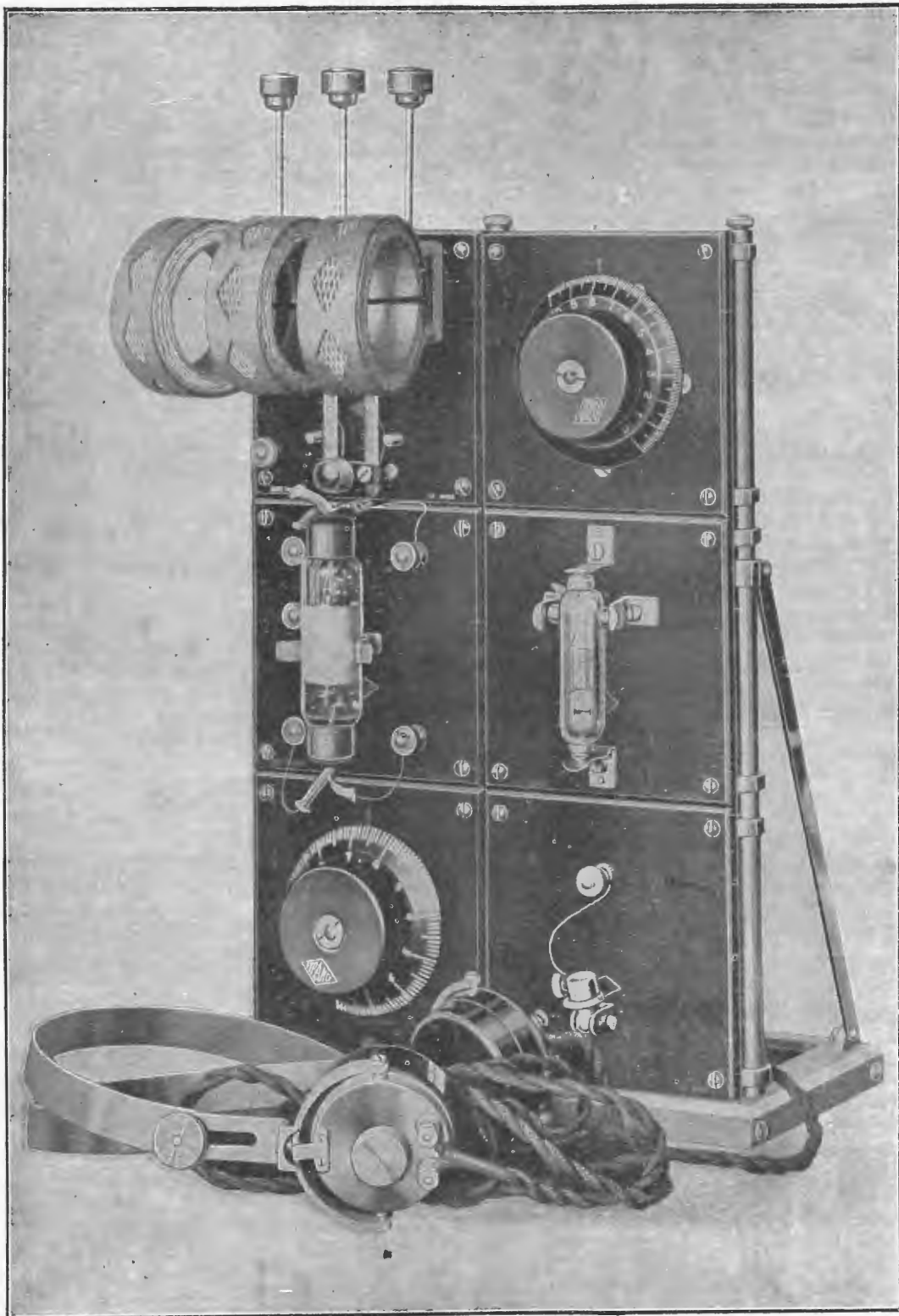
The set is so constructed as to allow any combination of parts to be quickly put together to form a Panel, without in any way impairing the finished and harmonious appearance of the set.

The base units are of heavy white brass die castings, with the framework so designed that it can be built up in sections, the units of which are robust, giving stability to the assembled set. The number of parts required for the framework construction have been reduced to a minimum. All metal work is heavily nickelled, and, in consequence, frequent cleaning and polishing is eliminated.

The rotary condenser panel carries the standard Rotary Condenser which is of very robust design and conforms in every respect to modern practice. The scale is engraved on a 3 in. bevelled dial.

The Rotary Resistance Panel is mounted with the latest Panel Type Variable Resistance. These Resistances enable a very fine adjustment to be made, and are provided with a calibrated dial similar in appearance to the Condenser dial. The cross section of the wire is sufficiently large to prevent any undue heating.

The Crystal Detector Panel is mounted with a Crystal Swivel head Crystal Detector. The Crystal Cup



An "Expense" Panel Unit Receiver assembled with various types of panels that may be used.

which screws out is provided with a standard thread, making it interchangeable with other types of crystal holders.

The Expanse "B" Valve Panel is mounted with a new type Valve Clip made from very best phosphor bronze, heavily nickelled.

"R" Type Valve Panel is fitted with back connected plug sockets drilled in a standard jig to take the "R" Valve pins.

The Tuning Panel is fitted with clips to take Expanse Honeycomb Coils and is arranged so that the inductive coupling is easily accessible, consequently very fine adjustments can be made. A rapid change of coils can easily be carried out, and the objectionable feature of loose flexible leads has been eliminated.

High Frequency Transformers are wound in ebonite formers fitted with plug sockets. Plugs to fit these sockets are supplied separately. Transformers of different wave-lengths can be interchanged very rapidly.

Fixed Mica Condensers are built up of foil with tested mica dielectric. They are clamped together in ebonite forms, being easily connected in circuit.

The Fixed Air Condensers are exactly similar in appearance to the mica condenser, but with air dielectric.

Fixed Filament Resistances are wound to .7 ohms with heavy wire on non-inflammable forms. They are fitted with terminals and means for mounting on panel.

Non-inductive Resistances are wound non-inductively with double silk-covered resistance wire on an ebonite former, being fitted with terminals and means for mounting on back of panel.

Grid Leaks are hermetically sealed in glass tubes with metal caps for connectors. They are unaffected by moisture and are made up to several resistances. The clips are of nickel-plated phosphor bronze, and the design is such that rapid change is possible.

The whole of the apparatus is back connected, with the terminals sufficiently long to take several connections. A positive connection is arranged for in every case by a lock nut and washer, or a binding screw to enable hard wiring to be adopted.

Assembled sets are being wired with rigid rectangular section copper conductor. This conductor is nickel-plated, the wiring is arranged to be non-capacitative and to give maximum rigidity.

The metal work throughout is finished in polished nickel, this against the black bakelite panels and mouldings of the control handles gives a handsome appearance. The nickel finish ensures satisfactory connection on moving contacts and does away with the necessity of repeated cleaning.

Simple in construction, handsome in appearance, and possessing great flexibility in permitting the addition, subtraction, and transposition of various Units, it is a Radio Set of which every owner will be proud.

Victorian Notes

(By Our Special Correspondent.)

Experimenters who have considerable static trouble may possibly trace it to being located in the path of currents returning to a source of supply.

The station of Mr. C. Hiam, Carlisle Street, St. Kilda, is on occasions compelled to shut down owing to the "statics" of an extensive electric train and tram service. The cross-over discharge is heard clearly as a crackle, and Mr. Hiam has been enabled to enlighten various other experimenters who were troubled with hums, rumbles and crackles that occurred with time-table regularity. Tram cars with faulty sparking commutators cause unpleasant effects in the 'phones, and the trouble is only relieved as the car recedes from the station.

Mr. Hiam could, with ease, compile a list of faulty motors. This is a new form of "static" that some experi-

menters in Melbourne have to contend with, and it will only be rectified when the evil of electrolysis is combated. Although 3LW is in the path of a stampede of currents that leave the rail and cut across country per medium of an attractive network of water pipes, etc., the worthy owner, Mr. Hiam, still remains a cheerful and successful experimenter.

The Wireless Institute in Melbourne is endeavouring to eliminate the weakness of divided control in the ranks of experimenters. A sound and constructive policy is being laid down, which it is hoped will permanently avoid the friction that might otherwise arise.

Radio Clubs are now being formed in Brunswick, Footscray and Northcote. There are rumors of similar action from other districts and there seems to be no doubt of the actual formation of at least a few more. Prac-

tically all of those now existent have linked up with the Wireless Institute, and there is a general feeling that all experimenters should be under one banner, if research for the benefit of wireless is to yield results of maximum value.

Generally the only reward that transmitters of radiophone concerts receive is a congratulatory letter from some enthusiastic "listener in" who has enjoyed the gratis fare. These letters unquestionably spur them on to greater efforts. Mr. N. Culliver (3 DP) has quite a file of treasured documents, and their contents reflect great credit on the tuning of his station. When 3 DP was working intensely with 3 ZZ, experimenters in all States were in receipt of a feast. One N.S.W. experimenter, distant 600 miles, wrote stating he received regularly on an "Expanse B" single valve and that the modulation was perfect;

Sea Cheated of its Prey

Remarkable Voyage of Trevesa's Crew

What Wireless Did—and Could Have Done

AT the moment of writing, Australia is rejoicing over the news of the ill-fated *Trevesa* have escaped a watery grave. Two men in the first boat died and those in the second, after enduring indescribable sufferings, reached Mauritius with no less than eleven out of the company of twenty-seven missing. It is presumed from the meagre details available at the time of writing that they died of thirst.

The remarkable feat performed by Captain Foster in steering an open boat over 1500 miles of turbulent ocean stands out as one of the grandest feats of seamanship in recent years. When the full story is known it is probable that words will fail to adequately describe the suffering and privation of the survivors, but above it all will stand out the dauntless and supreme physical performance of the ill-fated ship's crew.

When the *Trevesa* sent out a wireless call in the early hours of June 4, it was realized that her position was desperate, and out of the numerous stations that picked up the message, three vessels which were closest to the position indicated in the *Trevesa's* S.O.S., hastened to the scene.

During the days that followed, the ocean for hundreds of miles around the spot where the ill-fated ship foundered was searched by the rescue vessels, and the world was kept informed by radio of their non-success. Then when hope was almost dead, the glad news was flashed through that two boats containing the captain, officers and a number of the crew had reached safety.

HOW WIRELESS HELPED.

From the moment it was known that the *Trevesa's* distress call had been picked up, a feeling of confi-

dence in the ultimate rescue of the crew inspired the public mind. It was known that no effort would be spared to find the boats that were tossing about on the waste of water, and the relatives of the officers and crew, and the owners of the vessel, as the people most concerned, never lost hope of ultimate rescue. Had the *Trevesa* not carried wireless her disappearance during the weeks that followed would have stamped her case as another ocean mystery. As it happened, however, the world knew of the supreme efforts that were being made to find the survivors. No doubt, too, the hapless men in the open boat were buoyed up with hope which would have been entirely absent had they not felt—as they must have felt—that every effort was being made to find them.

"Hope springs eternal in the human breast" is a truism which probably means more in the case of shipwrecked sailors than it ever could mean to humans in a less critical position. Their relatives, too, are spared to a very great extent, the hopeless anguish inseparable from a disaster in which the only record of the vessel's end is contained in the grim words, "Posted Missing".

WHAT WIRELESS COULD HAVE DONE.

It must not be thought for one moment that the part played by wireless in the case of the *Trevesa* represents its full capacity to succor the crews of wrecked vessels. The fact that two lifeboats were able to carry men over 1500 miles of ocean demonstrates beyond any shadow of doubt the value a wireless set would have proved to the crews of those boats. The very fact that ships are compelled to carry lifeboats proves that occasions will

always arise when crews will have to abandon a sinking ship in a desperate hurry, and even though other vessels are racing to the rescue in response to a wireless call, the period that sometimes elapses before they reach the spot may make a difference of many miles in the position of the lifeboats. In the case of the *Trevesa* it made a difference of many days between the time the boats would almost certainly have been picked up had they been fitted with wireless, and the time they reached safety.

During those days the crew must have suffered acutely, in addition to which a failing food and water supply lessened their chance of reaching safety with every hour that passed. The number of men who died on the voyage speaks eloquently of their sufferings.

VALUE OF DIRECTION FINDERS.

Most ships nowadays carry three operators, and in the event of it being necessary to take to the boats hurriedly the captain would, if the lifeboats carried wireless sets, see that at least three of them carried an operator each. Providing the rescue ships were equipped with direction-finding apparatus—which has now reached a high standard of proficiency—it would be an easy matter for them to ascertain the exact position of the lifeboats through the messages sent out. Cases such as that of the *Trevesa*, where the men were exposed to privation and danger for 24 days would then be practically impossible.

It is with feelings of confidence based on sane and sound knowledge that one looks to a time in the near future when the suffering and suspense such as that associated with the ill-fated *Trevesa* will cease to torture mankind.

Tuning and Interference on Short Waves

By E. JOSEPH

OWING to the increased number of experimental transmitting stations using telephony, and principally transmitting musical items there is now increased difficulty in reception due to interference. This, to some extent, may be caused through the operator at the transmitting station not realising the effect that the shorter the wave-length and extremely minute variations of inductance, capacity or resistance, have on the wave-length emitted, and the desire of the receiving operator to obtain loud signals, so that all his friends may listen.

Remembering that wave-length is proportional to the square root of the product of inductance and capacity, that resistance also plays a part in the determining wave-length, that the majority of the transmitters referred to are working in the neighbourhood of four hundred metres, and that the power as measured in the anode circuits of their valves may not exceed ten watts, we will investigate causes of interference.

First, an indication of ten watts in the anode circuit is no criterion of the amount of oscillatory energy in either that or the aerial circuit.

The ten watts is measured on direct current while it is only the rapidly varying part of this which is of use to the transmitter. The current in the anode circuit consists of a current of—more or less—steady value; "more" if its source is accumulators or cells than if it is a generator, and "less" if it consists of rectified A.C.

In the latter case, it consists usually of a direct current component together with an alternating current component of a fundamental frequency equal to that of the supply mains.

When the reaction reaches such a point that oscillation occurs, there is also impressed on this circuit an al-

ternating current component of radio frequency, the amplitude of which faithfully reproduces—as a first approximation, the contour of the curve representing the direct and low-frequency currents, illustrated in Fig. 1, which assumes a valve is supplied from a source of rectified A.C. Curve "A" represents the current prior to oscillation and this curve may be taken as made up of direct current of value "B", plus an alternating current of value "C". Where "B" is the height of the ordinate representing the "zero" of the A.C. wave and "C" is the effective value of the A.C. current.

The height or amplitude of the resultant current is given by

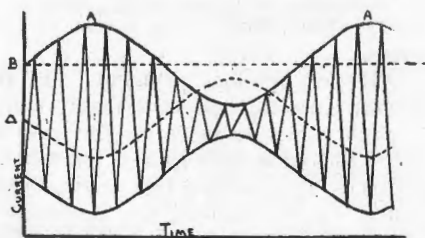


Fig. 1.

$b + 1.414 c$ at its maximum and by $b - 1.414 c$ at its minimum.

The oscillatory current when produced follows in amplitude the outline of this resultant curve.

In I.C.W. transmission the whole amplitude of the oscillatory current is available for signalling and the low frequency variations in amplitude may be used to enable signals to be picked up on non-heterodyne sets and crystals. The low frequency may therefore be considered as a "modulation" of the high frequency wave and, as such, is detrimental in telephony. Filter circuits are used to prevent this low frequency from reaching the anode.

In the case of telephony the range of the transmitter is very much less than I.C.W., because the actual amplitude of the oscillatory current wave is of no use, only the variations in its amplitude, caused by modulations, are effective.

It follows, therefore, that the milliamperes in the anode circuit are no criterion of the oscillatory energy, and the amperes in the aerial circuit are no criterion of the amount of "telephonic" energy being radiated.

Another source of interference known as the "hum" is caused by the L.F. supply.

If the valve filaments are supplied with A.C., the temperature will vary as the A.C. follows its wave form.

As the electron emission, and the plate current, depend upon the filament temperature, the cause of variation and of consequent "hum" is obvious.

This is being overcome in modern valves by making more massive filaments requiring heavier current at a lower pressure and having a greater "heat storage capacity" to assist in maintaining them at constant temperature.

Improvement in his transmitter in this direction is, of course, outside the scope of the experimenter, but much may be done by attention to the "filter circuits."

Now, as to wave-length. The value of the product of an inductance of 90 microhenries and a capacity of .0005 microfarads for a wave-length of 400 metres is 0.045. An increase of, say, 2 per cent. in wave-length brings it up to 408 metres, requiring the product to be .0468. With .0005 mfd. the inductance must be 94 microhenries and with 90 microhenries the capacity must be .00052 mfd. Thus a change of 4 mths. or of .00002 mfd. will give a change of 8 metres in 400.

These inductances and capacities being small, a very slight alteration of coupling or of a variometer will easily vary the values of the circuit.

The grid condenser where used is in series with the grid filament plate capacities of the valve and the combination shunts the tuning condenser and forms an appreciative amount of the total.

Any alteration in filament current alters the grid filament current, and this alters the effective capacity of the valve. Any alteration of the grid condenser alters the effective capacity of the combination and the amount of such alteration may easily approach and surpass the .00002 mfd. figure. For tuning to remain accurate it must therefore be measured at the setting of filament current, grid condenser (or potentiometer), grid leak, couplings, both reaction and to aerial, which are to be used in actual transmission and no alteration may be made without, in any of these factors, causing a change in wave-length. Most experimenters like to send the aerial ammeter as high as possible. The above shows a reason for avoiding this.

Contrary to general belief a valve transmitter does not necessarily give a pure sine wave. Harmonics are very prevalent, and in the aerial help to swell the ammeter reading but do not help in transmission. They may be kept out by using a loose coupling. This will reduce the amplitude of the harmonics much more than it will reduce that of the fundamental to which it is tuned.

Determine all adjustments which give the sharpest tuning, even if it means an apparent sacrifice of efficiency. Adjust to the desired wave-length with these settings and alter nothing in the belief that each alteration is too small to affect the wave length.

Do not strive for excessive aerial currents, but devote attention to the elimination of "hum" and improvements in "modulation." Experimenters will thus improve the actual efficiency of their sets, avoid interference with other transmitters working on a wave-length not far away, and avoid being interfered with by the other chap!

At receiving stations there is a tendency to use direct coupling "because it will give louder signals." This is a fallacy. A loosely coupled system with accurate tuning will give signals quite as loud and will avoid interference.

Experimenters using valve receivers usually set their valves oscillating, pick up a "corner wave", and then (or should) gradually loosen reaction until the valve ceases to oscillate.

It is impossible to receive telephony on an oscillating valve.

Valves should not be worked so close to oscillation point that any slight disturbance such as a strong signal or an atmosphere will set it in oscillation.

If *your* set is one which may cause oscillation in the aerial do not, in the interests of other listeners, indulge in experiments which may cause *your* valve to oscillate. This causes heterodyne frequency to be impressed on every aerial within your range and spoils things for others "listening-in".

A Lead for Australian 'Bus Owners

Wireless Music While Touring

A lead for enterprising motor-bus owners in Australia has been set by an English firm which has fitted its 40 h.p. saloon motor-coach with a wireless receiving set to entertain passengers when on a tour. A pair of cycle wheel rims has been utilised for the five-wire aerial, and the four-valve receiving set is slung from the roof in a special cradle which insulates it from road vibration.

As this receiver has a radius of 100 miles, it is able to pick up the musical and news' programmes which are broadcasted from London, Birmingham, Manchester, etc., and entertain the passengers on this motor coach at

any part of England in which they are travelling. On the front of the vehicle the owner has entitled it "The Silent Knight," thus paying an intended, or implied, compliment to its quiet running qualities which have enabled the wireless equipment to be so successfully operated.

By next summer broadcasting will be in full swing in Australia, and it is highly probable that when passengers board the motor-bus for a week-end on the Blue Mountains or the South Coast (if they are Sydney residents) they will be delighted to observe that they are going to be enter-

tained with radio music on the trip. The suggestion is not a far-fetched one; it is extremely probable that it will materialise, and what is more it will prove a tremendous "draw" for the first 'bus owner who is sufficiently enterprising to take the step indicated.

The reception of wireless concerts and speech is regarded as likely to be one of the future innovations of train travelling, and there is every reason to believe that what can be accomplished in regard to trains can be carried out much more easily in the case of motor-buses.

Tasmania Forges Ahead

(By Our Special Representative.)

That the interest of members in the newly-formed Tasmanian Division of the Wireless Institute of Australia is increasing was demonstrated by the excellent attendance at the May meeting. Mr. F. W. Bennett, chairman of the Council, presided.

Ten new members were enrolled for the coming year.

Mr. W. C. Crocker, a member of the Council, delivered an interesting and useful lecture on "Storage Batteries and their Application to Wireless". To add still further to the value of his lecture, Mr. Crocker exhibited and demonstrated the use of the various parts of a storage battery. He was accorded a hearty vote of thanks at the close of his lecture.

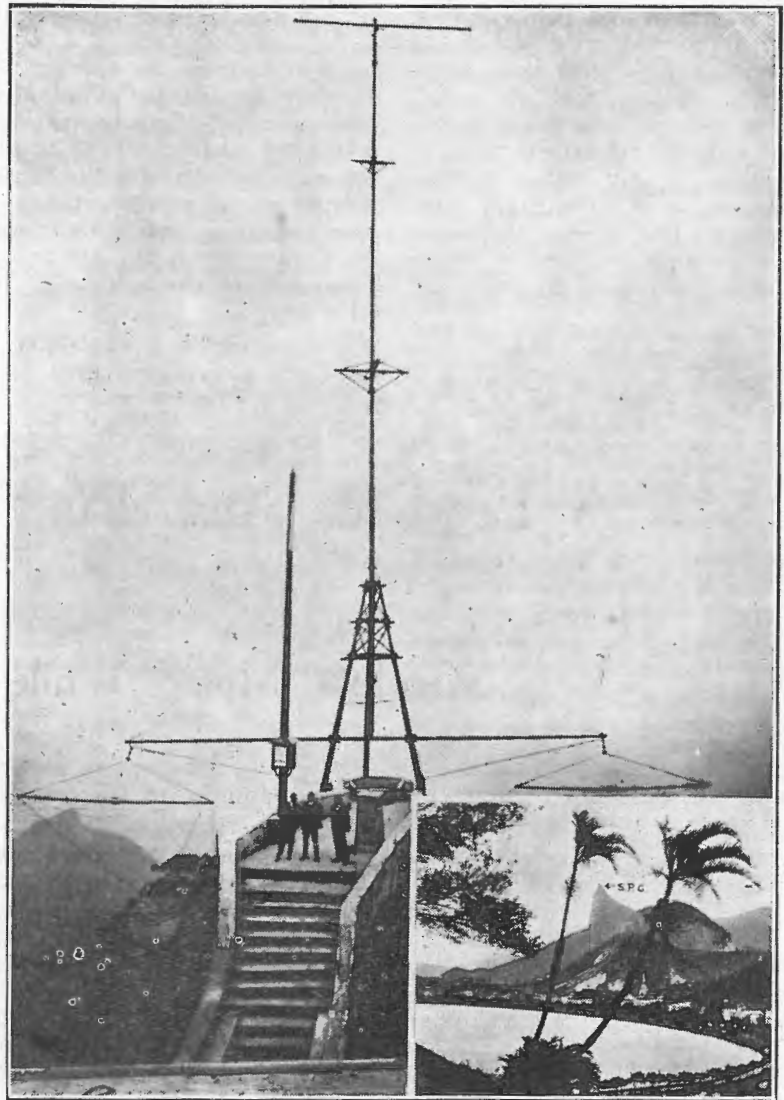
A start has been made to erect the Institute's "receiving set". When this is completed it is proposed to give a demonstration of Telephony to the general public, in order to enlist their support.

Quite recently a demonstration was given to some of the prominent business men of Hobart by the Tasmanian Division of the Institute. The transmitting station detailed for this work was 7AA in charge of Mr. T. Watkins, the receiving station, being 7AH, operated by Mr. M. H. G. Lewis. At the eleventh hour a most violent thunderstorm occurred, causing much anxiety to all concerned. At first Mr. Lewis decided not to risk his apparatus, and informed the spectators and transmitting station to that effect. Later he determined to try an indoor aerial, in the hope that it would overcome the unfavourable outdoor conditions to a certain extent. He procured a coil of bell wire, and by winding it around the rafters of an attic was able to fashion a loop aerial minus insulators. Owing to heavy rain prior to this the shingled roof was saturated, but despite this Mr. Lewis decided to make an attempt to get signals through. In a very short time Melbourne and Sydney stations were heard clearly, so it was decided to again communicate with the transmitting station, requesting Mr. Watkins to go head with the entertainment. Much to the surprise and delight of everyone the music was heard strongly by the aid of a three-stage audio

frequency amplifier and Brown's Loud Speaker. When the weather cleared the outdoor aerial was reverted to, and several Melbourne amateurs were heard conducting tests with local experimenters, both on speech and music.

The apparatus used at the transmitting station was a simple high tension battery circuit, consisting of one "R" type receiving valve with a potential of 90 volts supplied by No. 1000 poc-

ket lamp refills, Federal type of modulation transformer connected for microphone and "tonic train" modulation. The circuit used at the receiving station was the well-known triple coil circuit connected to an "Expanse B" valve used in conjunction with a three stage audio frequency amplifier with V24 valves. Much good work has been done by Mr. Lewis with this set, signals from Victorian and N.S.W. amateurs being heard nightly.



The Broadcasting Station (SPC) at Mount Corcovado, South America, which was recently completed, is the highest in the world. Inset at bottom right hand corner shows a distant view of the Mount on which the Station is built.

Radiotron Valves

RADIOTRONS form the centre of a system of radio communication which would be entirely impossible without them. These vacuum tubes are manufactured by the General Electric Company, and the Westinghouse Lamp Company for the Radio Corporation of America. There are so many shining examples of great distances covered by Radio-

There are many functions for the Radiotron to perform in connection with radio reception, and only its great versatility permits it to be confined to two forms which cover perfectly the varied tasks they are called upon to perform. These two forms are the detector and amplifier Radiotrons UV-200 and UV-201, respectively.

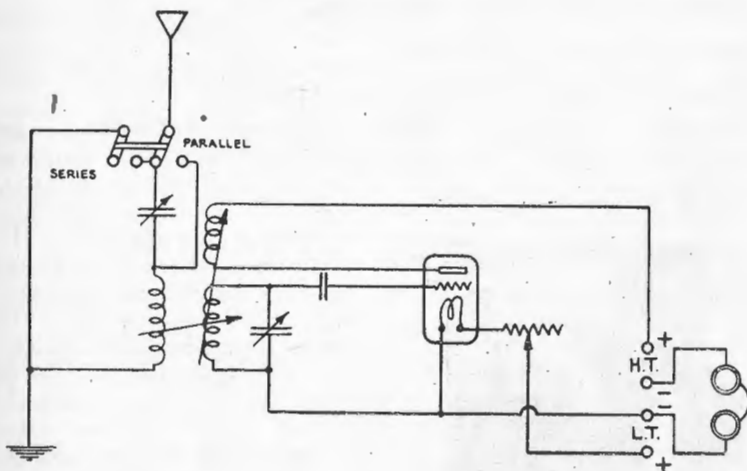
THE UV-200 DETECTOR TUBE.

Radiotron UV-200 may be called upon to perform a great variety of duties, as shown in the accompanying illustrations. In any receiving circuit, either simple or complex, Radiotron UV-200 is the detector which embodies all the characteristics necessary for faultless performance. The circuits which appear throughout this article show some of the common uses made of this wonderful vacuum tube, which has made communication over thousands of miles—a fact by means of the code and speech, to say nothing of music. Where long distances are to be covered, where stability of operation is desired, where long life and its resultant low cost are desired, where detector tubes of uniform characteristics are required for critical receiving adjustments; in fact, where ever real results are sought, there is but one answer to the detector tube question—Radiotron UV-200.

The Radiotron UV-200 is made with a standard four-prong bayonet base, designed to fit the Radio Corporation standard sockets.

In using Radiotron UV-200 for a detector, a grid condenser of approximately .00025 mfd., or thereabouts, should be connected in series with the

(Continued on page 184.)

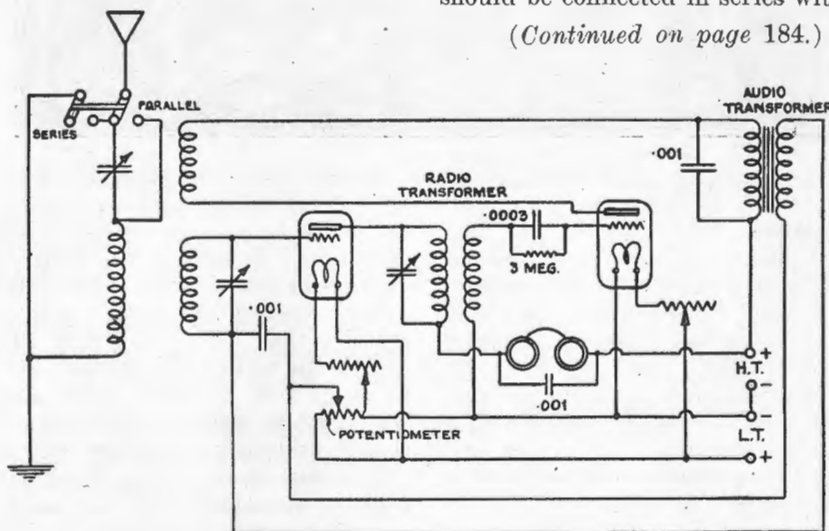


Inductively Coupled Regenerative Valve Circuit.

on reception and transmission that enumeration here would be impossible. With a single Radiotron, experimenters in Florida, and another in Cuba, have listened to the concerts sent out by a radio broadcasting station located in the vicinity of New York City.

The Radiotron detector tube was used by Mr. Paul F. Godley in his successful attempt to hear American amateur transmitting stations at the station he erected in Ardrossan, Scotland.

The electrical characteristics of all Radiotrons are practically uniform. This is made possible by the highly standardized method of production utilised by the manufacturers at the various factories for the production of Radiotrons. For this reason, the experimenter in using Radiotrons, is assured of a uniform reliability, as every tube is made to pass a severe test, and is rejected unless the high standard set for it is obtained.



SPECIAL TWO VALVE REGENERATIVE RECEIVER

Giving radio and audio amplification in addition to rectification; the first valve acting as a combined radio and audio amplifier. Note special connection of filament resistance in first valve for positive and negative potential effects on potentiometer.

A Pioneer Experimenter

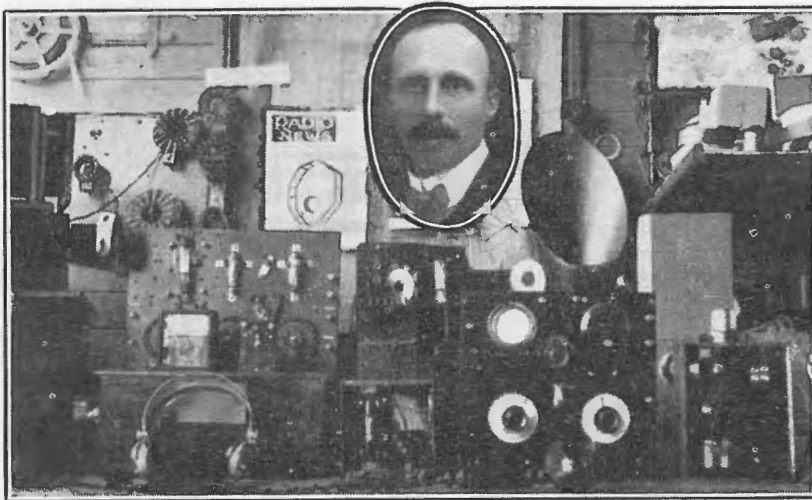
Mr. E. B. Crocker's Activities

Mr. E. B. Crocker (2BB) may rightly be regarded as one of the pioneers of radio experimenting in New South Wales. When he first became interested he was confronted with a position very much the same as that which faced the pioneers of settlement who landed in Australia in the early days. The initial stages of any undertaking are necessarily difficult; public interest is hard to arouse, and the experimenter may well be pardoned if, at times, he doubts the ultimate success and value of his efforts.

Fortunately, so far as radio is concerned, that time is now past. Wou-

menced work again, and the apparatus illustrated in this article—which is all home-made with the exception of the valves, 'phones, and accumulators—bears eloquent testimony to his good work. The results achieved compare very favourably with those of other experimenters. All Australian and Pacific stations and many American and European stations have been heard on one valve.

Mr. Crocker was one of the first New South Wales experimenters to transmit CW on a short wavelength with any measure of success. His wavelength at the time was 410 metres, and the results show that good



Mr. E. B. Crocker's Experimental Station. Inset: Mr. Crocker.

derful success has been achieved during the past couple of years, and the public is now fully alive to the commercial and entertainment possibilities of the science. The experimenter deserves a great deal of credit for this. He has plodded along, sparing neither time nor money in his endeavour to reach a high standard of proficiency in the construction and operation of wireless apparatus.

Mr. Crocker was deeply engrossed in his experiments at the outbreak of war in 1914, but in common with all other amateurs had to close down under the Commonwealth Government regulations. As soon as the restrictions were lifted, however, he com-

work can be carried out with one 5-watt tube. Telephony has been heard on crystal sets in practically all the suburbs around Sydney, which considering that the aerial is only 43 feet long, with a height of 30 feet, a lead-in of 25 feet, and the power used 5 watts, is no mean performance. It should certainly encourage others to experiment along similar lines with a view to demonstrating the practicality of transmitting on an indoor aerial.

Mr. Crocker is a council member of the New South Wales Division of the Wireless Institute of Australia, and is regarded as a tower of strength in radio circles in Australia.

Adelaide Activities

(By Our Special Representative.)

Mr. McLaren presided over a recent meeting of the Radio Association, at which there was a good attendance. The meeting was held to discuss further details arising out of the recent Melbourne conference, and to meet Mr. Collas, who represented Western Australian interests at that conference. Mr. Ames, secretary of the South Australian branch of the Wireless Institute of Australia, accompanied by members of that body, attended the meeting in response to an invitation.

Mr. Collas addressed the gathering and emphasized the necessity of establishing sound methods in the introduction of Wireless Telephony and broadcasting in this State. He advocated co-operation with Western Australian interests, and said that much had been accomplished at the Melbourne conference, at which it had been demonstrated that the interests of all States were identical. The speaker added that the value of co-operation had been demonstrated by the great help given him by Mr. L. C. Jones, who represented South Australia. The importance of Mr. Collas's suggestion was recognized by the meeting, and a resolution to that effect was carried. The following resolution was also carried:—

"That this meeting considers favourably the project of an institution covering all Wireless interests under the constitution."

This will be considered by the Wireless Institute.

Although there are only 10 licensed persons with powerful sets, there are more than 100 amateurs in the State equipped with receiving or "listening in" sets. There is a keen demand for sets and electrical houses are experiencing difficulty in obtaining supplies. Nevertheless, there are sufficient enthusiasts to warrant the nightly exchange of concerts.

Experimenters frequently entertaining are:—Mr. H. Kauper (5BG), Mr. F. Williamson (5AH), and Mr. L. C. Jones (5BQ), all located within a 10-mile radius. The establishment of broadcasting stations is being anxiously awaited on every hand.

Radio Doings in Queensland

(By Our Special Correspondent.)

ALTHOUGH wireless in Queensland dates back as far as 1910, an active interest in it was displayed only after the termination of the war. The number of licensed amateurs is already large and is growing each day as the sets are put into working order after the receipt of licenses. In a chat with several leading Brisbane firms, the writer was acquainted with the fact that the same difficulty is being experienced here as in the South, viz., the difficulty of filling the large number of orders for receiving sets.

Although at present broadcasting is carried on only by a few individuals and clubs, there is every reason to believe that some firms intend, in the near future, to erect transmitting stations and supply regular concerts.

There are practically only four broadcasting stations in Queensland, two in Brisbane, and one each in Gympie and Maryborough. It is generally admitted that Station 4CM, owned by Dr. Val M'Dowall, Preston

House, and operated by Mr. T. Elliot, is the leading station, and next in order is that of the Queensland Wireless Institute, to which big improvements have recently been made. Consequently, although wireless here is not deficient in quality, it seriously lacks quantity. Therefore, it is pleasing to note that several enterprising individuals have lodged applications for transmitting licenses, which in several instances, have already been issued. Thus Brisbane folk may rest assured that in the very near future broadcasting will be in full swing.

Another point of interest is the attention paid to wireless by newspapers in Brisbane, Gympie and other centres. In the majority of cases they are doing everything to encourage amateurs, and are always ready to give their doings every publicity.

All eyes in this State are now turned towards the Queensland Institute of Radio Engineers, which is getting into its stride. Up till recently

experiments have been carried on in a moderate way, but the Council has in view an ambitious programme, which it hopes soon to commence.

Brisbane can now be credited with its first radio dance. On May 31, Mr. T. Stephens, Ipswich Road, entertained a number of friends at a radio dance at his residence, and the results were very creditable.

As this was the first radio dance in Queensland, Station 4CM, owned by Dr. Val M'Dowall, at Preston House, which is credited with the success of Queensland's first radio concert, was entrusted with the task of supplying the music.

Mr. Stephens operated his two-valve receiving set, and, at the conclusion of the evening, expressed himself as highly pleased with the results. The broadcasting was in the hands of Mr. O'Hearn and Mr. T. Elliott. Throughout the evening statics were not troublesome, whilst commercial stations were fairly quiet.

Big Men in the West Interested in Radio

(By Our Special Correspondent.)

The old motto, "Slow but sure," can be aptly applied to the progress made by radio in West Australia.

The recent Broadcasting Conference did much to stimulate public opinion, and the gazettal of the regulations is now awaited with interest. There is no doubt whatever that when broadcasting commences one of its immediate effects will be to educate those who have long held the belief—a few

still hold it—that radio will never come down to the level of the average untechnical man. As a matter of cold fact wireless has been so simplified that its fundamentals can now be readily grasped by a schoolboy of ten. It is a healthy sign when several prominent nor'-west pastoralists and sheep station owners are evincing a keen interest in wireless. In fact a number of them have already got together in a determination to investigate the commercial possibilities of radio. One can picture a time in the not very distant future when the nor'-west cattle kings will be kept fully apprised of the daily happenings in the business world a couple of thousand miles away. A number of these "big" men intend going East very shortly, and the pursuit of further information regarding radio will form quite an important part of their programme.

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The Experimenters' Corner



IMPROVING HONEYCOMB COILS.

It often happens during the cold and wet weather that difficulty is experienced in getting honeycomb coils to function properly. The smaller sizes, owing to the fewer turns exposed to atmospheric influence, show very little variation, but the coils used for longwave reception often refuse to oscillate. The cause of this intermittent working is the condensation of moisture within the coil itself, and upon the binding strip used to attach the coil to the plug mounting. During very humid weather the moisture collects like dew on the outside strip. A permanent cure can be effected as follows:—

Take all coils and hang them up—well separated—inside a gas stove or oven, and heat them for at least half an hour. Do not have the heat too

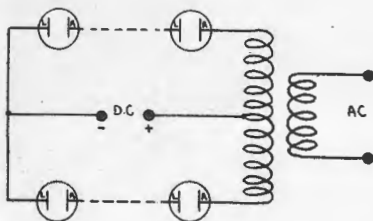


Fig. "A."

great or the insulation may be scorched. Now take them individually and dip into a can containing molten paraffin or beeswax, leaving the coils there until no more bubbles rise, then take out and shake them free of excess wax; allowing them to cool with the plug end down so that any free wax drains down into the part where it is most needed, i.e., the terminals of the coil. The increase in distributed capacity is so small that no apparent change in the tuning condensers before and after treatment can be no-

ticed. Be sure and clean the pin and socket of the connecting plug free of wax before putting into use.

ELECTROLYTIC RECTIFIERS FOR TRANSMITTERS.

The provision of a supply of current at a voltage of 350 to 500 volts is a problem which confronts experimenters building a valve transmitting station. For small amounts of current there is nothing to beat the electrolytic rectifier as regards first cost and simplicity of operation. There are two important points to be watched when building this type of rectifier. The current density on the electrodes should not exceed 0.1 amp. per square inch, and the voltage across the terminals of the cell must be kept below 100 volts. The lower the voltage the rectifier has to handle, the more perfect will be its action. The limiting voltage is in the neighborhood of 150 volts when the solution is cold, but as it warms up this limit falls. There is little to be gained from a practical standpoint by lowering the voltage below 70 per cell, therefore for use with a 5-watt Radiotron working from a 500-volt transformer, twelve jars connected according to Figure (A) or (B) will suffice. The connection shown in (A) is for a 1000-volt transformer with a centre tap, while (B) is suitable for a single 500-volt winding with no centre tap. If the number of jars in each leg of the bridge connection in (B) are doubled (i.e., to six), it is possible to handle the output of a 1000-volt transformer.

For the electrodes use lead and aluminium. A suitable size to handle up to 500 milliamps is 6in. x 2in. with 4in. immersed in a saturated solution of borax. This solution should be mixed up in bulk with warm water

and allowed to stand overnight to ensure saturation. The containing cells are one pint fruit preserving jars, obtainable from any hardware store. Turn out from some close grained wood 12 tops for the jars, and slot them to take the electrodes. They must be boiled in wax to prevent absorption of the borax solution. Set the electrodes in firmly with molten composition from the top of dry cells. Through the centre of the lid a $\frac{3}{8}$ in. hole is bored, and a little to the side of it another hole $\frac{3}{32}$ in. diameter. The reason for these two holes will be apparent later. Now take the glass jars and immerse them in some molten paraffin wax, so that a surface film remains all over. This prevents subsequent creeping of the solution. Take the mounted electrodes, and, with some of the previously mentioned composition from the dry cells, seal them liberally to the glass jars. Run a hot iron around the joint between the two to ensure perfect contact. The

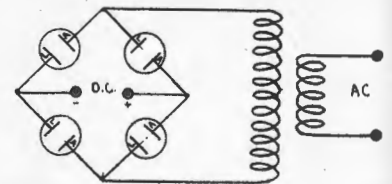


Fig. "B."

borax solution is poured into the cells through the $\frac{3}{8}$ in. centre hole until it reaches within one inch of the top. The smaller hole is to allow the air to escape as the solution is poured in, otherwise "backfiring" would result. Cork up the centre hole with a waxed cork, leaving the other free to act as a "breather."

A teaspoonful of loose borax powder should be poured into each jar

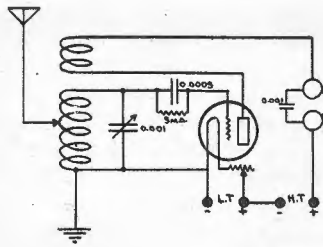
to maintain a saturated solution when the electrolyte heats up. The surface of the aluminium and lead plates must be perfectly clean before being put into operation. Scour them with sand soap prior to being sealed in.

When first put into circuit the jars will pass current both ways until the hydrate film is formed on the aluminium. To prevent injury to the transformer during this process connect several metal filament lamps (one for each 250 volts) in each leg of the transformer. They will light brilliantly at first and remain so for a while, but will soon dim and go rigid. When this happens, the rectifier is ready to be put into operation.

A SIMPLE AND SELECTIVE RECEIVER.

The two-coil valve receiver which employs direct coupling to the aerial circuit is a great favourite amongst experimenters, owing to its ease of operation and simplicity of construction. Its great disadvantage is the manner in which it responds to almost every radio wave that happens to pass by the aerial. The advantage of inductive coupling with none of its complications is obtained by connecting up the variocoupler as in the accompanying diagram. At about ten or twelve points along the inductance, taps are taken out and led to a multi-point switch on the receiver panel.

It will be noticed that there is no tuning provided for the aerial circuit, and, although this seems radically wrong at first sight, it will be found to matter but little in practical operation. The aerial acts as an aperiodic collector circuit and delivers a regular



radio "cocktail" of signals to the tuned valve circuit, from which the latter selects the component to which it is tuned. By making the number of turns of wire included between the aerial and earth small, the coupling will be made weak, and the selectivity increased. To make the aerial circuit thoroughly aperiodic, a non-inductive resistance connected therein flattens out its tuning and makes it responsive with equal intensity to a wide band of waves. A prominent Sydney experimenter using a similar circuit originally designed for 1200 metre work has succeeded in copying 400 metre Victorian stations, merely by adjustment of the coupling.

A Queer Demonstration.

Jimmy—You take this wireless receiver I just finished making, and go down stairs in the cellar; hold it close to your ear and listen.

Freddy—(after waiting in suspense for several moments in the cellar)—Aw—it's a fake; I don't hear a thing.

Jimmy—Good! That shows it's workin' right. I didn't say anything yet.

HINTS ON THE USE OF VALVES.

- DON'T handle valves roughly, or elements may be injured.
- DON'T burn valve filaments above rated amperage and voltage.
- DON'T insert valves in sockets unless absolutely certain filament resistances are turned off or at the proper setting for normal operation.
- DON'T make the fatal error of connecting the plate battery to the filament battery. Watch all battery connections.
- DON'T burn out a valve and expect your dealer to exchange it for another.
- DON'T expect a loud speaker to operate on weak signals, generally one stage of amplification is necessary to give good results.
- DON'T operate a valve set from a low amperage accumulator, a steady current is necessary for the filament, especially with soft valves.
- DON'T be anxious to produce sound with very great volume; it is not necessary.
- DON'T forget that valves cost from twenty to thirty times as much as ordinary incandescent lamps—they deserve a little respect.
- DON'T take one valve out of a cascade circuit in which the filaments are in parallel. It causes a rise in current in the remaining filaments, and may burn them out. Cut off all the power first.
- DON'T expect to get best results if you use an amplifier valve for a detector, or vice versa.

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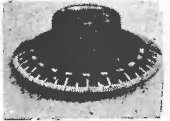
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Born Optimists

The success achieved by New Zealand experimenters during recent months emphasises their high standard of efficiency. It is a healthy sign to observe the friendly interest prevailing between Australian radio enthusiasts and their fellow experimenters in the Dominion. The geographical position of the two countries offers excellent facilities for conducting experiments on the lines along which the Metropolitan Radio Club of N.S.W. proposes to work. Friendly

rivalry is an excellent stimulant to achievement, and with the experimenters of the two countries on their mettle it is quite possible that sooner or later records that will astonish even overseas experts will be credited to the experimenters of either one or other country, or both.

A recent visitor to Australia from New Zealand when in a humorous vein related a few incidents illustrative of the inborn optimism of Dominion amateurs. Following on the success in hearing American signals recorded from quite a number of stations one experimenter gravely announced his intention of trying to get the "whispering voices" on a "loud speaker." Not to be outdone a friendly rival declared that as soon as he could get his "crystal" set working he would have a "go" at the American signals. Our visitor did not enlighten us as to whether the attempts indicated were made, and if so with what result. He preferred, he said, to leave that to our imagination. The laughter that greeted his story showed that it "tickled" our imagination.

MALVERN EXPERIMENTERS.

About 50 enthusiastic experimenters of Malvern (Victoria) and surrounding districts met on Thursday, June 28, in the Malvern Town Hall, and adopted the Constitution of the newly-formed District Section of the Wireless Institute.

The following Office-bearers were elected:—President, Mr. R. A. Golding; Vice-president, Mr. T. Court; Hon. Sec., Mr. B. J. Masters. Asst. Hon. Sec., Mr. H. L. Johnson; Members of Committee, Messrs. Love, Holst and Conry; Delegates, Messrs. Conry and Masters.

Until the Club can arrange for permanent Club Rooms, it will meet on the second Tuesday in each month in the A.N.A. Hall, High Street, Prahran, and all experimenters of the district are cordially invited to come along and join up.

Radiotron Valves

(Continued from page 179.)

grid. Many experimenters prefer a variable grid condenser which is of value in regenerative circuits. In addition to the grid condenser, one of the Radio Corporation's standard

grid leaks should be connected across the grid condenser, as shown in diagrams.

RADIOTRON UV-201.

Where it is desired to use loud speakers, in order to eliminate the necessity of listening to radio with the head telephones, sufficient energy must be provided to actuate the loud speaking device. A most suitable means for providing this energy is found in audio frequency amplification, which is the combination of Radiotrons and amplifying transformers functioning with a local source of current.

The incoming radio signals affect the vacuum tube in such a way as to draw current from the local source; this local current is then used to actuate the loud speaking device.

As may be seen from the following description, the amplification factor ordinarily obtained where this method is employed, is between 6 and 10; so that for each stage of amplification the incoming signal is multiplied from 6 to 10 times. Where several stages are used, the signal may reach 36 to 100 times its original intensity.

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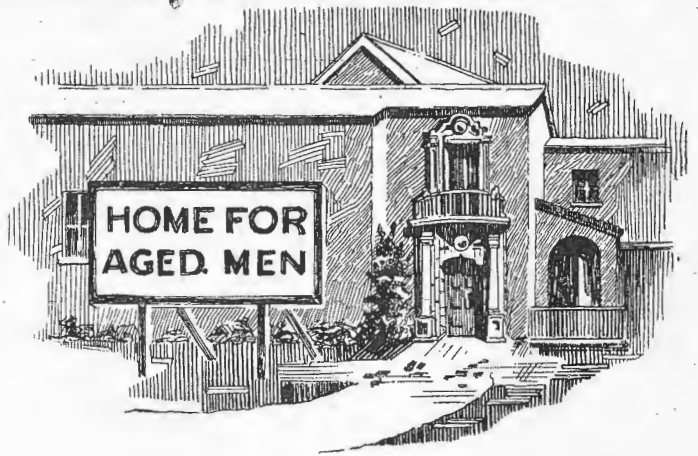
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The Fear that haunts your declining years

Red blooded youth, healthy in mind and body, sound in wind and limb, lives for to-day; to-morrow can take care of itself. The responsibilities of manhood are not yet urgent.

YOUR youth has passed; you have reached the age of discretion. Maybe you have accepted the responsibilities of marriage and parentage.

In your thoughtful moments you wonder where your declining years will be spent. In a home for the aged—living on the charity of others—one of life's derelicts—a monument to cause and effect?

And your partner, she who has shared your joys and sorrows, she whom you vowed to cherish and protect, what of her?

Put this question to yourself,

"Am I a Real Man?"

Give this query a straight-from-the-shoulder

answer. Push regrets behind you. Concentrate on bigger things.

Kill the Ghost!

Destroy the haunting fear that is robbing you of initiative, the fear that is sapping your boundless energy, and besmirching the clear grey of your brain cells.

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That initiative which gained Australians such a reputation overseas and which was the direct cause of Australia's being recognised as a Nation, is now being developed along business lines by 1000 Australians. This is the number who are daily finding better work and better pay

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No one can kill that ghost but you. Write now for the book that will help you to become a real executive. Don't strangle that impulse, control it. Take the first executive action of your life. Write now!

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Radiofun

At considerable expense we have made exclusive arrangements for the publication of "Radio Ralf's" adventures, which is one of our regular features. Hereunder is one of Ralf's adventures, and in subsequent issues of "Radio" his many thrilling experiences will be recorded, which we believe our readers will enjoy.—Ed.

RADIO RALF—

By Jack Wilson



DICTIONARY OF TECHNICAL TERMS.

"H.T."—A source of current supply often used on the filament to transfer a V.T. from the polished panel to the garbage tin.

Grid Leak.—Well, the only leaky thing worth keeping.

Thermo Couple.—A term applied to "Newlyweds"; at the height of a heated argument.

Aerial.—Much resembling a Bill Collector—the further or higher from the house grounds the better.

Vernier.—A great swearing and bad language eliminator, especially on broadcast wave-lengths.

Howling Valve.—A crying shame!

Earth.—A thick substance used greatly by Radio "Hams" for preventing the earth plate from flying up and smashing the aerial.

Internal Wiring.—A future form of punctuation which will entirely eliminate the now much-used mark of interrogation.

COLD WEATHER?

Mr. Accumulator Plate: "Here am I doing a shiver in these cold baths, while Mr. Grid is at home curled up by the fire!"

SAYS THE VALVE—

When waves of music surge through me,
The feeling—it is great.
The Waltz and Jazz—I've let them be,
And now I oscillate.

* * *

A good detector tube am I,
All coupled up with wires,
I kid myself, when I'm placed by
Two L.F. Amplifiers.

* * *

Old King Cole bought a Hundred-foot pole,
And a coil of Seven-Twentee;
And a twelve-valve set,
Just to see what he could get,
For a Radio "Ham" was he.

YOU MAY OPINE SO, BUT HE DOESN'T.

Listen, old-timers, and your fones will resound
With the well-known squeal of the CQ hound,
Whose sending won't stop for fire or flood,
Though every old-timer thirsts for his blood.

It's always, "Hello, and how am I now?"
And "QSU now, for it's time to chow."
He is always on deck, though "QTC NIL,"
His message will read, "Is this you or Bill?"

A Radio Amateur I,
No joke would I cherish so high,
Than to Broadcast the smell
Of the Beer liked so well,
To American "Fans" who feel dry!

* * *

Ten thousand kilowatt's my power,
I work on I.C.W.
When, after music on my wave,
I hope I do not trouble you.

LETTER TO THE EDITOR.

Dear Mr. Editor,—

An *ex*-wireless operator (a great friend of mine) sprung a good one on me regarding a new amplifier he made recently. He declares that at 12,000 miles range, he can pick up the waves radiated from the fur of the old ship's cat, every time it is stroked—Fact!

Yours Radiusly,
A. TALLWUN.
—Contributed by—
R. H. E. CHANNON.

Oh! For his presence and a huge retty-snitche,
A double-barreled shotgun, a barrel of hot pitch.
That never again could we hear that sound.

Sydney Firm Supplies Entertainment

Paling's Weekly Radio Concerts

Experimental transmissions are still being conducted from Paling's by the New System 'Phones acting under a temporary license from Amalgamated Wireless (Australasia) Ltd. Last week's concerts were given with even greater success than formerly. On the 20th June, Madam Ada Gee's Pupils gave a Recital. Miss Mary Judd, violinist, played solos, and Mr. A. Kerr, cornet champion of Queensland, played "The Rosary" and other popular numbers. Roderick Tiernan, baritone, and Miss Muriel Humphries, soprano, completed a very interesting programme. On Friday, 22nd June, Mr. Roy Head, pianist, Ronald Potter, baritone, and Roy McKinlay, tenor, appeared. Mr. McKinlay is a well-known tenor from Brisbane who has been engaged by the Sydney Philharmonic Society to sing in "Elijah". He sang with splendid effect Liddle's "Farewell", a new Maori song, and finished up with a new Fox-trot song, "Josie". A record by "His Majesty the King and Queen" was given out with splendid effect. On Wednesday, 27th June, the whole of Paling's Monthly Recital was transmitted, commencing at 8 o'clock and continuing until 10 o'clock. Over 20 items were given out, including solos by Miss Elsie Peerless, soprano, Stanley Catlett, tenor, E. J. Wood, baritone, and violin solos by Miss Mary Judd, with accompaniments on

the Behning and Autotone Player Pianos. Mr. Oswald Anderson conducted the proceedings and explained that by arrangement with the New System 'Phones a listening in set had been installed in the Highland Society's Rooms that evening, where they were holding a smoke concert. The whole of their musical programme was being obtained by radio from Paling's. To make the effect more realistic for the Highland Society's evening, they sent their Pipe Major to Paling's Hall where Bagpipe Selections and appropriate melodies were transmitted. The Hall was crowded and every item was enthusiastically received.

On Sunday evening, July 1, many well-known theatrical and concert artists gathered there for the purpose of giving a Concert to the many thousands of listeners in. Miss Lee White and Clay Smith gave a number of items at the piano, in addition to Miss Lee White's appeal for subscriptions for the St. Margaret's Hospital for Babies. The main items for the evening were arranged by Mrs. Lightband and the following artists appeared:— Miss Gertrude Palmer, piano solos; Mr. Harold Bloomfield, operatic tenor; Westell Gordon, whose songs at the piano were a feature of the evening; Mr. Alex. Wright, baritone, and Mr. Winslow Knight, who sang with splendid effect "The Poet's

Song" from "La Boheme". The humorous touch of the programme was given by songs by Sam Rowley, an old identity from the theatrical world. Billy Lockwood's imitations of Miss Lee White were wonderfully like the original. Keith Desmond in dramatic and humorous monologues, and finally Miss Mona Wilkins, the possessor of a very dainty soprano voice, sang "Pipes of Pan" and "Musette's Song" from "La Boheme". The evening was terminated by the whole company singing "God Save the King". Reports were received from various centres saying how wonderfully clear the transmission was.

The Wentworth Radio Club recently held a demonstration of Wireless telephony, using an electric light aerial. There was a good roll-up of members, and the evening proved very interesting.

* * *

The Metropolitan Radio Club proposes to hold on September 3 a big social evening, at which there will be the presentation of prizes to the successful competitors in the N.S.W.-New Zealand Radio Test. A good attendance is expected, it being anticipated that the importance of the proceedings will attract numbers of enthusiasts.

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'PHONES. — Double-head Sets, Murdock's 2000, 30/-; Bestone 2200, 32/6; Trimms 3000, 39/6; Western Electric 4000, 42/-; 8000 45/-; Stromberg Carlson 2000, 45/-; Brands' superior, 55/-; Baldwin's mica diaphragm 2000 were £7/7/-, now £4/18/6.

VALVES.—Mullard Ora, 27/6; Royal Ediswan, 30/-; Myers detector and Hi-Mu, 35/-, V24 37/6; Cunningham 300, £1/17/6, 301 £2/2/, 302 5 watt £2/10/; Radiotron 200, £1/17/6, 201 £2/2/, 201a £2/5/ (this tube works with only ¼ amp. on the filament); Radiotron 202, 5 watt tube, £2/10/-; W.D.11, 1½v., works off dry cell, £2/10/; D.E.R., 2 volt, £2/10/-; Q.X., 47/6; Expanse B, 35/-.

A small shipment of Jefferson Intervalve Transformers coming. Order now. Priced £2.

Phillips Tubes, Detector and Amplifier, 25/-.

RHEOSTATS.—Col-Mo, 7/6; Remler, 8/6; Bestone, 7/6; Power 8 amps, £1; Remler coil mountings suitable for panel with anti-capacity extension Handles 25/; Vernier Rheostat, 10/6. Coil plugs: Remler, 4/6; English, 4/-; B. Batteries, 8 tappings, 21-41 14/, 21-31 10/6.

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Club Notes & News



WIRELESS INSTITUTE OF AUSTRALIA

N.S.W. DIVISION.

The Council of the above Division is arranging for the appointment of a full-time organiser for the forthcoming Wireless and Electrical exhibition. This course has been found necessary owing to the previously appointed honorary organiser, Mr. O. F. Mingay, being unable to continue the work owing to pressure of business. The Council is unquestionably acting wisely. The exhibition will be an important one and is bound to attract a tremendous amount of interest. It is essential that nothing should be left undone to ensure success, and the action of the Institute Council is along the right lines. In the meantime, the organisation is being pushed ahead with all possible despatch.

RADIO ASSOCIATION OF N.S.W.

A general All Clubs meeting will be held on July 12, at which Mr. G. E. Taylor will lecture on broadcasting and how it affects the public and the genuine experimenter. The meeting place will be at the Education Building, corner Loftus and Bridge Streets, Sydney. It is hoped that all clubs will avail themselves of the opportunity of meeting at this lecture, as it is of primary importance to all who at present hold experimental licenses.

The Radio Association has been approached by the Broken Hill District Radio Society for affiliation. It is hoped that in the near future all clubs will see their way clear to become affiliated with the Association, as it is essential that experimenters should be one united body.

AUSTRALIAN RADIO RELAY LEAGUE.

With reference to the transmitting roster, Mr. R. C. Marsden has definite-

ly decided to give up running it. The display on a recent night was beyond all reason. Those transmitters who happen to disagree over the ether should discuss their grievances on the landline and not in the ether. The latter practice tends to lower the high standard of the wireless experimenter. The matter of the roster will be brought up at the Radio Relay League and will be thoroughly thrashed out. It is sincerely hoped that those transmitters who at the beginning signified their intention of abiding by the unwritten rules, will take this matter to heart.

KURIN-GAI DISTRICT RADIO SOCIETY.

A very instructive lecture covering a wide range was given at a recent meeting of the Kurin-gai District Radio Society by Mr. R. Hill. Mr. Hill was called upon at the last moment to take the place of Mr. Mingay, who was unavoidably absent owing to a Council meeting of the Wireless Institute. Nevertheless his lecture touching on Radio Frequency Transformers, Wave Meters and Tuning Coils was extremely valuable, and members were not slow to show their appreciation of it.

Members of this Society are eagerly looking forward to a visit to Mr. MacLurean's Station at Strathfield. For the information of all concerned, it is again notified that buzzer practise is held for 45 minutes prior to the commencement of each meeting at 8.15 p.m. and those who wish to avail themselves of the opportunity of practising their Morse are particularly requested to do so.

WAVERLEY AMATEUR RADIO CLUB.

At the June 21 meeting of the above club it was decided to hold a concert on July 21 in St. Luke's Hall, Varna Street, Clovelly. The authori-

ties will be approached for permission to hold a wireless telephony demonstration on that evening as an added attraction. Mr. Marsden (2 JM), who has been delighting "unseen audiences" by his excellent programmes, has kindly consented to transmit.

It is hoped that a large number of radio enthusiasts will support the entertainment.

At the conclusion of the general business a lecture was delivered by Mr. Marsland.

ILLAWARRA RADIO CLUB.

At the 25th general meeting of the above Club the proposal to have a common meeting night for all clubs was considered. The consensus of opinion was that the proposal was not acceptable mainly because it would preclude members of different clubs visiting other clubs. Furthermore the suggestion that experimental stations should be asked to close down on that particular night would soon prove ineffective because of the probable early commencement of broadcasting. The meeting instructed the Club's delegates to the Radio Association to vote against the proposal.

The Radio Relay League was warmly supported, members generally voicing their approval of its great practical value.

A suggestion was put forward that all amateur transmitters should be asked during each programme of transmission to give, say, five minutes of buzzer practice at varying speeds. This, it is thought, would be of vast assistance to the amateur who is learning and acquiring speed in reading Morse signals, as he would be doing the work under practical conditions. The delegate was also asked to bring this matter up at the Radio Association.

Later in the evening Mr. C. A. Gorman continued his lecture on "Radio



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Frequency Amplification on Short Waves." He dealt with his recent experiences in this connection in the Trans-Pacific tests, in which, as is known, he achieved remarkable results.

Mr. Gorman was assisted at his station during the tests by Mr. A. T. Whitaker, of Banksia (also a member), and the club has cause to feel proud of the great success achieved by these two gentlemen. At the meeting the club's appreciation of their fine work was carried by acclamation.

Information concerning the club can be obtained from the Hon. Sec., Mr. W. D. Graham, 44 Cameron Street, Rockdale.

ITEMS OF INTEREST.

During the recent storm, experimenters aerials suffered severely. Both 2JM and 2GR had their aerials carried away. Very shortly we hope to hear these stations once more in the ether.

On the day before the gale reached Sydney, 2ER put up a very fine mast, and notwithstanding that it had only been erected a few hours it stood the test O.K.

The Metropolitan Radio Club has the arrangements for the forthcoming Test with New Zealand well in hand. Entry forms are available at most of the leading wireless shops. Amateurs should realise that entering for a test such as this will prove to the public generally that they are genuine experimenters and not mere "listeners in". Up to date, applications for entry forms have been coming in very well, and it is hoped that before July 4—which is the last day for receiving entries—the majority of experimenters will have signified their intention of taking part in the Test.

On Sunday, June 10, at 4 o'clock in the morning, 2DS and 2JM carried out a test with Mr. Orbell, of Christchurch, N.Z. Two-way conversation was carried out, and the result proved that the forthcoming N.S.W.-New Zealand Test will be productive of keen interest and probably, remarkable results.

Mr. Orbell, of Christchurch, N.Z., reports that he can hear the majority of Sydney experimenters working every evening. He reports that 2CM—Mr. Chas. Maclurcan—signals can be heard 200 feet from the telephones in Christchurch, N.Z. This proves the efficiency of the N.S.W. experimenter to-day.

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Technical Terms Used in Wireless

Oscillations.—Alternating currents of very high frequency. Continuous or undamped waves are created by oscillations which are constant in amplitude. Damped waves, such as are used in spark telegraphy are created by oscillations, the amplitude of which is not constant.

Potential.—Potential may be regarded as the difference of electrical level giving rise to electro-motive force. The unit of potential is the Volt.

Radiation.—The transmission of energy through space in the form of electro-magnetic waves.

Radio Frequencies.—Frequencies corresponding to vibrations not normally audible to the human ear. See *Audio Frequency*.

Reactance.—A function of the inductance capacity and the impressed frequency in a circuit.

Rectifier.—Any apparatus for converting alternating or oscillating currents into continuous current or into pulses of uni-directional current.

Rectifier Electron.—A device for rectifying an alternating current by utilizing the approximately unilateral conductivity between a hot cathode and a relatively cold anode in so high a vacuum that a pure electron current flows between the electrodes.

Regeneration.—Regenerative or retro-active amplification obtained in a

thermionic valve by causing the energy variations of the anode circuit to feed back into the grid circuit, and thus increase the voltage operating on the grid.

Resistance.—The property possessed by a conducting medium by which it opposes the flow of electricity through it. All metals have more or less electrical resistance. Copper is used universally for both electrical and radio work on account of its low resistance and comparative low cost. The unit of resistance is the Ohm.

Resonance.—Resonance is the name given when the condition of a given circuit is such that its natural frequency has the same value as the frequency of the alternating electro-motive force introduced into it. When this condition exists the effective current or voltage in the circuit is a maximum. The theory of electrical resonance is the same as that of acoustics, readily demonstrated by tuning forks when one tuning fork will not respond to another unless it is of the same key or pitch.

Rheostat.—A variable resistance usually employed to control or regulate the value of current flowing in a circuit.

Selectivity.—The power of a receiving system to discriminate between a number of simultaneous signals.

Sharp Tuning.—Sharp tuning is the term used when a very slight change in adjustment of a tuner or tuning system produces a marked effect in the strength of signals.

Static.—See *Atmospherics*.

Transformers.—A stationary induction device for transferring energy from one circuit to another by the medium of magnetic energy. It may or it may not transform the current into another current at different potential. Thus we have power transformers, amplifying transformers, oscillation transformers, telephone transformers, etc.

Tuning.—The process of securing the maximum indication by adjusting the time period of a driven element. Thus the act of tuning an electrical circuit involves the alteration of the capacity or inductive values so as to bring the circuit into resonance with any given applied frequency. In radio receiving the greatest signal strength is possible only when the product of the inductance capacity value of the receiving circuit matches that of the transmitter.

Undamped.—The term applied to high frequency oscillations of a constant amplitude, such as continuous waves or C.W.

(To be Continued.)



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Queries Answered



Wireless Willie (Longreach): We have noted your remarks with interest. We would advise a Loose Coupler set with variable secondary condenser, and fixed phone condenser—Brown's 2,000 ohm phones and galena crystal. Why not, however, instal a valve receiver, as you would get very little on a crystal. There are too many points to be considered to allow of a reliable answer to your second query.

J. H. (Griffith): The primary, secondary and tickler tuning circuits in the reflex receiver are similar to those used in any standard receiver for the wave-lengths desired to be used. The only additional apparatus required is the Radio Frequency Transformer, of which full details were given in Mr. Reed's article in "Radio" No. 5.

A. G. (North Richmond, Vic.) asks: (1) Gauge and amount of wire required to build variocoupler as described in "Radio" May 30. (2) How to receive concerts, etc., more clearly using crystal detector in conjunction with double slide tuner, measurement of aerial submitted.

Answers (1) Stator 50 turns No. 24 D.C.C. Rotor 50 turns No. 50 D.S.C.

(2) This depends on power of transmitting station. With good crystal and high resistance phones you should read station at the distance mentioned.

G. A. S. (Quipolly) asks: (1) Would a single wire aerial, 3/20 gauge wire, 35 feet high at both ends, 300 feet long, make a good aerial for receiving. (2) Which would make the best ground, a copper filled with ashes or a sheet of galvanized iron

buried 6 feet in the ground. (3) What is the gauge of sample of wire submitted.

Answer: (1) Reduce the length to 200 feet, as its natural wavelength is approximately 450 metres, which is too high for the reception of experimental stations.

(2) Whichever has the greatest surface area.

(3) No. 24 single silk, suitable for winding short wave variocouplers and tuning coils.

T. W. M. (Dulwich Hill) asks: (1) What is a suitable single valve circuit using crystal detector and audio frequency amplification. (2) Is it essential that the lead-in of a T aerial should be taken from the centre of the aerial.

Answer: (1) Previously published in Q. and A. column of "Radio."

(2) No—not as regards reception.

Gripped by Radio

The "wireless" habit is already seriously affecting our social life. In a country house the other day it was possible to make up a four for bridge, or secure an opponent for a game of billiards, because all the guests had retired to the bedroom of the young son of the house, there to "listen-in" to the broadcast wireless news and entertainments, on the re-

ceiving set which the said youth had just installed. Earlier in the evening the same youth had made a late appearance at the dinner-table, where I overheard him telling his neighbour that he had been delayed by "listen-in" on his receiving set for a certain orchestral selection.

"But," said his neighbour, "you don't mean to tell me that you have

been dressing with the receivers to your ears?"

"Yes," said the young enthusiast, "I do; and, what is more, I tied my bow round the wire, as well as my collar. Also I brushed my hair to ragtime, and buttoned my boots during the one-minute intermission between two items."

Movements of Marine Operators

Mr. R. S. Bastin, who was relieved by Mr. R. J. Inglis on s.s. *Wear*, at Melbourne, on June 5, has terminated his service.

Mr. W. Hill was relieved by Mr. W. H. George on s.s. *Kowarra*, at Melbourne, on June 2.

Mr. M. L. Robertson rejoined s.s. *Gorgon*, at Fremantle, on May 22.

Mr. A. G. Dixon was relieved by Mr. W. C. Brown on s.s. *Wahine*, at Wellington, on May 30.

..Mr. G. Whiteside transferred from s.s. *Waitomo* to s.s. *Kaiwarra*, at Auckland, on May 28.

Mr. P. J. Manly signed off s.s. *Ooma*, at Melbourne, on May 29.

..Mr. W. C. Lucas returned to the operating staff, and joined s.s. *Kadina*, at Sydney, on June 9.

Mr. R. W. Barnes, who was relieved by Mr. M. H. Stuart on s.s. *Junee*, at Melbourne, on June 6, has proceeded on Home Port leave.

Mr. K. McSwan, who signed off s.s. *Corio*, at Melbourne, on June 9, has returned to Sydney.

Mr. L. N. Callaghan, who signed on s.s. *Barambah*, at London, on March 27, as third operator, was relieved by Mr. A. B. N. Weeks, at Sydney, on June 10, and proceeded on Home Port leave.

Mr. A. D. R. Davis, who was relieved by Mr. R. E. Haddock on s.s. *Time*, at Sydney, on June 12, has proceeded on Home Port leave.

Messrs. A. J. Costa and R. C. V. Humphrey signed on s.s. *Victoria*, at Sydney, on June 12, as second and third operators respectively.

Mr. T. Dines terminated service on June 11.

Mr. C. H. Hart, who signed off s.s. *Kurow* on June 5, terminated service on June 19.

Mr. E. D. Nicholl, who joined operating staff at Wellington on June 4, signed on s.s. *Kaikorai*, at Dunedin, on June 5.

Mr. F. N. Davidson signed on s.s. *Waitomo*, at Auckland, on June 5.

Mr. T. G. McEwan, who signed off s.s. *Age*, at Sydney, on June 9, relieved Mr. V. P. Nevins on s.s. *Wairuna*, at Sydney, on June 14. Mr. Nevins proceeded on Home Port leave.

Mr. W. J. Washburne, who was relieved on s.s. *St. Albans* by Mr. T. Bannister, at Sydney, on June 15, proceeded on Home Port leave.

Messrs. C. E. Robinson and L. C. Coleman, who signed off s.s. *Victoria*, at Sydney on June 15, relieved Messrs. H. Taylor and R. G. C. Rob-

erts on s.s. *St. Albans*, as second and third operators respectively.

Mr. C. W. Drew signed on s.s. *Yankabilla*, at Sydney, on June 18.

Mr. E. Pollock signed on s.s. *Moreton Bay*, at London, on May 4, relieving Mr. J. Flynn, left ashore ill. Mr. Pollock terminated service at Sydney on June 19.

Messrs. F. C. Davies, O. S. Kelly and A. C. Jackson, Senior, 2nd and 3rd operators, respectively, signed off s.s. *Changsha*, at Sydney, on June 18.

Mr. A. B. Taylor, who relieved Mr. A. Stuart on s.s. *Wodonga*, at Brisbane, on June 16, terminated service and was relieved by Mr. O. S. Kelly, at Sydney, on June 18.

Mr. A. Stuart signed on s.s. *Macumba*, at Brisbane, on June 16.

Mr. J. M. Camps joined s.s. *Hexham*, at Newcastle, on June 20.

Mr. L. A. Paul joined s.s. *Chronos*, at Newcastle, on June 21.

Mr. H. E. Young returned from leave and relieved Mr. R. T. Murray on s.s. *Dimboola*, at Sydney, on June 19.

Mr. A. C. Hickey signed on s.s. *Dilga*, at Melbourne, on June 7.

Mr. C. J. Lilley terminated service and signed off s.s. *Dilga*, at Sydney, on June 6.

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